Kholmurod Egamberdiev

$2n+m,\ 5n+m$

THEORETICAL BASES OF CHEMICAL ALGORITHMS

Xolmurod Egamberdiev

$n=2\ ;\ m=-3$

KIMYOVIY ALGORITMLARNING NAZARIY ASOSLARI

$[3m+(m+7)]$

$[n+(m+3)]$

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TOSHKENT-1012

THE MINISTRY OF NATIONAL EDUCATION OF REPUBLIC OF UZBEKISTAN

THE SURKHAN-DARYA REGIONAL INSTITUTE OF IMPROVEMENT OF PROFESSIONAL SKILL AND RETRAINING OF PEDAGOGICAL PERSONNELS

Kholmurod Egamberdiev

THEORETICAL BASES OF CHEMICAL ALGORITHMS

(Scientific - methodical handbook)

TASHKENT - 2012

In the given handbook, the author seeks to introduce the concepts of "chemical algorithm", "index expressions", "sequence coefficient", "expressions of value coefficient" for the first time in organic chemistry. On the basis of these concepts some variants of the method of "chemical algorithms" are developed and the equations of combustion reaction of representatives of homologues of organic substances which enter into one of their classes are presented and expressed by the general formulas of equalizing by So of coefficients.

The law that **"in chemical reactions the quantity of weights of substances increases or decreases for one of consecutive changes"** has been proved. It draws attention of those who are interested in chemical science, a rule about «chemical algorithms» offered by the author. The book is intended for pupils of schools, students, teachers, and researchers of chemistry.

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PROSPECTS OF ALGORITHMIZATION OF CHEMICAL REACTIONS

After establishment of independence in our country considerable successes are reached in the field of development of chemical science and industry: Bukhara oil refining plant is placed in operation, the Fergana oil refining plant is reconstructed, the chemical complex «Shurtangazhimiya» is constructed, metallurgical combines in the cities of Zarafshan and Almalik are converted on the basis of new technologies, the Kungradsky plant (Karakalpakstan) which makes soda is constructed and placed in operation. Exportable production which answers completely to the world standards and is issued at the given enterprises, brings the considerable contribution to development of the industry of our country. Development of the chemical industry is closely connected with development of a chemical science. Preparation of leading personnel among rising generation, for the given branch is one of urgent problems.

According to the State national program of development of school education in 2004 - 2009 modern conditions are created for studying natural sciences at schools, academic lyceums and professional colleges. By today, almost all educational institutions of republic, educational institutions, and laboratories in chemistry, biology, and physics are equipped with necessary educational equipment, laboratory devices, and reactants corresponding to the world standards.

It proves once again that much attention is paid to this branch of science. The life proves necessity of advanced stage-by-stage chemical training for schools, academic lyceums, professional colleges, and higher educational institutions. Modern person regardless his/her work widely uses thousand kinds of natural, artificial and synthetic food, medicines, clothes and industrial goods.

The knowledge of a chemical compound and properties of these products for proper, expedient, economical use is necessary for every person. For this reason, it is important to train pupils from school more deeply with primary knowledge in chemistry. In this connection, «chemical algorithms» is worth for attention.

As the President of Uzbekistan Islam Abduganiyevich Karimov confirms, «All of us know well, what is the value of great openings of our compatriot Mohammed Muse Al Horezmi which were included in the branch of a science of concept algorithm, algebra, ten-character system of the account in universal development. Thus, he began the development of all exact sciences, as astronomy, a geodesy, geography, mathematics»[1].

The author in the given handbook tries to use concept "algorithm" as a concept «chemical algorithm». The first scientific works by the author devoted to "Chemical algorithms" as an article included into the collection of materials of the international conference on a theme «Actual problems of school chemical education » which passed from 28 April till 4 May 2008, in Tashkent in

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connection with the 42nd Mendeleev Olympiad. The added and reviewed data of scientific and methodical elaboration have been published on pages of newspapers: «The Teacher of Uzbekistan» (№ 41, on 10 October, 2008) on a theme: "The chemical phenomena and the equations", "Surkhan ziyosi" (№ 10-11, 2008) on a theme: "Use" of chemical algorithms" and generation of the equations of reaction of combustion of organic substances".

The primary goal of "modern" chemistry is to get above noted substance properties, acceleration of industrial production and creation of technology without waste. Use of energy of chemical changes is also the main task of modern chemistry. It is possible to name chemistry the unique industry of changes. It gives possibility to synthesize nonexistent materials in the nature of which details of various cars and devices are made; houses are built; national economic consumer goods are produced.

The synthetic rubber, plastic, artificial fibers, artificial fuel, paints, medical products and the biopolymers used in medicine successfully, and the important set for humanity of other "substances" are basic products of the chemical industry. Only from oil 20 thousand various organic substances are received, and from coal it is possible to receive even more. Now about 500 thousand (basically organic) substances are applied in the industry. In general, 97 % products used by mankind is process of the processed chemical manufactures.

All these testify that a modern science, i.e. the chemistry and industrial chemistry occupy all spheres of life and human activity.

According to data of science and scientific - popular literature, more than 100 organic substances are received in the artificial and synthetic way in laboratories of scientific - research institutes of the different countries of the world every day. According to some information their number has reached 38 million.

It is known that the first representative in the world - the Nobel Prize winner the Dutch physicist-chemist J.Van-Gogh is the founder of three basic areas of modern chemistry: kinetics, study of solutions and stereochemistry. In June, 1869 J.Van-Gogh sustained the first on a province of Southern Holland to the entrance examination in the higher polytechnic school Delfte. Already at that time, he represented well potential possibilities of chemistry. To the question of the examiner «Where can go an organic synthesis? », the 17-year-old graduate of high school answered: « To a cell ». Indeed, according to a prediction of the great scientist, now the big achievements in the field of modern organic chemistry give possibilities to study thoroughly the chemical processes occurring in a cell of live organisms. In unique laboratories of studying of a structure of a code of DNA at the end of the 20th century and the beginning of the 21st century and attainments in the field of cloning of living organisms are achievements of organic chemistry of last years, indeed. One of the important knowledge and concepts of organic chemistry is a generation of the equations of combustion of organic substances. Despite of from what stage the organic chemistry is studied, it is clear to learners that organic substances differ from inorganic substances with the property of burning.

In textbooks of schools, professional colleges, the academic lyceums, and higher educational institutions in organic chemistry data of physical and chemical properties of representatives of one of certain classes of organic connections are given. But data on the equations of burning reaction of organic substances in the published textbooks in chemistry for last years is resulted insufficiently. The general equations of burning reaction of representatives of homologues, organic substances entering into certain classes are given in these textbooks, and also the general equations of reaction of burning given in some magazines on chemistry and manuals complicate definition of coefficients a little.

For example, «Chemistry at school» (2008, № 11), the manual (G.P.Khomchenko), "Chemistry" for applying high schools (Publishing House «O'qituvchi», 2007) $C_nH_{2n+2}+(1.5n+0.5)O_2 \rightarrow nCO_2+(n+1)H_2O$ (427.) under editions of prof. Kuzmenko N.E. and Professor Terenina V. I.

« Chemistry -2005», «Entrance examinations of Moscow State University» (Publishing House. M, 2005.) $C_nH_{2n+1}CHO+(\frac{3n+2}{2})O_2 \rightarrow (n+1)CO_2+(n+1)H_2O$ (67), or O.S.Gabrielyan, etc. "Chemistry" 10th form textbook (M: "Drofa", 2005) $C_nH_{2n+2}+(\frac{3n+1}{2})O_2 \rightarrow nCO_2+(n+1)H_2O$ (74.) It is possible to consider that fractional numbers in these equations of burning reaction are difficult for defining in specification of coefficients. In scientific elaboration of the author «Chemical algorithms» reaction of combustion of the organic substances which entered into different classes, completely corresponds to mathematical laws.

It is proved in elaboration that generation of the equations of burning reactions of organic substances and equalizing them with the help of coefficients is based on exact mathematical laws.

In such way, there is not only «mathematical algorithms » in science, but also «chemical algorithms». The author introduces for the first time the concept of «chemical algorithm», "index-expressions", «sequence of coefficient» and «expressions of coefficient value» in organic chemistry.

The author names quantity of atoms of hydrogen of organic substances as «index - expression». The value of "index-expression" specifies number of hydrogen atoms as a part of any organic substance. Although it concerns any class of organic connections, it will be equal 2n, 2n+m, 2n-m. Then it is possible to consider, the equation of burning reaction of a molecule of organic substances in chemical algorithms in which structure quantity of atoms of hydrogen is expressed by "index-expression" repetitions. And for a product of burning reaction the coefficient value of carbonic gas CO_2 and water H_2O is obtained. Introducing the concepts of «sequence coefficient» the author specifies that weights of the substances are one of consecutive changes, which have entered reaction in a number of the equations with weights of substances which were formed, increase in reaction. It is also defined that in the ranks of the equations of burning reaction of organic substances which the structure of molecule includes atoms C, H or C, H, O, «the sequence coefficient» is equal (2n/n) or n5 (2). Despite the fact that, what class includes organic substance among the equations of reaction of burning of representatives of organic substances, with the same structure the coefficient value of oxygen O_2 increases or decreases on (3) units, and carbonic gas CO_2 and water H_2O on (2) units. The author also manages to find out that among representatives of homologue of organic substances in the equations of reaction of combustion if the sequence coefficient is equal $\frac{4n}{n}$ or (4) coefficient value with change of radical (CH_2). The coefficient value of oxygen proportionally increases on (6) units, including coefficient value CO_2 and H_2O considered as the basic products of reactions, increases or decreases on (4) units. The author on the basis of value (n) and (m) has developed «chemical algorithms» in different variants and has applied thus an algebraic method of positive and negative numerals.

For example, at saturated hydrocarbons if n=1, m=2, at aldehydes n=1, m=0, at the one-core carbon acids if n=1, m =-1 or at aldehydes and ketone acids if, n=2, m =-2. Such laws are proved on an example of other "chemical algorithms». As a conclusion, in elaboration of different variants of "chemical algorithms» it is possible to use the algebraic concepts effectively concerning to positive and negative numerals.

It is known, that at formic aldehyde $H-CHO$ and acetic acid $H-COOH$ value (CH_2) of a radical is equal to zero $^{(0)}$. In the given organic substances functional groups $-CHO$ and $-COOH$ are connected only with atoms of hydrogen. The author's elaborations of "chemical algorithms» confirm that the radical (CH_2) is equal to zero $^{(0)}$.

The author of scientific elaboration of "Chemical algorithms» continues the researches due to the classical law invented by the well-known Russian scientist M.V.Lomonosov **«the weight of the substances entering into chemical reaction, as a result of reaction is equal to the formed weights of substances»**. He specifies the relation of this law with law numbers of the equations of burning reaction by change and increase or reduction in certain sequence of quantity of weights of the given substances. That is, the author of the manual makes comments on his conclusions to a theme: « The mathematical analysis of chemical algorithms » as follows. In the ranks of the equations of burning reaction into which molecules of atoms of carbon enter, hydrogen or atoms of carbon, hydrogen and oxygen, the sequence coefficient is equal 2n/n, and the value of weight of initial organic substance proportionally raises or decreases on 28 a.w.u,[2] the basic participant of

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a.w.u. [2] – atom weight unit.

reaction of oxygen O_2 - on 96 a.w.u , and the basic products of reaction of carbonic gas CO_2 - on 88 a.w.u, and water H_2O - on 36 a.w.u. in the equations of burning reaction , the structure includes molecules of atoms of carbon, hydrogen, nitrogen or carbon, hydrogen, nitrogen and oxygen, sequence coefficient - 4n/n, the value of weight of initial organic substance proportionally raises or decreases on 56 a.w.u, weights of the basic participant of reaction of oxygen O_2 to the 192 a.w.u and weights of the basic products of reaction of carbonic gas CO_2 - on 176 a.w.u and water H_2O on 72 a.w.u. In the appendix 1 table of expressions of coefficient value for oxygen O_2, carbonic gas CO_2 and water H_2O also will help to understand that relation between values (n) and (m) changes in certain sequence. The presented tables of the value (n) and (m) of the first representative of "chemical algorithm" of homologues of the basic class of organic connections in the appendix 2, choosing coefficients on the basis of variants 11, 111 and 1V promotes composition of the equations of reaction and equalizing.

At present time the rapid development of the chemical industry in the country included in textbooks and concept manuals concerning «chemical algorithm», raises its role in development of a chemical science and in its training. In connection with applying concepts concerning «chemical algorithms» in textbooks of schools, the academic lyceums, the professional colleges or higher educational institutions, it becomes clear for those who study chemistry that chemical processes are based on exact mathematical laws.

«Chemical algorithms» are considered only as initial scientific elaborations in this direction of the author and therefore due to our assumptions they afford new possibilities for different directions of science (thermo-chemistry, biochemistry, chemistry of polymers, molecular biology and others) algorithmizations of chemical reactions. Besides that, the laws and rules concerning «chemical algorithms» developed by the author draw youth attention who studies chemical science with interest. We hope for it.

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THE BASIC CONCEPTS AND THE RULES OF «THE CHEMICAL ALGORITHMS »

It is well known that the role of mathematics as bases of fundamental natural scientific formation is very great. All fundamental disciplines use mathematical models and abstraction for the description of laws of the nature. In addition, with computer facilities development the increasing quantity of pure chemical disciplines gets applied important value for natural sciences.

The modern chemist should know about principles of construction of mathematical model and be able to use mathematical abstraction. It assumes high level of chemical culture, the strong knowledge based on the mathematical facts, and possibilities of independent perfection of the knowledge studying of new sections of mathematics. The knowledge can be required for the expert-chemist in the course of scientific researches or in its practical work. Profound studying of bases of natural-chemical sciences should be based on consideration of interrelation of the chemical phenomena and laws with others natural and applied sciences. Leading theoretical and world outlook ideas of chemistry from a school course to high school should be based on elaboration of special abilities of practical character. In practice, it is possible to apply the algorithmic approach widely at training of organic chemistry, at studying of the equations of reaction of burning of organic substances in oxygen.

The algorithm is sequence of precisely described operations which are carried out in a certain order. Thus it is necessary to change concept «mathematical algorithm» to concept «chemical algorithm».

«The chemical algorithm» is a performance in certain sequence of the ordinal mathematical decisions applied in formation of the equations of chemical reactions and putting down of equalizing coefficients.

At all performed operations by defining number of the hydrogen atoms which are a part of organic substances, «index - expression»s (2n, 2n+1, 2n+2, 2n-4, 2n-6, *2n+3, 2n+1, 2n+2, 2n-1,* etc.), are considered as the basic product of the equations of reaction of burning of carbonic gas CO_2 and water H_2O, also repeated for definition of coefficient value. Including organic connections which include atoms C, H or C, H, O in structure of molecules, if the number of hydrogen equals index-expression 2n in all reactions of the equations coefficient value of carbonic gas CO_2 and water H_2O will be equal 2n as well. Connections, in which the number of changed index - hydrogen expressions was (2n+2, 2n-2, 2n-4, 2n-6, 2n-8 etc.), carbonic gas CO_2 will be equal 2n, and the coefficient value of water H_2O will be proportional an index - expression, that is (2n+2, 2n-2, 2n-4, 2n-6, 2n-8 etc.).

Number of atoms of hydrogen of "index-expression" which (2n+3) in primary, secondary, tertiary amines, including containing atoms C, H, N, O of organic substances, is equal 2n+1 for nitroalkanes and amino acids $C_nH_{2n+1}NO_2$, amides acids $C_nH_{2n+1}NO$, hydroxy-amino acid $C_nH_{2n+1}NO_3$ and number of atoms of hydrogen of index-expression, which 2n+2, for diaminocarboxylic acids $C_nH_{2n+2}N_2O_2$, number of hydrogen of «index-expression» in which 2n-1 for aminodicarboxylic acids - $C_nH_{2n-1}NO_4$, the product of the equation of burning for carbonic gas CO_2 of coefficient value will be equal to quantity of carbon atoms of initial organic substance and multiplication of quantity of coefficient sequence, and coefficient value of water H_2O also are defined by a double parity. For example, 4n+6 (amines), 4n+2 (nitroalkanes, amino acids, amides acids, hydroxy-amino acids), 4n+4 (diaminocarbon acids), 4n-2 (aminodicarbon acids).

As a part of the molecules containing atoms C, H or C, H, O, it is possible to express any organic substances of reaction of burning of the equation of chemical algorithms in two ways. We will result the equations of reaction of burning of chemical algorithm where representatives of aromatic hydrocarbons enter:

$$\frac{2n}{n}C_nH_{2n-6} + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q$$

Or

$$2C_nH_{2n-6} + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q$$

Here, the meaning coefficient value $\frac{2n}{n}$ and (2), entering reactions, initial organic substance provides consecutive performance of algorithmic operations. If the representative of homologues, entering into one of certain organic substances, changes on radical (CH_2) then the meaning value of coefficient of oxygen proportionally changes on (3) units. For example, in reaction of the equation of burning of benzene C_6H_6 the value of coefficient of oxygen is equal 3n-3=3*[3]6-3=18-3=15, and in toluene C_7H_8 3n-3=3*7-3=21-3=18.

The equation of burning of organic substances in which structure of molecules includes atoms C, H, N or C, H, N, O, it is possible to show algorithm on an example nitroalkanes:

$$4n/nC_nH_{2n+1}NO_2 + (6n-3)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

Or

$$4C_nH_{2n+1}NO_2 + (6n-3)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

And in it, the meaning coefficient value $\frac{4n}{n}$ and (4), entering into a reaction initial organic substance provides consecutive performance of algorithmic operation. The representative entering into a certain class of organic substances of homologues, changes on radical (CH_2), and the meaning value of coefficient of oxygen proportionally changes on (6) units. For example, in the equation of

*[3] The multiplying sign is expressed by asterix.

burning of nitromethane CH_3NO_2 the oxygen coefficient is equal in reaction 6n-3=6*1-3=6-3=3, and in nitroethane $C_2H_5NO_2$ will be - 6n-3=6*2-3=12-3=9.

In general, indicating quality and quantity of organic substances expressed by the general formula which belongs to the class of organic connections of representatives of homologues of the equation of burning reaction in chemical algorithms of a molecule of organic substances in which structure quantity of atoms of hydrogen expressing repetition of «index - expression» for a product of reaction of burning of carbonic gas CO_2 and water H_2O the value coefficient is obtained. So, chemical algorithms are a monolithic system of knowledge in which structure includes following concepts and rules:

1. The magnitude, which shows number of atoms of the hydrogen, a part of any organic substance, is called as "index-expression".

2. The value of "index-expression" specifying number of hydrogen atoms as a part of any organic substance, despite the fact that, to what class of organic connections it concerns, will be 2n, 2n+m, 2n-m.

3. Value $\frac{2n}{n}$ or (2), $\frac{4n}{n}$ or (4), providing sequence of algorithmic operations, are coefficient value of initial organic substances and are called as consecutive coefficients of chemical algorithms.

4. If in the ranks of the equations of reaction of burning the sequence coefficient is equal $\frac{2n}{n}$ or (2), the value of the representative of homologues of organic substances will change on radical (CH_2). The coefficient value of the basic participant of reaction of oxygen proportionally increases or decreases for (3) units, and coefficient value of carbonic gas CO_2 and water H_2O, considered as the basic products of reactions, increases or decreases for (2) units.

5. In the ranks of the equations of reaction of burning if the sequence coefficient is equal $\frac{4n}{n}$ or (4), the value of representatives of homologues of organic substances will change on radical (CH_2). The coefficient value of the basic participant of reaction of oxygen proportionally increases or decreases for (6) units, and coefficient value of carbonic gas CO_2 and water H_2O, considered, the basic products of reactions, increases or decreases for (4) units.

6. In the ranks of the equations of reaction of burning if the coefficient of sequence of chemical algorithms is equal $\frac{2n}{n}$ or (2) value at the carbonic gas CO_2 considered as the basic product of reaction of burning, the value coefficient will be equal to quantity of carbon atoms of initial organic substance and multiplication of quantity of coefficient sequence. The coefficient value of water H_2O will be equal "index-expression » of initial organic substance.

7. In the ranks of the equations of reaction of burning if the coefficient sequence of chemical algorithms is equal $\frac{4n}{n}$ or (4) value at the carbonic gas CO_2 considered as the basic product of reaction of combustion, the value coefficient will be equal to quantity of carbon atoms of initial organic substance and multiplication of quantity of coefficient sequence. The coefficient value of water H_2O is equal "index-expression » of initial organic substance in a double parity.

Researches show that there are various forms of "chemical algorithm» and following general rules are expedient for them.

Among the equations of reaction of burning, one of the basic products of burning which is considered carbonic gas CO_2, the value coefficient will be equal quantity of carbon atoms of initial organic substance of the coefficient sequence increased by numbers. The coefficient value of water H_2O will be equal «index - expression» of initial organic substance, at nitric connections "index-expression » of initial organic substance in a double parity.

Firstly, chemical algorithms of the equation of burning reaction of representatives of homologues of saturated hydrocarbons are given in the handbook

SATURATED HYDROCARBONS

Saturated hydrocarbons are widespread in the nature. They are found not only in the pure state but also in the form of compound connections. Oil and gas are considered as a basic source. Many connections of representatives of these classes are found in plants. For example, normal heptane C_7H_{16} allocate from pine wood, eicosane $C_{20}H_{42}$ is found in parsley leaves, nonacosane $C_{29}H_{60}$ - in cabbage leaves. Knowing, that the general formula of representatives of homologues of saturated hydrocarbons is C_nH_{2*n+2}, it is possible to express their chemical algorithm as the equation of reaction of burning in following way:

$$\boxed{\frac{2n}{n}C_nH_{2n+2} + (3n+1)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}$$

It is possible to activate reactions of burning of methane using this algorithm.

Burning of methane CH_4 in oxygen:

1) $\frac{2*1}{1}C_1H_{2*1+2} + (3*1+1)O_2 \rightarrow (2*1)CO_2 + (2*1+2)H_2O$,

$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,

We define small coefficients reducing left and right parts of the equation:
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$.

Burning of ethane C_2H_6 in oxygen:

2) $\frac{2*2}{2}C_2H_{2*2+2} + (3*2+1)O_2 \rightarrow (2*2)CO_2 + (2*2+2)H_2O$

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$.

Burning of propane C_3H_8 in oxygen:

3) $\frac{2*3}{3}C_3H_{2*3+2} + (3*3+1)O_2 \rightarrow (2*3)CO_2 + (2*3+2)H_2O$,

$2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$,

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + Q$.

Burning of butane C_4H_{10} in oxygen:

4) $\frac{2*4}{4}C_4H_{2*4+2} + (3*4+1)O_2 \rightarrow (2*4)CO_2 + (2*4+2)H_2O$

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$.

Burning of pentane C_5H_{12} in oxygen:

5) $\frac{2*5}{5}C_5H_{2*5+2} + (3*5+1)O_2 \rightarrow (2*5)CO_2 + (2*5+2)H_2O$

$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$, Small coefficients are defined reducing left and right parts of the equation to identical number:

$$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O + Q$$

Burning of hexane C_6H_{14} in oxygen:

6) $$\frac{2*6}{6}C_6H_{2*6+2} + (3*6+1)O_2 \rightarrow (2*6)CO_2 + (2*6+2)H_2O$$,

$$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O + Q$$.

Burning of heptane C_7H_{16} in oxygen:

7) $$\frac{2*7}{7}C_7H_{2*7+2} + (3*7+1)O_2 \rightarrow (2*7)CO_2 + (2*7+2)H_2O$$,

$$2C_7H_{16} + 22O_2 \rightarrow 14CO_2 + 16H_2O + Q$$,

$$C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O + Q$$.

Burning of octane C_8H_{18} in oxygen:

8) $$\frac{2*8}{8}C_8H_{2*8+2} + (3*8+1)O_2 \rightarrow (2*8)CO_2 + (2*8+2)H_2O$$,

$$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O + Q$$.

Burning of nonane C_9H_{20} in oxygen:

9) $$\frac{2*9}{9}C_9H_{2*9+2} + (3*9+1)O_2 \rightarrow (2*9)CO_2 + (2*9+2)H_2O$$,

$$2C_9H_{20} + 28O_2 \rightarrow 18CO_2 + 20H_2O + Q$$,

$$C_9H_{20} + 14O_2 \rightarrow 9CO_2 + 10H_2O + Q$$.

Burning of decane $C_{10}H_{22}$ in oxygen:

10) $$\frac{2*10}{10}C_{10}H_{2*10+2} + (3*10+1)O_2 \rightarrow (2*10)CO_2 + (2*10+2)H_2O$$,

$$2C_{10}H_{22} + 31O_2 \rightarrow 20CO_2 + 22H_2O + Q$$.

In variant II of chemical algorithm of the representative for substance of oxygen O_2 - expressions of the value of coefficients $(2n+m)$, the basic participant of the equations of reaction of burning, the choice of coefficient use from (n) and (m) numbers is made and consecutive relation between them is shown. In this value (n) and (m) distinguishes on one unit or, if n=1, m=2 or, if n=5, m=6. So, proportional change of values (n) and (m) on unit (1) is observed.

The given chemical algorithm is expressed as followed:

$$\boxed{2C_nH_{2n+2} + (2n+m)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}.$$

Relation between values (n) and (m):

n=1;	m=2;	n=4;	m=5;	n=7;	m = 8;
n=2;	m=3;	n=5;	m=6;	n=8;	m = 9;
n=3;	m=4;	n=6;	m=7;	n=9;	m=10.

Examples of algorithmic tasks:

1) $2C_1H_{2*1+2} + (2*1+2)O_2 \rightarrow (2*1)CO_2 + (2*1+2)H_2O$,

$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2+2} + (2*2+3)O_2 \rightarrow (2*2)CO_2 + (2*2+2)H_2O$,

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$.

3) $2C_3H_{2*3+2} + (2*3+4)O_2 \rightarrow (2*3)CO_2 + (2*3+2)H_2O$,

$2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$,

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + Q$.

4) $2C_4H_{2*4+2} + (2*4+5)O_2 \rightarrow (2*4)CO_2 + (2*4+2)H_2O$,

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$.

5) $2C_5H_{2*5+2} + (2*5+6)O_2 \rightarrow (2*5)CO_2 + (2*5+2)H_2O$,

$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$,

$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O + Q$.

6) $2C_6H_{2*6+2} + (2*6+7)O_2 \rightarrow (2*6)CO_2 + (2*6+2)H_2O$,

$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O + Q$.

7) $2C_7H_{2*7+2}+(2*7+8)O_2 \rightarrow (2*7)CO_2+(2*7+2)H_2O$

$2C_7H_{16}+22O_2 \rightarrow 14CO_2+16H_2O+Q$

$C_7H_{16}+11O_2 \rightarrow 7CO_2+8H_2O+Q$

8) $2C_8H_{2*8+2}+(2*8+9)O_2 \rightarrow (2*8)CO_2+(2*8+2)H_2O$

$2C_8H_{18}+25O_2 \rightarrow 16CO_2+18H_2O+Q$

9) $2C_9H_{2*9+2}+(2*9+10)O_2 \rightarrow (2*9)CO_2+(2*9+2)H_2O$

$2C_9H_{20}+28O_2 \rightarrow 18CO_2+20H_2O+Q$

$C_9H_{20}+14O_2 \rightarrow 9CO_2+10H_2O+Q$

10) $2C_{10}H_{2*10+2}+(2*10+11)O_2 \rightarrow (2*10)CO_2+(2*10+2)H_2O$

$2C_{10}H_{22}+31O_2 \rightarrow 20CO_2+22H_2O+Q$

In variant III of chemical algorithms consecutive relation between values (n) and (m) definitions of coefficients for water H_2O, one of the basic products of the equation of reaction of burning is shown.

In this expression the defining coefficient value of water H_2O is shown in the form of $[n+(m+1)]$:

$$\boxed{2C_nH_{2n+2}+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+1)]H_2O+Q}$$

Relation between values (n) and (m):

n=1;	m=2;	n=4;	m=5;	n=7;	m = 8;
n=2;	m=3;	n=5;	m=6;	n=8;	m = 9;
n=3;	m=4;	n=6;	m=7;	n=9;	m=10.

Examples of algorithmic tasks:

1) $2C_1H_{2*1+2}+(2*1+2)O_2 \rightarrow (2*1)CO_2+[(1+(2+1)]H_2O$

$2CH_4+4O_2 \rightarrow 2CO_2+4H_2O$

$CH_4+2O_2 \rightarrow CO_2+2H_2O+Q$

2) $2C_2H_{2*2+2}+(2*2+3)O_2 \rightarrow (2*2)CO_2+[2+(3+1)]H_2O$

value (n) and (m) distinguishes on one unit or, if n=1, m=2 or, if n=5, m=6. So proportional change of values (n) and (m) on unit (1) is observed.

The given chemical algorithm is expressed as followed:

$$\boxed{2C_nH_{2n+2} + (2n+m)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}$$

Relation between values (n) and (m):

n=1;	m=2;	n=4;	m=5;	n=7;	m = 8;
n=2;	m=3;	n=5;	m=6;	n=8;	m = 9;
n=3;	m=4;	n=6;	m=7;	n=9;	m=10.

Examples of algorithmic tasks:

1) $2C_1H_{2*1+2} + (2*1+2)O_2 \rightarrow (2*1)CO_2 + (2*1+2)H_2O$,

$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2+2} + (2*2+3)O_2 \rightarrow (2*2)CO_2 + (2*2+2)H_2O$,

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$.

3) $2C_3H_{2*3+2} + (2*3+4)O_2 \rightarrow (2*3)CO_2 + (2*3+2)H_2O$,

$2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$,

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + Q$.

4) $2C_4H_{2*4+2} + (2*4+5)O_2 \rightarrow (2*4)CO_2 + (2*4+2)H_2O$,

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$.

5) $2C_5H_{2*5+2} + (2*5+6)O_2 \rightarrow (2*5)CO_2 + (2*5+2)H_2O$,

$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$,

$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O + Q$.

6) $2C_6H_{2*6+2} + (2*6+7)O_2 \rightarrow (2*6)CO_2 + (2*6+2)H_2O$,

$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O + Q$.

7) $2C_7H_{2*7+2} + (2*7+8)O_2 \rightarrow (2*7)CO_2 + (2*7+2)H_2O$,

$2C_7H_{16} + 22O_2 \rightarrow 14CO_2 + 16H_2O + Q$,

$C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O + Q$.

8) $2C_8H_{2*8+2} + (2*8+9)O_2 \rightarrow (2*8)CO_2 + (2*8+2)H_2O$

$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O + Q$.

9) $2C_9H_{2*9+2} + (2*9+10)O_2 \rightarrow (2*9)CO_2 + (2*9+2)H_2O$,

$2C_9H_{20} + 28O_2 \rightarrow 18CO_2 + 20H_2O + Q$,

$C_9H_{20} + 14O_2 \rightarrow 9CO_2 + 10H_2O + Q$.

10) $2C_{10}H_{2*10+2} + (2*10+11)O_2 \rightarrow (2*10)CO_2 + (2*10+2)H_2O$,

$2C_{10}H_{22} + 31O_2 \rightarrow 20CO_2 + 22H_2O + Q$.

In variant III of chemical algorithms consecutive relation between values (n) and (m) definitions of coefficients for water H_2O, one of the basic products of the equation of reaction of burning is shown.

In this expression the defining coefficient value of water H_2O is shown in the form of $[n+(m+1)]$:

$$\boxed{2C_nH_{2n+2} + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m+1)]H_2O + Q}$$

Relation between values (n) and (m):

n=1;	m=2;	n=4;	m=5;	n=7;	m = 8;
n=2;	m=3;	n=5;	m=6;	n=8;	m = 9;
n=3;	m=4;	n=6;	m=7;	n=9;	m=10.

Examples of algorithmic tasks:

1) $2C_1H_{2*1+2} + (2*1+2)O_2 \rightarrow (2*1)CO_2 + [(1+(2+1)]H_2O$,

$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2+2} + (2*2+3)O_2 \rightarrow (2*2)CO_2 + [2+(3+1)]H_2O$,

$$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$$

3) $$2C_3H_{2*3+2} + (2*3+4)O_2 \rightarrow (2*3)CO_2 + [3+(4+1)]H_2O$$,

$$2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$$,

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + Q$$.

4) $$2C_4H_{2*4+2} + (2*4+5)O_2 \rightarrow (2*4)CO_2 + [4+(5+1)]H_2O$$,

$$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$$.

5) $$2C_5H_{2*5+2} + (2*5+6)O_2 \rightarrow (2*5)CO_2 + [5+(6+1)]H_2O$$,

$$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$$,

$$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O + Q$$.

6) $$2C_6H_{2*6+2} + (2*6+7)O_2 \rightarrow (2*6)CO_2 + [6+(7+1)]\ H_2O$$,

$$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O + Q$$.

7) $$2C_7H_{2*7+2} + (2*7+8)O_2 \rightarrow (2*7)CO_2 + [7+(8+1)]H_2O$$,

$$2C_7H_{16} + 22O_2 \rightarrow 14CO_2 + 16H_2O + Q$$,

$$C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O + Q$$.

8) $$2C_8H_{2*8+2} + (2*8+9)O_2 \rightarrow (2*8)CO_2 + [8+(9+1)]H_2O$$,

$$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O + Q$$.

9) $$2C_9H_{2*9+2} + (2*9+10)O_2 \rightarrow (2*9)CO_2 + [9+(10+1)]H_2O$$,

$$2C_9H_{20} + 28O_2 \rightarrow 18CO_2 + 20H_2O + Q$$,

$$C_9H_{20} + 14O_2 \rightarrow 9CO_2 + 10H_2O + Q$$.

10) $$2C_{10}H_{2*10+2} + (2*10+11)O_2 \rightarrow (2*10)CO_2 + [10+(11+1)]H_2O$$,

$$2C_{10}H_{22} + 31O_2 \rightarrow 20CO_2 + 22H_2O + Q$$.

Let's write down variant IV of chemical algorithms in a kind of the following formula:

$$2C_nH_{2n+2} + (2n+m)O_2 \rightarrow [n+(m-1)]CO_2 + [n+(m+1)]H_2O$$

We express coefficient value for carbonic gas CO_2 - in one of the basic products of the equations of burning reaction $[n+(m-1)]$.

Relation between values (n) and (m):

n=1;	m=2;	n=4;	m=5;	n=7;	m = 8;
n=2;	m=3;	n=5;	m=6;	n=8;	m = 9;
n=3;	m=4;	n=6;	m=7;	n=9;	m=10.

Examples of algorithmic tasks:

1) $2C_1H_{2*1+2} + (2*1+2)O_2 \rightarrow [1+(2-1)]CO_2 + [(1+(2+1)]H_2O$,
$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$

2) $2C_2H_{2*2+2} + (2*2+3)O_2 \rightarrow [2+(3-1)]CO_2 + [2+(3+1)]H_2O$,
$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$

3) $2C_3H_{2*3+2} + (2*3+4)O_2 \rightarrow [3+(4-1)]CO_2 + [3+(4+1)]H_2O$

$2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + Q$

4) $2C_4H_{2*4+2} + (2*4+5)O_2 \rightarrow [4+(5-1)]CO_2 + [4+(5+1)]H_2O$,

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$

5) $2C_5H_{2*5+2} + (2*5+6)O_2 \rightarrow [5+(6-1)]CO_2 + [5+(6+1)]H_2O$,
$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$,

$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O + Q$

6) $2C_6H_{2*6+2} + (2*6+7)O_2 \rightarrow [6+(7-1)]CO_2 + [6+(7+1)]H_2O$,
$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O + Q$

7) $2C_7H_{2*7+2} + (2*7+8)O_2 \rightarrow [7+(8-1)]CO_2 + [7+(8+1)]H_2O$,
$2C_7H_{16} + 22O_2 \rightarrow 14CO_2 + 16H_2O + Q$,

$C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O + Q$

CYCLOPARAFFINS AND HYDROCARBONS OF ETHYLENE SERIES

Hydrocarbons of ethylene series or unsaturated hydrocarbons are the hydrocarbons which easily undergo reactions of connection. The general formula of hydrocarbons of ethylene series and cyclic molecules is C_nH_{2n}. The equation of reaction of combustion of chemical algorithms of representatives of cycloparaffins and hydrocarbons of ethylene series should have the following appearance:

$$\boxed{\frac{2n}{n}C_nH_{2n} + 3nO_2 \rightarrow 2nCO_2 + 2nH_2O + Q}$$

The equations of combustion reaction of ethane in oxygen: C_2H_4

1) $\frac{2*2}{2}C_2H_{2*2} + (3*2)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

Reducing left and right parts of equation to the same number, we define small coefficients:

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

The equation of burning reaction of propene in oxygen: C_3H_6

2) $\frac{2*3}{3}C_3H_{2*3} + (3*3)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

The equation of reaction of combustion of butene: C_4H_8

3) $\frac{2*4}{4}C_4H_{2*4} + (3*4)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

The equation of reaction of burning of pentene: C_5H_{10}

4) $$\frac{2*5}{5}C_5H_{2*5} + (3*5)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$$,

$$2C_5H_{10} + 15O_2 \rightarrow 10CO_2 + 10H_2O + Q$$

The equation of reaction of burning of hexene: C_6H_{12}

5) $$\frac{2*6}{6}C_6H_{2*6} + (3*6)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$$,

$$2\,C_6H_{12} + 18\,O_2 \rightarrow 12\,CO_2 + 12\,H_2O$$,

In this reaction small coefficients are defined.

$$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$$

The equation of reaction of burning of heptene;

6) $$\frac{2*7}{7}C_7H_{2*7} + (3*7)O_2 \rightarrow (2*7)CO_2 + (2*7)H_2O$$,

$$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$$

The equation of reaction of burning of octene: C_8H_{16}

7) $$\frac{2*8}{8}C_8H_{2*8} + (3*8)O_2 \rightarrow (2*8)CO_2 + (2*8)H_2O$$,

$$2C_8H_{16} + 24O_2 \rightarrow 16CO_2 + 16H_2O$$,

$$C_8H_{16} + 12O_2 \rightarrow 8CO_2 + 8H_2O + Q$$

The equation of reaction of burning of nonene: C_9H_{18}

8) $$\frac{2*9}{9}C_9H_{2*9} + (3*9)O_2 \rightarrow (2*9)CO_2 + (2*9)H_2O$$,

$$2C_9H_{18} + 27O_2 \rightarrow 18CO_2 + 18H_2O$$

In variant II of chemical algorithms for substance of oxygen O_2 - one of basic participants of the equations of reaction of burning from (n) and (m) values consecutive relation between participants of the equations of reaction of burning is shown by defining their coefficients. Variant II of chemical algorithm in the equation of burning reaction of representatives of homologues of the given class is expressed in a following kind:

$$\boxed{2C_nH_{2n} + (2n + m)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q}$$

Consecutive relation between values (n) and (m):

n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;
n=4; m=4; n=7; m=7:

In this expression the coefficient value of oxygen O_2 is expressed as $(2n + m)$, (n) and (m) values do not differ in any way or when n=2, m=2 or n=5 and m=5, i.e. the value between (n) and (m) do not change.

Examples of algorithmic tasks:

1) $2C_2H_{2*2} + (2*2+2)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3} + (2*3+3)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

3) $2C_4H_{2*4} + (2*4+4)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$

4) $2C_5H_{2*5} + (2*5+5)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10} + 15O_2 \rightarrow 10CO_2 + 10H_2O + Q$

5) $2C_6H_{2*6} + (2*6+6)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,

$2\ C_6H_{12} + 18\ O_2 \rightarrow 12\ CO_2 + 12\ H_2O$,

$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

6) $2C_7H_{2*7} + (2*7+7)O_2 \rightarrow (2*7)CO_2 + (2*7)H_2O$,

$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$

Expression of coefficient value of water H_2O $(n+m)$ is one of the basic products of the equations of reaction of combustion and variant III of chemical algorithms.

CYCLOPARAFFINS AND HYDROCARBONS OF ETHYLENE SERIES

Hydrocarbons of ethylene series or unsaturated hydrocarbons are the hydrocarbons which easily undergo reactions of connection. The general formula of hydrocarbons of ethylene series and cyclic molecules is C_nH_{2n}. The equation of reaction of combustion of chemical algorithms of representatives of cycloparaffins and hydrocarbons of ethylene series should have the following appearance:

$$\boxed{\frac{2n}{n}C_nH_{2n} + 3nO_2 \rightarrow 2nCO_2 + 2nH_2O + Q}$$

The equations of combustion reaction of ethane in oxygen: C_2H_4

1) $\frac{2*2}{2}C_2H_{2*2} + (3*2)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

Reducing left and right parts of equation to the same number, we define small coefficients:

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

The equation of burning reaction of propene in oxygen: C_3H_6

2) $\frac{2*3}{3}C_3H_{2*3} + (3*3)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

The equation of reaction of combustion of butene: C_4H_8

3) $\frac{2*4}{4}C_4H_{2*4} + (3*4)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

$$2C_nH_{2n} + (2n + m)O_2 \rightarrow 2nCO_2 + (n + m)H_2O + Q$$

The relation table between (n) and (m) values;

n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;
n=4; m=4; n=7; m=7:

Examples for algorithmic tasks:

1) $2C_2H_{2*2} + (2*2+2)O_2 \rightarrow (2*2)CO_2 + (2+2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

2) $2C_3H_{2*3} + (2*3+3)O_2 \rightarrow (2*3)CO_2 + (3+3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

3) $2C_4H_{2*4} + (2*4+4)O_2 \rightarrow (2*4)CO_2 + (4+4)H_2O$

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

4) $2C_5H_{2*5} + (2*5+5)O_2 \rightarrow (2*5)CO_2 + (5+5)H_2O$,

$2C_5H_{10} + 15O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

5) $2C_6H_{2*6} + (2*6+6)O_2 \rightarrow (2*6)CO_2 + (6+6)H_2O$,

$2C_6H_{12} + 18O_2 \rightarrow 12CO_2 + 12H_2O$,

$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

6) $2C_7H_{2*7} + (2*7+7)O_2 \rightarrow (2*7)CO_2 + (7+7)H_2O$,

$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$.

Variant IV of chemical algorithms:

$$2C_nH_{2n} + (2n + m)O_2 \rightarrow (n + m)CO_2 + (n + m)H_2O + Q$$

and expression of coefficient value at the carbonic gas CO_2 $(n+m)$, one of the products of the equations of reaction of burning.

CYCLOPARAFFINS AND HYDROCARBONS OF ETHYLENE SERIES

Hydrocarbons of ethylene series or unsaturated hydrocarbons are the hydrocarbons which easily undergo reactions of connection. The general formula of hydrocarbons of ethylene series and cyclic molecules is C_nH_{2n}. The equation of reaction of combustion of chemical algorithms of representatives of cycloparaffins and hydrocarbons of ethylene series should have the following appearance:

$$\frac{2n}{n} C_n H_{2n} + 3nO_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

The equations of combustion reaction of ethane in oxygen: C_2H_4

1) $\frac{2*2}{2} C_2 H_{2*2} + (3*2)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

Reducing left and right parts of equation to the same number, we define small coefficients:

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$

The equation of burning reaction of propene in oxygen: C_3H_6

2) $\frac{2*3}{3} C_3 H_{2*3} + (3*3)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

The equation of reaction of combustion of butene: C_4H_8

3) $\frac{2*4}{4} C_4 H_{2*4} + (3*4)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$

$$2C_nH_{2n} + (2n + m)O_2 \rightarrow 2nCO_2 + (n + m)H_2O + Q$$

The relation table between (n) and (m) values;

n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;
n=4; m=4; n=7; m=7:

Examples for algorithmic tasks:

1) $2C_2H_{2*2} + (2*2+2)O_2 \rightarrow (2*2)CO_2 + (2+2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3} + (2*3+3)O_2 \rightarrow (2*3)CO_2 + (3+3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

3) $2C_4H_{2*4} + (2*4+4)O_2 \rightarrow (2*4)CO_2 + (4+4)H_2O$

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$

4) $2C_5H_{2*5} + (2*5+5)O_2 \rightarrow (2*5)CO_2 + (5+5)H_2O$,

$2C_5H_{10} + 15O_2 \rightarrow 10CO_2 + 10H_2O + Q$

5) $2C_6H_{2*6} + (2*6+6)O_2 \rightarrow (2*6)CO_2 + (6+6)H_2O$,

$2C_6H_{12} + 18O_2 \rightarrow 12CO_2 + 12H_2O$,

$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

6) $2C_7H_{2*7} + (2*7+7)O_2 \rightarrow (2*7)CO_2 + (7+7)H_2O$,

$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$

Variant IV of chemical algorithms:

$$2C_nH_{2n} + (2n + m)O_2 \rightarrow (n + m)CO_2 + (n + m)H_2O + Q$$

and expression of coefficient value at the carbonic gas CO_2 $(n+m)$, one of the products of the equations of reaction of burning.

The relation table between values (n) and (m):

n=2;	m=2;	n=5;	m=5;
n=3;	m=3;	n=6;	m=6;
n=4;	m=4;	n=7;	m=7:

Examples for algorithmic tasks:

1) $2C_2H_{2*2} + (2*2+2)O_2 \rightarrow (2+2)CO_2 + (2+2)H_2O$,

$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3} + (2*3+3)O_2 \rightarrow (3+3)CO_2 + (3+3)H_2O$,

$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

3) $2C_4H_{2*4} + (2*4+4)O_2 \rightarrow (4+4)CO_2 + (4+4)H_2O$,

$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$

4) $2C_5H_{2*5} + (2*5+5)O_2 \rightarrow (5+5)CO_2 + (5+5)H_2O$,

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5) $2C_6H_{2*6} + (2*6+6)O_2 \rightarrow (6+6)CO_2 + (6+6)H_2O$,

$2C_6H_{12} + 18O_2 \rightarrow 12CO_2 + 12H_2O$,

$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$

6) $2C_7H_{2*7} + (2*7+7)O_2 \rightarrow (7+7)CO_2 + (7+7)H_2O$,

$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$

DIETHENOID AND ACETYLENE HYDROCARBONS

Diethenoid hydrocarbons are unsaturated hydrocarbon series which contain molecule double bonds and molecules of representatives of acetylene series contain triple bonds. But present general formula C_nH_{2n-2} is used for two classes of representatives of homologues.

Properties of typical representatives of diene and acetylene hydrocarbon series, such as ethyne, propyne, butyn, pentyne or butadien-1.3, pentadien-1.4, are widely studied in organic chemistry and used in the industry for the various purposes. For example, gas of an acetylene(ethyne)-oxygen mix is used for cutting and welding metals, and butadien-1.3 is considered the basic material for reception of synthetic rubbcr. We express the equation of combustion reaction of chemical algorithms, representatives of homologues of the given class in a following kind:

$$\boxed{\frac{2n}{n}C_nH_{2n-2}+(3n-1)O_2\rightarrow 2nCO_2+(2n-2)H_2O+Q}$$

We set up the reaction equation of ethyne: C_2H_2

1) $\frac{2*2}{2}C_2H_{2*2-2}+(3*2-1)O_2\rightarrow(2*2)CO_2+(2*2-2)H_2O$,

$2C_2H_2+5O_2\rightarrow 4CO_2+2H_2O+Q$

We set up the reaction equation of propyne: C_3H_2

2) $\frac{2*3}{3}C_3H_{2*3-2}+(3*3-1)O_2\rightarrow(2*3)CO_2+(2*3-2)H_2O$,

$2C_3H_4+8O_2\rightarrow 6CO_2+4H_2O$

In this reaction small coefficients are defined:
$C_3H_4+4O_2\rightarrow 3CO_2+2H_2O+Q$

We set up the reaction equation of butyn: C_4H_6

3) $\frac{2*4}{4}C_4H_{2*4-2}+(3*4-1)O_2\rightarrow(2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6+11O_2\rightarrow 8CO_2+6H_2O+Q$

We set up the reaction equation of pentyne: C_5H_8

4) $\frac{2*5}{5}C_5H_{2*5-2}+(3*5-1)O_2\rightarrow(2*5)CO_2+(2*5-2)H_2O$,

$2C_5H_8+14O_2\rightarrow 10CO_2+8H_2O$

$C_5H_8+7O_2\rightarrow 5CO_2+4H_2O+Q$

So the equation of reaction of burning of hexyne is defined: C_6H_{10}

5) $\frac{2*6}{6}C_6H_{2*6-2}+(3*6-1)O_2\rightarrow(2*6)CO_2+(2*6-2)H_2O$,

$2C_6H_{10}+17O_2\rightarrow 12CO_2+10H_2O+Q$

The relation table between values (n) and (m):

n=2;	m=2;	n=5;	m=5;
n=3;	m=3;	n=6;	m=6;
n=4;	m=4;	n=7;	m=7:

Examples for algorithmic tasks:

1) $2C_2H_{2*2}+(2*2+2)O_2 \rightarrow (2+2)CO_2+(2+2)H_2O$,

$2C_2H_4+6O_2 \rightarrow 4CO_2+4H_2O$

$C_2H_4+3O_2 \rightarrow 2CO_2+2H_2O+Q$

2) $2C_3H_{2*3}+(2*3+3)O_2 \rightarrow (3+3)CO_2+(3+3)H_2O$,

$2C_3H_6+9O_2 \rightarrow 6CO_2+6H_2O+Q$

3) $2C_4H_{2*4}+(2*4+4)O_2 \rightarrow (4+4)CO_2+(4+4)H_2O$,

$2C_4H_8+12O_2 \rightarrow 8CO_2+8H_2O$

$C_4H_8+6O_2 \rightarrow 4CO_2+4H_2O+Q$

4) $2C_5H_{2*5}+(2*5+5)O_2 \rightarrow (5+5)CO_2+(5+5)H_2O$,

$2C_5H_{10}+15O_2 \rightarrow 10CO_2+10H_2O+Q$

5) $2C_6H_{2*6}+(2*6+6)O_2 \rightarrow (6+6)CO_2+(6+6)H_2O$,

$2C_6H_{12}+18O_2 \rightarrow 12CO_2+12H_2O$

$C_6H_{12}+9O_2 \rightarrow 6CO_2+6H_2O+Q$

6) $2C_7H_{2*7}+(2*7+7)O_2 \rightarrow (7+7)CO_2+(7+7)H_2O$,

$2C_7H_{14}+21O_2 \rightarrow 14CO_2+14H_2O+Q$

DIETHENOID AND ACETYLENE HYDROCARBONS

Diethenoid hydrocarbons are unsaturated hydrocarbon series which contain molecule double bonds and molecules of representatives of acetylene series contain triple bonds. But present general formula C_nH_{2n-2} is used for two classes of representatives of homologues.

Properties of typical representatives of diene and acetylene hydrocarbon series, such as ethyne, propyne, butyn, pentyne or butadien-1.3, pentadien-1.4, are widely studied in organic chemistry and used in the industry for the various purposes. For example, gas of an acetylene(ethyne)-oxygen mix is used for cutting and welding metals, and butadien-1.3 is considered the basic material for reception of synthetic rubber. We express the equation of combustion reaction of chemical algorithms, representatives of homologues of the given class in a following kind:

$$\boxed{\frac{2n}{n}C_nH_{2n-2} + (3n-1)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q}$$

We set up the reaction equation of ethyne: C_2H_2

1) $\frac{2*2}{2}C_2H_{2*2-2} + (3*2-1)O_2 \rightarrow (2*2)CO_2 + (2*2-2)H_2O$,

$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$

We set up the reaction equation of propyne: C_2H_2

2) $\frac{2*3}{3}C_3H_{2*3-2} + (3*3-1)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,

$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$

In this reaction small coefficients are defined:
$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$

We set up the reaction equation of butyn: C_4H_6

3) $\frac{2*4}{4}C_4H_{2*4-2} + (3*4-1)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,

$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$

We set up the reaction equation of pentyne: C_5H_8

4) $\frac{2*5}{5}C_5H_{2*5-2} + (3*5-1)O_2 \rightarrow (2*5)CO_2 + (2*5-2)H_2O$,

$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$

$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$

So the equation of reaction of burning of hexyne is defined: C_6H_{10}

5) $\frac{2*6}{6}C_6H_{2*6-2} + (3*6-1)O_2 \rightarrow (2*6)CO_2 + (2*6-2)H_2O$,

$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$

Variant II of chemical algorithms of the equation of burning reaction of representatives of homologues of the given classes looks so:

$$2C_nH_{2n-2} + (2n + m)O_2 \rightarrow 2nCO_2 + (2n - 2)H_2O + Q$$

Consecutive relation between values (n) and (m) changes proportionally on unit(1), and expression value of coefficients of oxygen O_2 will be $(2n+m)$.

Relation between values (n) and (m) is resulted in the table:

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

Examples for algorithmic tasks:

1) $2C_2H_{2*2-2} + (2*2+1)O_2 \rightarrow (2*2)CO_2 + (2*2-2)H_2O$,
$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3-2} + (2*3+2)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$
$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$

3) $2C_4H_{2*4-2} + (2*4+3)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,
$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$

4) $2C_5H_{2*5-2} + (2*5+4)O_2 \rightarrow (2*5)CO_2 + (2*5-2)H_2O$,
$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$
$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$

5) $2C_6H_{2*6-2} + (2*6+5)O_2 \rightarrow (2*6)CO_2 + (2*6-2)H_2O$,
$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$

6) $2C_7H_{2*7-2} + (2*7+6)O_2 \rightarrow (2*7)CO_2 + (2*7-2)H_2O$,
$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O$
$C_7H_{12} + 10O_2 \rightarrow 7CO_2 + 6H_2O + Q$

Variant III of chemical algorithms of the equations of burning reaction of the representative of the classes is expressed

$$\boxed{2C_nH_{2n-2} + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m-1)]H_2O + Q}$$

Expression of coefficient value of water H_2O is equal to $[n+(m-1)]$.

The table values (n) and (m):

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

Examples for algorithmic tasks:

1) $2C_2H_{2*2-2} + (2*2+1)O_2 \rightarrow (2*2)CO_2 + [2+(1-1)]H_2O$,

$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3-2} + (2*3+2)O_2 \rightarrow (2*3)CO_2 + [3+(2-1)]H_2O$,

$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$,

$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$

3) $2C_4H_{2*4-2} + (2*4+3)O_2 \rightarrow (2*4)CO_2 + [4+(3-1)]H_2O$,

$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$

4) $2C_5H_{2*5-2} + (2*5+4)O_2 \rightarrow (2*5)CO_2 + [5+(4-1)]H_2O$,

$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$,

$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$

5) $2C_6H_{2*6-2} + (2*6+5)O_2 \rightarrow (2*6)CO_2 + [6+(5-1)]H_2O$,

$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$

6) $2C_7H_{2*7-2} + (2*7+6)O_2 \rightarrow (2*7)CO_2 + [7+(6-1)]H_2O$,

$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O + Q$,

$C_7H_{12} + 10O_2 \rightarrow 7CO_2 + 6H_2O + Q$

Expressing the coefficient value of carbonic gas CO_2 for variant IV in the form of $[n+(m+1)]$, we will represent the equation of burning reaction of representatives of homologues of diene and an acetylene hydrocarbon series as:

$$2C_nH_{2n-2} + (2n + m)O_2 \rightarrow 2nCO_2 + [n + (m - 1)]H_2O + Q$$

Expression of coefficient value of water H_2O is equal to $[n+(m-1)]$.

The table values (n) and (m):

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

Examples for algorithmic tasks:

1) $2C_2H_{2*2-2} + (2*2+1)O_2 \rightarrow (2*2)CO_2 + [2+(1-1)]H_2O$,

$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3-2} + (2*3+2)O_2 \rightarrow (2*3)CO_2 + [3+(2-1)]H_2O$,

$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$,

$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$

3) $2C_4H_{2*4-2} + (2*4+3)O_2 \rightarrow (2*4)CO_2 + [4+(3-1)]H_2O$,

$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$

4) $2C_5H_{2*5-2} + (2*5+4)O_2 \rightarrow (2*5)CO_2 + [5+(4-1)]H_2O$,

$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$,

$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$

5) $2C_6H_{2*6-2} + (2*6+5)O_2 \rightarrow (2*6)CO_2 + [6+(5-1)]H_2O$,

$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$

6) $2C_7H_{2*7-2} + (2*7+6)O_2 \rightarrow (2*7)CO_2 + [7+(6-1)]H_2O$,

$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O + Q$,

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Expressing the coefficient value of carbonic gas CO_2 for variant IV in the form of $[n+(m+1)]$, we will represent the equation of burning reaction of representatives of homologues of diene and an acetylene hydrocarbon series as:

$$2C_nH_{2n-2} + (2n + m)O_2 \rightarrow [n + (m + 1)]CO_2 + [n + (m - 1)]H_2O + Q$$

The table of values (n) and (m):

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

Examples for algorithmic tasks:

1) $2C_2H_{2*2-2} + (2*2 + 1)O_2 \rightarrow [2 + (1 + 1)]CO_2 + [2 + (1 - 1)]H_2O$,
$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$

2) $2C_3H_{2*3-2} + (2*3 + 2)O_2 \rightarrow [3 + (2 + 1)]CO_2 + [3 + (2 - 1)]H_2O$,
$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$

3) $2C_4H_{2*4-2} + (2*4 + 3)O_2 \rightarrow [4 + (3 + 1)]CO_2 + [4 + (3 - 1)]H_2O$,
$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$

4) $2C_5H_{2*5-2} + (2*5 + 4)O_2 \rightarrow [5 + (4 + 1)]CO_2 + [5 + (4 - 1)]H_2O$,
$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$,
$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$

5) $2C_6H_{2*6-2} + (2*6 + 5)O_2 \rightarrow [6 + (5 + 1)]CO_2 + [6 + (5 - 1)]H_2O$,
$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$

6) $2C_7H_{2*7-2} + (2*7 + 6)O_2 \rightarrow [7 + (6 + 1)]CO_2 + [7 + (6 - 1)]H_2O$,
$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O$,
$C_7H_{12} + 10O_2 \rightarrow 7CO_2 + 6H_2O + Q$

AROMATIC HYDROCARBONS

The general formula of representatives of homologues of aromatic hydrocarbons can be written in the form of C_nH_{2n-6}. Benzene is the simplest representative of aromatic hydrocarbons and its first homologue methyl benzene or toluene C_7H_8. Toluene doesn't contain isomers like other derivatives. The chemical algorithm of the equation of burning reaction of benzene and its derivatives are expressed so:

$$\frac{2n}{n} C_nH_{2n-6} + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q$$

The equation of burning reaction of benzene C_6H_6 is formulated as following:

1) $\frac{2*6}{6} C_6H_{2*6-6} + (3*6-3)O_2 \rightarrow (2*6)CO_2 + (2*6-6)H_2O$,

$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$

Toluene burning in oxygen: C_7H_8

2) $\frac{2*7}{7} C_7H_{2*7-6} + (3*7-3)O_2 \rightarrow (2*7)CO_2 + (2*7-6)H_2O$,

$2C_7H_8 + 18O_2 \rightarrow 14CO_2 + 8H_2O$,

Small coefficients are defined:

$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$

The equation of burning reactions of xylene (dimethylbenzene) C_7H_8 is generated so:

3) $\frac{2*8}{8} C_8H_{2*8-6} + (3*8-3)O_2 \rightarrow (2*8)CO_2 + (2*8-6)H_2O$,

$2C_8H_{10} + 21O_2 \rightarrow 16CO_2 + 10H_2O + Q$

Burning of trimethyl benzene C_9H_{12} in oxygen:

4) $\frac{2*9}{9} C_9H_{2*9-6} + (3*9-3)O_2 \rightarrow (2*9)CO_2 + (2*9-6)H_2O$,

$2C_9H_{12} + 24O_2 \rightarrow 18CO_2 + 12H_2O$,

Small coefficients are defined:

$C_9H_{12} + 12O_2 \rightarrow 9CO_2 + 6H_2O + Q$

We cite one more example:

5) $\frac{2*10}{10} C_{10}H_{2*10-6} + (3*10-3)O_2 \rightarrow (2*10)CO_2 + (2*10-6)H_2O$,

$2C_{10}H_{14} + 27\,O_2 \rightarrow 20\,CO_2 + 14\,H_2O + Q$

Variant II of chemical algorithms of the equation of burning reaction for aromatic hydrocarbons and its derivatives is expressed as followed:

$$\boxed{2C_nH_{2n-6} + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q}$$

Expression of coefficient value of oxygen O_2 $(2n+m)$ and consecutive relation values (n) and (m) is resulted in the following table.

The table values (n) and (m):

n=6;	m=3;	n=10;	m = 7;
n=7;	m=4;	n=11;	m = 8;
n=8;	m=5;	n=12;	m = 9;
n=9;	m=6;	n=13;	m=10;

Examples for algorithmic tasks:

1) $2C_6H_{2*6-6} + (2*6+3)O_2 \rightarrow (2*6)CO_2 + (2*6-6)H_2O$,

$2C_6H_6 + 15\,O_2 \rightarrow 12\,CO_2 + 6H_2O + Q$.

2) $2C_7H_{2*7-6} + (2*7+4)O_2 \rightarrow (2*7)CO_2 + (2*7-6)H_2O$,

$2C_7H_8 + 18\,O_2 \rightarrow 14\,CO_2 + 8H_2O$,

$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$.

3) $2C_8H_{2*8-6} + (2*8+5)O_2 \rightarrow (2*8)CO_2 + (2*8-6)H_2O$,

$2C_8H_{10} + 21\,O_2 \rightarrow 16\,CO_2 + 10\,H_2O + Q$.

4) $2C_9H_{2*9-6} + (2*9+6)O_2 \rightarrow (2*9)CO_2 + (2*9-6)H_2O$

$2C_9H_{12} + 24\,O_2 \rightarrow 18\,CO_2 + 12\,H_2O$,

$C_9H_{12} + 12\,O_2 \rightarrow 9CO_2 + 6H_2O + Q$.

5) $2C_{10}H_{2*10-6} + (2*10+7)O_2 \rightarrow (2*10)CO_2 + (2*10-6)H_2O$,

$$2C_{10}H_{14} + 27O_2 \rightarrow 20CO_2 + 14H_2O + Q.$$

Variant III of chemical algorithms of the equations of burning reaction of representatives of homologues of the given class is expressed so:

$$\boxed{2C_nH_{2n-6} + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m-3)]\ H_2O + Q}$$

The coefficient value of water H_2O is defined by expression: $[n+(m-3)]$

The table values (n) and (m):

n=6;	m=3;	n=10;	m = 7;
n=7;	m=4;	n=11;	m = 8;
n=8;	m=5;	n=12;	m = 9;
n=9;	m=6;	n=13;	m=10;

Examples for algorithmic tasks:

1) $2C_6H_{2*6-6} + (2*6+3)O_2 \rightarrow (2*6)CO_2 + [6+(3-3)]H_2O$,
$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$

2) $2C_7H_{2*7-6} + (2*7+4)O_2 \rightarrow (2*7)CO_2 + [7+(4-3)]H_2O$,
$2C_7H_8 + 18O_2 \rightarrow 14CO_2 + 8H_2O$,
$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$

3) $2C_8H_{2*8-6} + (2*8+5)O_2 \rightarrow (2*8)CO_2 + [8+(5-3)]H_2O$,
$2C_8H_{10} + 21O_2 \rightarrow 16CO_2 + 10H_2O + Q$

4) $2C_9H_{2*9-6} + (2*9+6)O_2 \rightarrow (2*9)CO_2 + [9+(6-3)]H_2O$,
$2C_9H_{12} + 24O_2 \rightarrow 18CO_2 + 12H_2O$,
$C_9H_{12} + 12O_2 \rightarrow 9CO_2 + 6H_2O + Q$

5) $2C_{10}H_{2*10-6} + (2*10+7)O_2 \rightarrow (2*10)CO_2 + [10+(7-3)]H_2O$,
$2C_{10}H_{14} + 27O_2 \rightarrow 20CO_2 + 14H_2O + Q$

If expression of coefficient value for carbonic gas CO_2 is written in this kind $[n+(m+3)]$ the equation of burning reaction and chemical algorithms for a variant IV of representatives of homologues of benzene and its derivatives looks as following:

$$2C_nH_{2n-6} + (2n+m)O_2 \rightarrow [n+(m+3)]CO_2 + [n+(m-3)]H_2O + Q$$

The table values (n) and (m):

n=6;	m=3;	n=10;	m = 7;
n=7;	m=4;	n=11;	m = 8;
n=8;	m=5;	n=12;	m = 9;
n=9;	m=6;	n=13;	m=10;

Examples for algorithmic tasks:

1) $2C_6H_{2*6-6} + (2*6+3)O_2 \rightarrow [6+(3+3)]CO_2 + [6+(3-3)]H_2O$,
$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$

2) $2C_7H_{2*7-6} + (2*7+4)O_2 \rightarrow [7+(4+3)]CO_2 + [7+(4-3)]H_2O$,
$2C_7H_8 + 18O_2 \rightarrow 14CO_2 + 8H_2O$
$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$

3) $2C_8H_{2*8-6} + (2*8+5)O_2 \rightarrow [8+(5+3)CO_2 + [8+(5-3)]H_2O$,
$2C_8H_{10} + 21O_2 \rightarrow 16CO_2 + 10H_2O + Q$

4) $2C_9H_{2*9-6} + (2*9+6)O_2 \rightarrow [9+(6+3)]CO_2 + [9+(6-3)]H_2O$,
$2C_9H_{12} + 24O_2 \rightarrow 18CO_2 + 12H_2O$
$C_9H_{12} + 12O_2 \rightarrow 9CO_2 + 6H_2O + Q$

5) $2C_{10}H_{2*10-6} + (2*10+7)O_2 \rightarrow [10+(7+3)]CO_2 + [10+(7-3)]H_2O$,
$2C_{10}H_{14} + 27O_2 \rightarrow 20CO_2 + 14H_2O + Q$

MONOHYDRIC ALCOHOLS AND SIMPLE ETHERS

Alcohols are hydrocarbonic derivatives, in which composition one or several atoms of the hydrogen replaced functional hydroxyl group - (OH). Depending on the number of groups of hydroxyls in their molecule composition they can be monohydric and polyhydric. Representatives of homologues of ethers and monohydric alcohols can be expressed as the following general formula: $C_nH_{2n+2}O$.

Chemical algorithms of the equations of burning reaction of representatives of homologues, ethers and monohydric alcohols are resulted below:

$$\boxed{\frac{2n}{n}C_nH_{2n+2}O + 3nO_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}$$

The equation of burning reaction of methanol: CH_3OH

1) $\frac{2*1}{1}C_1H_{2*1+2}O + (3*1)O_2 \rightarrow (2*1)CO_2 + (2*1+2)H_2O$,

$2C\,H_4O + 3O_2 \rightarrow 2CO_2 + 4H_2O + Q$

The equation of burning reaction of ethanol: C_2H_5OH

2) $\frac{2*2}{2}C_2H_{2*2+2}O + (3*2)O_2 \rightarrow (2*2)CO_2 + (2*2+2)H_2O$,

$2C_2H_6O + 6O_2 \rightarrow 4CO_2 + 6H_2O$,

$C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O + Q$.

The equation of burning reaction of propanol: C_3H_7OH

3) $\frac{2*3}{3}C_3H_{2*3+2}O + (3*3)O_2 \rightarrow (2*3)CO_2 + (2*3+2)H_2O$,

$2C_3H_8O + 9O_2 \rightarrow 6CO_2 + 8H_2O$.

Burning of butanol: C_4H_9OH

4) $\frac{2*4}{4}C_4H_{2*4+2}O + (3*4)O_2 \rightarrow (2*4)CO_2 + (2*4+2)H_2O$,

$2C_4H_{10}O + 12O_2 \rightarrow 8CO_2 + 10H_2O$,

Small coefficients are defined:

$C_4H_{10}O + 6O_2 \rightarrow 4CO_2 + 5H_2O + Q$.

Variant II of chemical algorithms of representatives of the present classes looks so:

$$\boxed{2C_nH_{2n+2}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}$$

Consecutive relation of values (n) and (m):

n=1;	m=1;	n=4;	m=4;
n=2;	m=2;	n=5;	m=5;
n=3;	m=3;	n=6;	m=6:

Expression of coefficient value for oxygen O_2 will be equal $(2n+m)$ and the value (n) also is equal (m). The values (n) and (m) or, n=1, m=1, or, n=5, m=5 do not differ in it.

The equation of burning reaction of methanol: CH_3OH

1) $2C_1H_{2*1+2}O+(2*1+1)O_2 \rightarrow (2*1)CO_2+(2*1+2)H_2O$,

$2C\ H_4O+3O_2 \rightarrow 2CO_2+4H_2O+Q$

The equation of burning reaction of ethanol: C_2H_5OH

2) $2C_2H_{2*2+2}O+(2*2+2)O_2 \rightarrow (2*2)CO_2+(2*2+2)H_2O$,

$2C_2H_6O+6O_2 \rightarrow 4CO_2+6H_2O$,

$C_2H_6O+3O_2 \rightarrow 2CO_2+3H_2O+Q$

The equation of burning reaction of propanol: C_3H_7OH

3) $2C_3H_{2*3+2}O+(2*3+3)O_2 \rightarrow (2*3)CO_2+(2*3+2)H_2O$,

$2C_3H_8O+9O_2 \rightarrow 6CO_2+8H_2O$

Burning of butanol: C_4H_9OH

4) $2C_4H_{2*4+2}O+(2*4+4)O_2 \rightarrow (2*4)CO_2+(2*4+2)H_2O$,

$2C_4H_{10}O+12O_2 \rightarrow 8CO_2+10H_2O$,

Small coefficients are defined:

$C_4H_{10}O+6O_2 \rightarrow 4CO_2+5H_2O+Q$

Variant III of chemical algorithm of representatives of the given classes and expression of coefficient value of water H_2O looks so: $[n+(m+2)]$

$$\boxed{2C_nH_{2n+2}O+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+2)]H_2O+Q}$$

Consecutive relation of values (n) and (m):

n=1;	m=1;	n=4;	m=4;
n=2;	m=2;	n=5;	m=5;
n=3;	m=3;	n=6;	m=6;

The equation of burning reaction of methanol: CH_3OH

1) $2C_1H_{2*1+2}O+(2*1+1)O_2 \rightarrow (2*1)CO_2+[1+(1+2)]H_2O$,

$2C\ H_4O+3O_2 \rightarrow 2CO_2+4H_2O+Q$

The equation of burning reaction of ethanol: C_2H_5OH

2) $2C_2H_{2*2+2}O+(2*2+2)O_2 \rightarrow (2*2)CO_2+[2+(2+2)]H_2O$,

$2C_2H_6O+6O_2 \rightarrow 4CO_2+6H_2O$,

$C_2H_6O+3O_2 \rightarrow 2CO_2+3H_2O+Q$

The equation of burning reaction of propanol: C_3H_7OH

3) $2C_3H_{2*3+2}O+(2*3+3)O_2 \rightarrow (2*3)CO_2+[3+(3+2)]H_2O$,

$2C_3H_8O+9O_2 \rightarrow 6CO_2+8H_2O+Q$

Combustion of butanol: C_4H_9OH

4) $2C_4H_{2*4+2}O+(2*4+4)O_2 \rightarrow (2*4)CO_2+[4+(4+2)]H_2O$,

$2C_4H_{10}O+12O_2 \rightarrow 8CO_2+10H_2O$

Small coefficients are defined:

$C_4H_{10}O+6O_2 \rightarrow 4CO_2+5H_2O+Q$

If in variant IV expression of coefficient value of one the basic products of reaction of carbonic gas CO_2 is given by $(n+m)$ expression of the equation of chemical algorithm looks so:

$$\boxed{2C_nH_{2n+2}O+(2n+m)O_2 \rightarrow (n+m)CO_2+[n+(m+2)]H_2O+Q}$$

Consecutive relation of values (n) and (m):

n=1;	m=1;	n=4;	m=4;
n=2;	m=2;	n=5;	m=5;
n=3;	m=3;	n=6;	m=6;

The equation of burning reaction of methanol: CH_3OH

1) $2C_1H_{2*1+2}O + (2*1+1)O_2 \rightarrow (1+1)CO_2 + [1+(1+2)]H_2O$,

$2CH_4O + 3O_2 \rightarrow 2CO_2 + 4H_2O + Q$

The equation of burning reaction of ethanol: C_2H_5OH

2) $2C_2H_{2*2+2}O + (2*2+2)O_2 \rightarrow (2+2)CO_2 + [2+(2+2)]H_2O$,

$2C_2H_6O + 6O_2 \rightarrow 4CO_2 + 6H_2O$

$C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O + Q$

The equation of burning reaction of propanol: C_3H_7OH

3) $2C_3H_{2*3+2}O + (2*3+3)O_2 \rightarrow (3+3)CO_2 + [3+(3+2)]H_2O$,

$2C_3H_8O + 9O_2 \rightarrow 6CO_2 + 8H_2O + Q$

Combustion of butanol: C_4H_9OH

4) $2C_4H_{2*4+2}O + (2*4+4)O_2 \rightarrow (4+4)CO_2 + [4+(4+2)]H_2O$,

$2C_4H_{10}O + 12O_2 \rightarrow 8CO_2 + 10H_2O$

Small coefficients are defined:

$C_4H_{10}O + 6O_2 \rightarrow 4CO_2 + 5H_2O + Q$

DIHYDRIC ALCOHOLS

Dihydric alcohols are called as glycols. The word "glycol" originates from Greek «glycos» - "sweet". Indeed, dihydric alcohols have sweet taste - the representative of organic connections which is widely used in different industries. It lowers temperature of freezing of water in combination with water; therefore it is used at manufacturing antifreezes freezing at low temperature. The general formula of representatives of homologues of this class looks so: $C_nH_{2\cdot n+2}O_2$, and the equation of burning reaction of chemical algorithm is expressed as:

$$\boxed{\frac{2n}{n}C_nH_{2n+2}O_2+(3n-1)O_2\rightarrow 2nCO_2+(2n+2)H_2O+Q}$$

Examples are presented:

Ethyleneglycol: $HO-CH_2-CH_2-OH \quad or \quad C_2H_6O_2$

1) $\frac{2*2}{2}C_2H_{2\cdot 2+2}O_2+(3*2-1)O_2\rightarrow(2*2)CO_2+(2*2+2)H_2O$,

$2C_2H_6O_2+5O_2\rightarrow 4CO_2+6H_2O+Q$

Trimethyleneglycol: $HO-CH_2-CH_2-CH_2-OH \quad or \quad C_3H_8O_2$

2) $\frac{2*3}{3}C_3H_{2\cdot 3+2}O_2+(3*3-1)O_2\rightarrow(2*3)CO_2+(2*3+2)H_2O$,

$2C_3H_8O_2+8O_2\rightarrow 6CO_2+8H_2O$

$C_3H_8O_2+4O_2\rightarrow 3CO_2+4H_2O+Q$

Tetramethyleneglycol: $HO-(CH_2)_4-OH \quad or \quad C_4H_{10}O_2$

3) $\frac{2*4}{4}C_4H_{2\cdot 4+2}O_2+(3*4-1)O_2\rightarrow(2*4)CO_2+(2*4+2)H_2O$,

$2C_4H_{10}O_2+11O_2\rightarrow 8CO_2+10H_2O+Q$

If expression of coefficient value of oxygen O_2, the basic participant of the equations of burning reaction is $(2n+m)$, variant II of chemical algorithm looks so:

$$\boxed{2C_nH_{2\cdot n+2}O_2+(2n+m)O_2\rightarrow 2nCO_2+(2n+2)H_2O+Q}$$

Consecutive relation between values (n) and (m):

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

It is obvious in the table, that the values (n) and (m) differ on unit (1), if n=2, m=1 or if n=5, m=4. In such order the relation between values (n) and (m) changes.

Examples are resulted:

Ethyleneglycol: $HO-CH_2-CH_2-OH$ *or* $C_2H_6O_2$

1) $2C_2H_{2*2+2}O_2+(2*2+1)O_2 \rightarrow (2*2)CO_2+(2*2+2)H_2O$,

$2C_2H_6O_2+5O_2 \rightarrow 4CO_2+6H_2O+Q$

Trimethyleneglycol: $HO-CH_2-CH_2-CH_2-OH$ *or* $C_3H_8O_2$

2) $2C_3H_{2*3+2}O_2+(2*3+2)O_2 \rightarrow (2*3)CO_2+(2*3+2)H_2O$,

$2C_3H_8O_2+8O_2 \rightarrow 6CO_2+8H_2O$

$C_3H_8O_2+4O_2 \rightarrow 3CO_2+4H_2O+Q$

Tetramethyleneglycol: $HO-(CH_2)_4-OH$ *or* $C_4H_{10}O_2$

3) $2C_4H_{2*4+2}O_2+(2*4+3)O_2 \rightarrow (2*4)CO_2+(2*4+2)H_2O$,

$2C_4H_{10}O_2+11O_2 \rightarrow 8CO_2+10H_2O+Q$

If expression of coefficient value of water H_2O is $[n+(m+3)]$ their variant III of chemical algorithm looks:

$$\boxed{2C_nH_{2n+2}O_2+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+3)]H_2O+Q}$$

Consecutive relation between values (n) and (m):

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

Examples are resulted:

Ethyleneglycol: $HO-CH_2-CH_2-OH$ *or* $C_2H_6O_2$

1) $2C_2H_{2*2+2}O_2+(2*2+1)O_2 \rightarrow (2*2)CO_2+[2+(1+3)]H_2O$,

$2C_2H_6O_2+5O_2 \rightarrow 4CO_2+6H_2O+Q$

Trimethyleneglycol: $HO-CH_2-CH_2-CH_2-OH$ *or* $C_3H_8O_2$

2) $2C_3H_{2*3+2}O_2+(2*3+2)O_2 \rightarrow (2*3)CO_2+[3+(2+3)]H_2O$,

$2C_3H_8O_2+8O_2 \rightarrow 6CO_2+8H_2O$

$C_3H_8O_2+4O_2 \rightarrow 3CO_2+4H_2O+Q$

Tetramethyleneglycol; $HO-(CH_2)_4-OH$ *or* $C_4H_{10}O_2$

3) $2C_4H_{2*4+2}O_2+(2*4+3)O_2 \rightarrow (2*4)CO_2+[4+(3+3)]H_2O$,

$$2C_4H_{10}O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + Q$$

If expression coefficient value of carbonic gas CO_2 $[n+(m+1)]$ the equation of burning reaction of chemical algorithm is made in a variant IV so:

$$\boxed{2C_nH_{2n+2}O_2 + (2n+m)O_2 \rightarrow [n+(m+1)]CO_2 + [n+(m+3)]H_2O + Q}$$

Consecutive communication between values (n) and (m):

n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;
n=4;	m=3;	n=7;	m=6;

Examples are resulted:

Ethyleneglycol: $HO-CH_2-CH_2-OH$ or $C_2H_6O_2$

1) $2C_2H_{2*2+2}O_2 + (2*2+1)O_2 \rightarrow [2+(1+1)]CO_2 + [2+(1+3)]H_2O$,

$2C_2H_6O_2 + 5O_2 \rightarrow 4CO_2 + 6H_2O + Q$

Trimethyleneglycol: $HO-CH_2-CH_2-CH_2-OH$ or $C_3H_8O_2$

2) $2C_3H_{2*3+2}O_2 + (2*3+2)O_2 \rightarrow [3+(2+1)]CO_2 + [3+(2+3)]H_2O$,

$2C_3H_8O_2 + 8O_2 \rightarrow 6CO_2 + 8H_2O$

$C_3H_8O_2 + 4O_2 \rightarrow 3CO_2 + 4H_2O + Q$

Tetramethyleneglycol; $HO-(CH_2)_4-OH$ or $C_4H_{10}O_2$

3) $2C_4H_{2*4+2}O_2 + (2*4+3)O_2 \rightarrow (4+(3+1)]CO_2 + [4+(3+3)]H_2O$,

$2C_4H_{10}O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + Q$

ALDEHYDES, KETONES AND UNSATURATED ALCOHOLS

Aldehydes, ketones, and unsaturated alcohols are also considered as the important classes of organic compounds. The general formula of representatives of homologues is $C_nH_{2n}O$. Concepts about physical and chemical properties of the form of aldehydes and acetaldehydes (ethyl aldehydes), representatives of the basic class of aldehydes are widely used in textbooks and manuals. Under the international nomenclature the name "aldehydes" is formed by suffix addition - «al» to the name of corresponding hydrocarbon. If the general formula of aldehydes is expressed $C_nH_{2n+1}CHO$, and if used general formula $C_nH_{2n}O$ for representatives of homologues of this class, then their chemical algorithm of the equations of burning reaction looks so:

$$\frac{2n}{n} C_nH_{2n}O + (3n-1)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

The equation of reaction of combustion of methanal: CH_2O

1) $\frac{2*1}{1} C_1H_{2*1}O + (3*1-1)O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,

$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$,

$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$.

Ethanal: C_2H_4O

2) $\frac{2*2}{2} C_2H_{2*2}O + (3*2-1)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

Propanal: C_3H_6O

3) $\frac{2*3}{3} C_3H_{2*3}O + (3*3-1)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$,

$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$.

Butanal: C_4H_8O

4) $\frac{2*4}{4} C_4H_{2*4}O + (3*4-1)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

Pentanal: $C_5H_{10}O$

5) $\frac{2*5}{5} C_5H_{2*5}O + (3*5-1)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$,

$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

The equation of burning reaction of hexanal: $C_6H_{12}O$

6) $\frac{2*6}{6} C_6H_{2*6}O + (3*6-1)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,

$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

If the general formula of homologues of the given class is $C_nH_{2n}O$, and expression of coefficient value of oxygen O_2 $(2n+m)$, for variant II of the equation of burning reaction is expediently used as the following chemical algorithm:

$$2C_nH_{2n}O + (2n + m)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

Consecutive relation between values (n) and (m):

n=1;	m=0;	n=5;	m=4;
n=2;	m=1;	n=6;	m=5;
n=3;	m=2;	n=7;	m=6;
n=4;	m=3;	n=8;	m=7;

Examples are resulted:

1) $2C_1H_{2*1}O + (2*1 + 0)O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,
$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$
$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$

2) $2C_2H_{2*2}O + (2*2 + 1)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$
$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

3) $2C_3H_{2*3}O + (2*3 + 2)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,
$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$
$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$

4) $2C_4H_{2*4}O + (2*4 + 3)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,
$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$

5) $2C_5H_{2*5}O + (2*5 + 4)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,
$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$
$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$

6) $2C_6H_{2*6}O + (2*6 + 5)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,
$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$

If expression of coefficient value of water H_2O is $[n+(m+1)]$ their variant III of chemical algorithm looks so:

$$2C_nH_{2n}O + (2n + m)O_2 \rightarrow 2nCO_2 + [n + (m + 1)]H_2O + Q$$

Consecutive relation between values (n) and (m):

n=1;	m=0;	n=5;	m=4;
n=2;	m=1;	n=6;	m=5;
n=3;	m=2;	n=7;	m=6;
n=4;	m=3;	n=8;	m=7;

Examples are resulted:

1) $2C_1H_{2*1}O + (2*1+0)O_2 \rightarrow (2*1)CO_2 + [1+(0+1)]H_2O$,

$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$

$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$

2) $2C_2H_{2*2}O + (2*2+1)O_2 \rightarrow (2*2)CO_2 + [2+(1+1)]H_2O$,

$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

3) $2C_3H_{2*3}O + (2*3+2)O_2 \rightarrow (2*3)CO_2 + [3+(2+1)]H_2O$,

$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$

$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$

4) $2C_4H_{2*4}O + (2*4+3)O_2 \rightarrow (2*4)CO_2 + [4+(3+1)]H_2O$,

$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$

5) $2C_5H_{2*5}O + (2*5+4)O_2 \rightarrow (2*5)CO_2 + [5+(4+1)]H_2O$,

$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$

$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$

6) $2C_6H_{2*6}O + (2*6+5)O_2 \rightarrow (2*6)CO_2 + [6+(5+1)]H_2O$,

$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$

If expression of coefficient value of the carbonic gas CO_2 $[n+(m+1)]$, their variant IV contains:

$$\boxed{2C_nH_{2n}O + (2n+m)O_2 \rightarrow [n+(m+1)]CO_2 + [n+(m+1)]H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=1;	m=0;	n=5;	m=4;
n=2;	m=1;	n=6;	m=5;
n=3;	m=2;	n=7;	m=6;
n=4;	m=3;	n=8;	m=7;

Examples are resulted:

1) $2C_1H_{2*1}O + (2*1 + 0)O_2 \rightarrow [1 + (0 + 1)]CO_2 + [1 + (0 + 1)]H_2O$,

$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$,

$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$

2) $2C_2H_{2*2}O + (2*2 + 1)O_2 \rightarrow [2 + (1 + 1)]CO_2 + [2 + (1 + 1)]H_2O$,

$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

3) $2C_3H_{2*3}O + (2*3 + 2)O_2 \rightarrow [3 + (2 + 1)]CO_2 + [3 + (2 + 1)]H_2O$,

$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$,

$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$

4) $2C_4H_{2*4}O + (2*4 + 3)O_2 \rightarrow [4 + (3 + 1)]CO_2 + [4 + (3 + 1)]H_2O$,

$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$

5) $2C_5H_{2*5}O + (2*5 + 4)O_2 \rightarrow [5 + (4 + 1)]CO_2 + [5 + (4 + 1)]H_2O$,

$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$,

$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$

6) $2C_6H_{2*6}O + (2*6 + 5)O_2 \rightarrow [6 + (5 + 1)]CO_2 + [6 + (5 + 1)]H_2O$,

$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$

THE MONOBASIC CARBOXYLIC ACIDS AND ESTERS

Carboxylic acids are called the complex organic compounds in which molecules contain one or several carboxyl groups $-COOH$, they are combined with a hydrocarbonic radical or an atom of hydrogen. They are also named butyric acids, as representatives of some carboxylic acids are received from the composition of oil at first. Its first representative - formic acid $H-COOH$ also is named so because it is received from a waste of formics. The second representative - the acetic acid CH_3-COOH is one of the first acids known to mankind. Since ancient times they are received from seasoned wine - from vinegar.

Formic, acetic, propionic, butyric, valeric, caproic, enanthic, palmitinic and stearic acids are considered as the basic representatives of the monobasic carboxylic acids. Carboxylic acids are widespread in the nature; they are used in the industry and in life for various purposes. The general formula of representatives of esters and monobasic carboxylic acids can be expressed as $C_nH_{2n}O_2$. Then their initial variant of chemical algorithms of the equation of burning reaction looks as follows:

$$\frac{2n}{n}C_nH_{2n}O_2 + (3n-2)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

The equation of burning reaction of formic acid:

1) $\frac{2*1}{1}C_1H_{2*1}O_2 + (3*1-2)O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,

$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

The equation of burning reaction of acetic acid:

2) $\frac{2*2}{2}C_2H_{2*2}O_2 + (3*2-2)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

The equation of burning reaction of propionic acids:

3) $\frac{2*3}{3}C_3H_{2*3}O_2 + (3*3-2)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

The equation of burning reaction of butyric acid:

4) $\frac{2*4}{4}C_4H_{2*4}O_2 + (3*4-2)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

The equation of burning reaction of valeric acids:

5) $\frac{2*5}{5}C_5H_{2*5}O_2 + (3*5-2)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

Expression of coefficient value of oxygen O_2, the basic participant of the equations, burning reaction of representatives of the given class looks $(2n+m)$, where variant II of their chemical algorithms:

$$2C_nH_{2n}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

Consecutive relation between values (n) and (m):

n=1;	m =-1;	n=5;	m=3;
n=2;	m = 0;	n=6;	m=4;
n=3;	m = 1;	n=7;	m=5;
n=4;	m = 2;	n=8;	m=6;

It is clear here that if n=1, m =-1 if n=2, m=0 or if n=4, m=2. In such order the difference changes between values (n) and (m).

Examples are resulted:

1) $2C_1H_{2*1}O_2 + [2*1 + (-1)]O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,

$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_2H_{2*2}O_2 + (2*2 + 0)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$

3) $2C_3H_{2*3}O_2 + (2*3 + 1)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$

4) $2C_4H_{2*4}O_2 + (2*4 + 2)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8O_2 + 10\,O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

5) $2C_5H_{2*5}O_2 + (2*5 + 3)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10}O_2 + 13\,O_2 \rightarrow 10\,CO_2 + 10\,H_2O + Q$

6) $2C_6H_{2*6}O_2 + (2*6 + 4)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,

$2C_6H_{12}O_2 + 16\,O_2 \rightarrow 12\,CO_2 + 12\,H_2O$,

$C_6H_{12}O_2 + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$

If expression of coefficient value of water H_2O in the form of $[n + (m + 2)]$ variant III of their chemical algorithms looks so:

$$2C_nH_{2n}O_2 + (2n + m)O_2 \rightarrow 2nCO_2 + [n + (m + 2)]H_2O + Q$$

Consecutive relation between values (n) and (m):

n=1;	m =-1;	n=5;	m=3;
n=2;	m = 0;	n=6;	m=4;
n=3;	m = 1;	n=7;	m=5;
n=4;	m = 2;	n=8;	m=6;

Examples are resulted:

1) $2C_1H_{2*1}O_2 + [2*1+(-1)]O_2 \rightarrow (2*1)CO_2 + [1+(-1+2)]H_2O$,

$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_2H_{2*2}O_2 + (2*2+0)O_2 \rightarrow (2*2)CO_2 + [2+(0+2)]H_2O$,

$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$

3) $2C_3H_{2*3}O_2 + (2*3+1)O_2 \rightarrow (2*3)CO_2 + [3+(1+2)]H_2O$,

$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$

4) $2C_4H_{2*4}O_2 + (2*4+2)O_2 \rightarrow (2*4)CO_2 + [4+(2+2)]H_2O$,

$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

5) $2C_5H_{2*5}O_2 + (2*5+3)O_2 \rightarrow (2*5)CO_2 + [5+(3+2)]H_2O$,

$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$

6) $2C_6H_{2*6}O_2 + (2*6+4)O_2 \rightarrow (2*6)CO_2 + [6+(4+2)]H_2O$,

$2C_6H_{12}O_2 + 16O_2 \rightarrow 12CO_2 + 12H_2O$,

$C_6H_{12}O_2 + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$

If expression of coefficient value of carbonic gas CO_2 $[n+(m+2)]$ variant IV of chemical algorithms of representatives of the given class looks so:

$$\boxed{2C_nH_{2n}O_2 + (2n+m)O_2 \rightarrow [n+(m+2)]CO_2 + [n+(m+2)]H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=1;	m =-1;	n=5;	m=3;
n=2;	m = 0;	n=6;	m=4;
n=3;	m = 1;	n=7;	m=5;
n=4;	m = 2;	n=8;	m=6

Examples are resulted:

1) $2C_1H_{2*1}O_2 + [2*1+(-1)]O_2 \rightarrow [1+(-1+2)]CO_2 + [1+(-1+2)]H_2O$,

$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_2H_{2*2}O_2 + (2*2+0)O_2 \rightarrow [2+(0+2)]CO_2 + [2+(0+2)]H_2O$,

$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$

3) $2C_3H_{2*3}O_2 + (2*3+1)O_2 \rightarrow [3+(1+2)]CO_2 + [3+(1+2)]H_2O$,

$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$

4) $2C_4H_{2*4}O_2 + (2*4+2)O_2 \rightarrow [4+(2+2)]CO_2 + [4+(2+2)]H_2O$,

$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

5) $2C_5H_{2*5}O_2 + (2*5+3)O_2 \rightarrow [5+(3+2)]CO_2 + [5+(3+2)]H_2O$,

$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$

6) $2C_6H_{2*6}O_2 + (2*6+4)O_2 \rightarrow [6+(4+2)]CO_2 + [6+(4+2)]H_2O$,

$2C_6H_{12}O_2 + 16O_2 \rightarrow 12CO_2 + 12H_2O$,

$C_6H_{12}O_2 + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$

THE UNSATURATED MONOBASIC CARBOXYLIC ACIDS, DIALDEHYDES AND DIKETONES

The organic compounds formed because of replacement of one atom of hydrogen in a radical of unsaturated hydrocarbons on carboxyl group $-COOH$ are called as the unsaturated monobasic carboxylic acids. Acrylic and meta-acrylic acids are typical representatives of classes of these organic substances. The general formula of representatives of the unsaturated monobasic carboxylic acids, dialdehydes and diketones are possible to express as $C_nH_{2n-2}O_2$ and the equations of burning reaction look so:

$$\frac{2n}{n}C_nH_{2n-2}O_2 + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q$$

Examples are resulted:

Acrylic acid: $C_3H_4O_2$

1) $\frac{2*3}{3}C_3H_{2*3-2}O_2 + (3*3-3)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,

$2C_3H_4O_2 + 6O_2 \rightarrow 6CO_2 + 4H_2O$,

$C_3H_4O_2 + 3O_2 \rightarrow 3CO_2 + 2H_2O + Q$

Meta-acrylic acid: $C_4H_6O_2$

2) $\frac{2*4}{4} C_4H_{2*4-2}O_2 + (3*4-3)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,

$2C_4H_6O_2 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$

Oleic acid: $C_{18}H_{34}O_2$

3) $\frac{2*18}{18} C_{18}H_{2*18-2}O_2 + (3*18-3)O_2 \rightarrow (2*18)CO_2 + (2*18-2)H_2O$,

$2C_{18}H_{34}O_2 + 51O_2 \rightarrow 36CO_2 + 34H_2O + Q$

Expression of coefficient value of oxygen O_2, the basic participant of the equations of burning reaction of representatives of the given class looks $(2n+m)$ variant II of their chemical algorithms will be:

$$\boxed{2C_nH_{2n-2}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=3;	m=0;	n = 7;	m=4;	----------	
n=4;	m=1;	n = 8;	m=5;	n=16;	m=13;
n=5;	m=2;	n = 9;	m=6;	n=17;	m=14;
n=6;	m=3;	n=10;	m=7;	n=18;	m=15;

It is visible here that if n=3, m=0 if n=4, m=1. The difference changes between values (n) and (m).

Examples are resulted:

Acrylic acid: $C_3H_4O_2$

1) $2C_3H_{2*3-2}O_2 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,

$2C_3H_4O_2 + 6O_2 \rightarrow 6CO_2 + 4H_2O$

$C_3H_4O_2 + 3O_2 \rightarrow 3CO_2 + 2H_2O + Q$

Meta-acrylic acid: $C_4H_6O_2$

2) $2C_4H_{2*4-2}O_2 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,

$2C_4H_6O_2 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$

Oleic acid: $C_{18}H_{34}O_2$

3) $2C_{18}H_{2*18-2}O_2 + (2*18+15)O_2 \rightarrow (2*18)CO_2 + (2*18-2)H_2O$,

$2C_{18}H_{34}O_2 + 51O_2 \rightarrow 36CO_2 + 34H_2O + Q$

If we will write expression of coefficient value of water H_2O in the form of $[n+(m+1)]$ their variant III of chemical algorithms looks so:

$$\boxed{2C_nH_{2n-2}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m+1)]H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=3;	m=0;	n = 7;	m=4;	----------	
n=4;	m=1;	n = 8;	m=5;	n=16;	m=13;
n=5;	m=2;	n = 9;	m=6;	n=17;	m=14;
n=6;	m=3;	n=10;	m=7;	n=18;	m=15;

Examples are resulted:

Acrylic acids: $C_3H_4O_2$

1) $2C_3H_{2*3-2}O_2 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + [3+(0+1)]H_2O$,

$2C_3H_4O_2 + 6O_2 \rightarrow 6CO_2 + 4H_2O$

$C_3H_4O_2 + 3O_2 \rightarrow 3CO_2 + 2H_2O + Q$

Meta-acrylic acid: $C_4H_6O_2$

2) $2C_4H_{2*4-2}O_2 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + [4+(1+1)]H_2O$,

$2C_4H_6O_2 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$

Oleic acid: $C_{18}H_{34}O_2$

3) $2C_{18}H_{2*18-2}O_2 + (2*18+15)O_2 \rightarrow (2*18)CO_2 + [18+(15+1)]H_2O$,

$2C_{18}H_{34}O_2 + 51O_2 \rightarrow 36CO_2 + 34H_2O + Q$

If expression of coefficient value of carbonic gas CO_2 in this kind $[n+(m+3)]$ variant IV of chemical algorithms of representatives of the given class looks so:

$$\boxed{2C_nH_{2n-2}O_2 + (2n+m)O_2 \rightarrow [n+(m+3)]CO_2 + [n+(m+1)]H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=3;	m=0;	n = 7;	m=4;	----------	
n=4;	m=1;	n = 8;	m=5;	n=16;	m=13;
n=5;	m=2;	n = 9;	m=6;	n=17;	m=14;
n=6;	m=3;	n=10;	m=7;	n=18;	m=15;

Examples are resulted:

Acrylic acid: $C_3H_4O_2$

1) $2C_3H_{2*3-2}O_2 + (2*3+0)O_2 \rightarrow [3+(0+3)]CO_2 + [3+(0+1)]H_2O$,

$2C_3H_4O_2 + 6O_2 \rightarrow 6CO_2 + 4H_2O$,

$C_3H_4O_2 + 3O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

Meta-acrylic acid: $C_4H_6O_2$

2) $2C_4H_{2*4-2}O_2 + (2*4+1)O_2 \rightarrow [4+(1+3)]CO_2 + [4+(1+1)]H_2O$,

$2C_4H_6O_2 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

Oleic acid: $C_{18}H_{34}O_2$

3) $2C_{18}H_{2*18-2}O_2 + (2*18+15)O_2 \rightarrow [18+(15+3)]CO_2 + [18+(15+1)]H_2O$,

$2C_{18}H_{34} - O_2 + 51O_2 \rightarrow 36CO_2 + 34H_2O + Q$.

MORE UNSATURATED CARBOXYLIC ACIDS

Representatives of homologues of this class are found in organism of animals and cells of plants. The general formula looks $C_nH_{2n-4}O_2$, and the chemical algorithm of the equations of burning reaction is expressed by the equation:

$$\boxed{\frac{2n}{n}C_nH_{2n-4}O_2 + (3n-4)O_2 \rightarrow 2nCO_2 + (2n-4)H_2O + Q}$$

Examples are resulted:

1) $\frac{2*4}{4}C_4H_{2*4-4}O_2+(3*4-4)O_2\rightarrow(2*4)CO_2+(2*4-4)H_2O$,

$2C_4H_4O_2+8O_2\rightarrow 8CO_2+4H_2O$,

$C_4H_4O_2+4O_2\rightarrow 4CO_2+2H_2O+Q$.

2) $\frac{2*5}{5}C_5H_{2*5-4}O_2+(3*5-4)O_2\rightarrow(2*5)CO_2+(2*5-4)H_2O$,

$2C_5H_6O_2+11O_2\rightarrow 10CO_2+6H_2O+Q$.

3) $\frac{2*6}{6}C_6H_{2*6-4}O_2+(3*6-4)O_2\rightarrow(2*6)CO_2+(2*6-4)H_2O$,

$2C_6H_8O_2+14O_2\rightarrow 12CO_2+8H_2O$,

$C_6H_8O_2+7O_2\rightarrow 6CO_2+4H_2O+Q$.

4) $\frac{2*7}{7}C_7H_{2*7-4}O_2+(3*7-4)O_2\rightarrow(2*7)CO_2+(2*7-4)H_2O$,

$2C_7H_{10}O_2+17O_2\rightarrow 14CO_2+10H_2O+Q$.

5) $\frac{2*18}{18}C_{18}H_{2*18-4}O_2+(3*18-4)O_2\rightarrow(2*18)CO_2+(2*18-4)H_2O$,

$2C_{18}H_{32}O_2+50O_2\rightarrow 36CO_2+32H_2O$,

$C_{18}H_{32}O_2+25O_2\rightarrow 18CO_2+16H_2O+Q$.

Expression of coefficient value of oxygen O_2 - the basic participant of the equations, we will write (2n + m) to reaction of burning of representatives of homologues of the given class, and the equation of chemical algorithm of variant II looks:

$$\boxed{2C_nH_{2n-4}O_2+(2n+m)O_2\rightarrow 2nCO_2+(2n-4)H_2O+Q}$$

Consecutive relation between values (n) and (m):

n=4;	m=0;	n =7;	m=3;	n=10;	m = 6;
n=5;	m=1;	n =8;	m=4;	n =---;	m =-;
n=6;	m=2;	n =9;	m=5;	n=18;	m=14;

It is shown in the table, if n=4, m=0 or if n=18, m=14. Thus, the values (n) and (m) in representatives of homologues of the given class proportionally distinguish on unit (4).

Examples are resulted:

1) $2C_4H_{2*4-4}O_2+(2*4+0)O_2\rightarrow(2*4)CO_2+(2*4-4)H_2O$,

$$2C_4H_4O_2 + 8O_2 \rightarrow 8CO_2 + 4H_2O$$,

$$C_4H_4O_2 + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$$.

2) $2C_5H_{2*5-4}O_2 + (2*5+1)O_2 \rightarrow (2*5)CO_2 + (2*5-4)H_2O$,
$2C_5H_6O_2 + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$

3) $2C_6H_{2*6-4}O_2 + (2*6+2)O_2 \rightarrow (2*6)CO_2 + (2*6-4)H_2O$,
$2C_6H_8O_2 + 14O_2 \rightarrow 12CO_2 + 8H_2O$,
$C_6H_8O_2 + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2*7-4}O_2 + (2*7+3)O_2 \rightarrow (2*7)CO_2 + (2*7-4)H_2O$,
$2C_7H_{10}O_2 + 17O_2 \rightarrow 14CO_2 + 10H_2O + Q$.

5) $2C_{18}H_{2*18-4}O_2 + (2*18+14)O_2 \rightarrow (2*18)CO_2 + (2*18-4)H_2O$,
$2C_{18}H_{32}O_2 + 50O_2 \rightarrow 36CO_2 + 32H_2O$,
$C_{18}H_{32}O_2 + 25O_2 \rightarrow 18CO_2 + 16H_2O + Q$.

Expression of coefficient value of water H_2O $(n+m)$ and variant III o chemical algorithm.

$$\boxed{2C_nH_{2n-4}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + (n+m)H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=4;	m=0;	n=7;	m=3;	n=10;	m = 6;
n=5;	m=1;	n=8;	m=4;	n =-;	m =-;
n=6;	m=2;	n=9;	m=5;	n=18;	m=14;

Examples are resulted:

1) $2C_4H_{2*4-4}O_2 + (2*4+0)O_2 \rightarrow (2*4)CO_2 + (4+0)H_2O$,
$2C_4H_4O_2 + 8O_2 \rightarrow 8CO_2 + 4H_2O$,
$C_4H_4O_2 + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_5H_{2*5-4}O_2 + (2*5+1)O_2 \rightarrow (2*5)CO_2 + (5+1)H_2O$,
$2C_5H_6O_2 + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2*6-4}O_2 + (2*6+2)O_2 \rightarrow (2*6)CO_2 + (6+2)H_2O$,
$2C_6H_8O_2 + 14O_2 \rightarrow 12CO_2 + 8H_2O$,

$$C_6H_8O_2 + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$$

4) $2C_7H_{2*7-4}O_2 + (2*7+3)O_2 \rightarrow (2*7)CO_2 + (7+3)H_2O$,

$$2C_7H_{10}O_2 + 17O_2 \rightarrow 14CO_2 + 10H_2O + Q$$

5) $2C_{18}H_{2*18-4}O_2 + (2*18+14)O_2 \rightarrow (2*18)CO_2 + (18+14)H_2O$,

$$2C_{18}H_{32}O_2 + 50O_2 \rightarrow 36CO_2 + 32H_2O$$,

$$C_{18}H_{32}O_2 + 25O_2 \rightarrow 18CO_2 + 16H_2O + Q$$

Expression of coefficient value of the carbonic gas CO_2, one of the basic products of reaction $[n+(m+4)]$ in variant 1V of chemical algorithm.

$$\boxed{2C_nH_{2n-4}O_2 + (2n+m)O_2 \rightarrow [n+(m+4)]CO_2 + (n+m)H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=4;	m=0;	n=7;	m=3;	n=10;	m = 6;
n=5;	m=1;	n=8;	m=4;	n =-;	m =-;
n=6;	m=2;	n=9;	m=5;	n=18;	m=14;

Examples are resulted:

1) $2C_4H_{2*4-4}O_2 + (2*4+0)O_2 \rightarrow [4+(0+4)]CO_2 + (4+0)H_2O$,

$$2C_4H_4O_2 + 8O_2 \rightarrow 8CO_2 + 4H_2O$$,

$$C_4H_4O_2 + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$$

2) $2C_5H_{2*5-4}O_2 + (2*5+1)O_2 \rightarrow [5+(1+4)]CO_2 + (5+1)H_2O$,

$$2C_5H_6O_2 + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$$

3) $2C_6H_{2*6-4}O_2 + (2*6+2)O_2 \rightarrow [6+(2+4)]CO_2 + (6+2)H_2O$,

$$2C_6H_8O_2 + 14O_2 \rightarrow 12CO_2 + 8H_2O$$,

$$C_6H_8O_2 + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$$

4) $2C_7H_{2*7-4}O_2 + (2*7+3)O_2 \rightarrow [7+(3+4)]CO_2 + (7+3)H_2O$,

$$2C_7H_{10}O_2 + 17O_2 \rightarrow 14CO_2 + 10H_2O + Q$$

5) $2C_{18}H_{2*18-4}O_2 + (2*18+14)O_2 \rightarrow [18+(14+4)]CO_2 + (18+14)H_2O$,

$$2C_{18}H_{32}O_2 + 50O_2 \rightarrow 36CO_2 + 32H_2O$$,

$$C_{18}H_{32}O_2 + 25O_2 \rightarrow 18CO_2 + 16H_2O + Q$$

BIBASIC CARBOXYLIC ACIDS

The basic representative of the bibasic carboxylic acids is oxalic acid $HOOC-COOH$, is found in plants in the form of salt. Malonic acid $HOOC-CH_2-COOH$ is segregated from turnip juice. At first it is received from acetic acid with a synthesis method.

The general formula of the bibasic carboxylic acids looks $C_nH_{2n-2}O_4$, and we will express chemical algorithm of the equations of reaction of burning as:

$$\boxed{\frac{2n}{n}C_nH_{2n-2}O_4+(3n-5)O_2\rightarrow 2nCO_2+(2n-2)H_2O+Q}$$

Oxalic acid: $HOOC-COOH$ or $C_2H_2O_4$

1) $\frac{2*2}{2}C_2H_{2*2-2}O_4+(3*2-5)O_2\rightarrow(2*2)CO_2+(2*2-2)H_2O$,

$2C_2H_2O_4+O_2\rightarrow 4CO_2+2H_2O+Q$

Malonic acid: $HOOC-CH_2-COOH$ or $C_3H_4O_4$

2) $\frac{2*3}{3}C_3H_{2*3-2}O_4+(3*3-5)O_2\rightarrow(2*3)CO_2+(2*3-2)H_2O$,

$2C_3H_4O_4+4O_2\rightarrow 6CO_2+4H_2O$

$C_3H_4O_4+2O_2\rightarrow 3CO_2+2H_2O+Q$

Amber acid: $HOOC-(CH_2)_2-COOH$ or $C_4H_6O_4$

3) $\frac{2*4}{4}C_4H_{2*4-2}O_4+(3*4-5)O_2\rightarrow(2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6O_4+7O_2\rightarrow 8CO_2+6H_2O+Q$

Glutaric acid; $HOOC-(CH_2)_3-COOH$ or $C_5H_8O_4$

4) $\frac{2*5}{5}C_5H_{2*5-2}O_4+(3*5-5)O_2\rightarrow(2*5)CO_2+(2*5-2)H_2O$,

$2C_5H_8O_4+10O_2\rightarrow 10CO_2+8H_2O$

$C_5H_8O_4+5O_2\rightarrow 5CO_2+4H_2O+Q$

Adipinic acid: $HOOC-(CH_2)_4-COOH$ or $C_6H_{10}O_4$

5) $\frac{2*6}{6}C_6H_{2*6-2}O_4+(3*6-5)O_2\rightarrow(2*6)CO_2+(2*6-2)H_2O$,

$2C_6H_{10}O_4+13O_2\rightarrow 12CO_2+10H_2O+Q$

Sebacic acid: $HOOC-(CH_2)_8-COOH$ or $C_{10}H_{18}O_4$

6) $\frac{2*10}{10}C_{10}H_{2*10-2}O_4+(3*10-5)O_2\rightarrow(2*10)CO_2+(2*10-2)H_2O$,

$2C_{10}H_{18}O_4+25O_2\rightarrow 20CO_2+18H_2O+Q$

Expression of coefficient value of oxygen O_2, - the basic participant of the equations of burning reaction of representatives of homologues of the given class will be presented as $(2n+m)$, and the equation of chemical algorithm of variant II is expressed as followed:

$$\boxed{2C_nH_{2n-2}O_4+(2n+m)O_2\rightarrow 2nCO_2+(2n-2)H_2O+Q}$$

Consecutive relation between values (n) and (m):

n=2; m =-3;	n=5; m=0;	n = 8; m=3;
n=3; m =-2;	n=6; m=1;	n = 9; m=4;
n=4; m =-1;	n=7; m=2;	n=10; m=5;

It is visible in the table, that if n=2, m =-3 or if, n=5, m=0. So, the values (n) and (m) in representatives of homologues of this class change proportionally on unit (5).

Examples are resulted:

Oxalic acid: $HOOC-COOH$ or $C_2H_2O_4$

1) $2C_2H_{2*2-2}O_4+[(2*2+(-3)]O_2\rightarrow(2*2)CO_2+(2*2-2)H_2O$,

$2C_2H_2O_4+O_2\rightarrow 4CO_2+2H_2O+Q$

Malonic acid: $HOOC-CH_2-COOH$ or $C_3H_4O_4$

2) $2C_3H_{2*3-2}O_4+[(2*3+(-2)]O_2\rightarrow(2*3)CO_2+(2*3-2)H_2O$,

$2C_3H_4O_4+4O_2\rightarrow 6CO_2+4H_2O$

$C_3H_4O_4+2O_2\rightarrow 3CO_2+2H_2O+Q$

Amber acid: $HOOC-(CH_2)_2-COOH$ or $C_4H_6O_4$

3) $2C_4H_{2*4-2}O_4+[(2*4+(-1)]O_2\rightarrow(2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6O_4+7O_2\rightarrow 8CO_2+6H_2O+Q$

Glutaric acid: $HOOC-(CH_2)_3-COOH$ or $C_5H_8O_4$

4) $2C_5H_{2*5-2}O_4+(2*5+0)O_2\rightarrow(2*5)CO_2+(2*5-2)H_2O$,

$2C_5H_8O_4+10O_2\rightarrow 10CO_2+8H_2O$

$C_5H_8O_4 + 5O_2 \to 5CO_2 + 4H_2O + Q$

Adipinic acid: $HOOC-(CH_2)_4-COOH$ or $C_6H_{10}O_4$

5) $2C_6H_{2*6-2}O_4 + (2*6+1)O_2 \to (2*6)CO_2 + (2*6-2)H_2O$

$2C_6H_{10}O_4 + 13O_2 \to 12CO_2 + 10H_2O + Q$

Sebacic acid: $HOOC-(CH_2)_8-COOH$ or $C_{10}H_{18}O_4$

6) $2C_{10}H_{2*10-2}O_4 + (2*10+5)O_2 \to (2*10)CO_2 + (2*10-2)H_2O$,

$2C_{10}H_{18}O_4 + 25O_2 \to 20CO_2 + 18H_2O + Q$

Expression of coefficient value of water H_2O, one of the basic product of the equation of burning reaction of representatives of homologues of the given class is replaced as $[n+(m+3)]$, and we will express variant III of chemical algorithm by equation:

$$2C_nH_{2n-2}O_4 + (2n+m)O_2 \to 2nCO_2 + [n+(m+3)]H_2O + Q$$

Consecutive relation between values (n) and (m):

n=2; m =-3;	n=5; m=0;	n = 8; m=3;
n=3; m =-2;	n=6; m=1;	n = 9; m=4;
n=4; m =-1;	n=7; m=2;	n=10; m=5;

Examples are resulted:

Oxalic acid: $HOOC-COOH$ or $C_2H_2O_4$

1) $2C_2H_{2*2-2}O_4 + [2*2+(-3)]O_2 \to (2*2)CO_2 + [2+(-3+3)]H_2O$,

$2C_2H_2O_4 + O_2 \to 4CO_2 + 2H_2O + Q$

Malonic acid: $HOOC-CH_2-COOH$ or $C_3H_4O_4$

2) $2C_3H_{2*3-2}O_4 + [2*3+(-2)]O_2 \to (2*3)CO_2 + [3+(-2+3)]H_2O$

$2C_3H_4O_4 + 4O_2 \to 6CO_2 + 4H_2O$,

$C_3H_4O_4 + 2O_2 \to 3CO_2 + 2H_2O + Q$

Amber acid: $HOOC-(CH_2)_2-COOH$ or $C_4H_6O_4$

3) $2C_4H_{2*4-2}O_4 + [2*4+(-1)]O_2 \to (2*4)CO_2 + [4+(-1+3)]H_2O$,

$2C_4H_6O_4 + 7O_2 \to 8CO_2 + 6H_2O + Q$

Glutaric acid: $HOOC-(CH_2)_3-COOH$ or $C_5H_8O_4$

4) $2C_5H_{2*5-2}O_4 + (2*5+0)O_2 \rightarrow (2*5)CO_2 + [5+(0+3)]H_2O$,

$2C_5H_8O_4 + 10O_2 \rightarrow 10CO_2 + 8H_2O$

$C_5H_8O_4 + 5O_2 \rightarrow 5CO_2 + 4H_2O + Q$

Adipinic acid: $HOOC-(CH_2)_4-COOH$ or $C_6H_{10}O_4$

5) $2C_6H_{2*6-2}O_4 + (2*6+1)O_2 \rightarrow (2*6)CO_2 + [6+(1+3)]H_2O$,

$2C_6H_{10}O_4 + 13O_2 \rightarrow 12CO_2 + 10H_2O + Q$

Sebacic acid: $HOOC-(CH_2)_8-COOH$ or $C_{10}H_{18}O_4$

6) $2C_{10}H_{2*10-2}O_4 + (2*10+5)O_2 \rightarrow (2*10)CO_2 + [10+(5+3)]H_2O$,

$2C_{10}H_{18}O_4 + 25O_2 \rightarrow 20CO_2 + 18H_2O + Q$

If expression of coefficient value of carbonic gas CO_2 in this kind $[n+(m+5)]$ IV variant of chemical algorithms of representatives of the given class looks as followed:

$$2C_nH_{2n-2}O_4 + (2n+m)O_2 \rightarrow [n+(m+5)]CO_2 + [n+(m+3)]H_2O + Q$$

Consecutive relation between values (n) and (m):

n=2;	m =-3;	n=5;	m=0;	n = 8;	m=3;
n=3;	m =-2;	n=6;	m=1;	n = 9;	m=4;
n=4;	m =-1;	n=7;	m=2;	n=10;	m=5;

Examples are resulted:

Oxalic acid: $HOOC-COOH$ or $C_2H_2O_4$

1) $2C_2H_{2*2-2}O_4 + [2*2+(-3)]O_2 \rightarrow [2+(-3+5)]CO_2 + [2+(-3+3)]H_2O$,

$2C_2H_2O_4 + O_2 \rightarrow 4CO_2 + 2H_2O + Q$

Malonic acid: $HOOC-CH_2-COOH$ or $C_3H_4O_4$

2) $2C_3H_{2*3-2}O_4 + [2*3+(-2)]O_2 \rightarrow [3+(-2+5)]CO_2 + [3+(-2+3)]H_2O$,

$2C_3H_4O_4 + 4O_2 \rightarrow 6CO_2 + 4H_2O$

$C_3H_4O_4 + 2O_2 \rightarrow 3CO_2 + 2H_2O + Q$

Amber acid: $HOOC-(CH_2)_2-COOH$ or $C_4H_6O_4$

3) $2C_4H_{2*4-2}O_4 + [2*4+(-1)]O_2 \rightarrow [4+(-1+5)]CO_2 + [4+(-1+3)]H_2O$,

$2C_4H_6O_4 + 7O_2 \rightarrow 8CO_2 + 6H_2O + Q$

Glutaric acid: $HOOC-(CH_2)_3-COOH$ or $C_5H_8O_4$

4) $2C_5H_{2*5-2}O_4+(2*5+0)O_2 \rightarrow [5+(0+5)]CO_2+[5+(0+3)]H_2O$,

$2C_5H_8O_4+10O_2 \rightarrow 10CO_2+8H_2O$

$C_5H_8O_4+5O_2 \rightarrow 5CO_2+4H_2O+Q$

Adipinic acid: $HOOC-(CH_2)_4-COOH$ or $C_6H_{10}O_4$

5) $2C_6H_{2*6-2}O_4+(2*6+1)O_2 \rightarrow [6+(1+5)]CO_2+[6+(1+3)]H_2O$,

$2C_6H_{10}O_4+13O_2 \rightarrow 12CO_2+10H_2O+Q$

Sebacic acid: $HOOC-(CH_2)_8-COOH$ or $C_{10}H_{18}O_4$

6) $2C_{10}H_{2*10-2}O_4+(2*10+5)O_2 \rightarrow [10+(5+5)]CO_2+[10+(5+3)]H_2O$,

$2C_{10}H_{18}O_4+25O_2 \rightarrow 20CO_2+18H_2O+Q$

UNSATURATED BIBASIC ACIDS

The compounds formed replacing two hydrogen atoms of unsaturated hydrocarbons in two groups of carboxyl $-COOH$, are called as the bibasic unsaturated (dicarboxylic) acids.

(R) Radicals in dicarboxylic acids can be the residua of hydrocarbons of ethylene and acetylene bonds. The general formula of representatives homologues of bibasic unsaturated carboxylic acids $C_nH_{2n-4}O_4$, chemical algorithm of the equations of reaction of burning is expressed:

$$\frac{2n}{n}C_nH_{2n-4}O_4+(3n-6)O_2 \rightarrow 2nCO_2+(2n-4)H_2O+Q$$

Examples are resulted:

1) $\frac{2*4}{4}C_4H_{2*4-4}O_4+(3*4-6)O_2 \rightarrow (2*4)CO_2+(2*4-4)H_2O$,

$2C_4H_4O_4+6O_2 \rightarrow 8CO_2+4H_2O$

$C_4H_4O_4+3O_2 \rightarrow 4CO_2+2H_2O+Q$

2) $\frac{2*5}{5}C_5H_{2*5-4}O_4+(3*5-6)O_2 \rightarrow (2*5)CO_2+(2*5-4)H_2O$,

$2C_5H_6O_4+9O_2 \rightarrow 10CO_2+6H_2O+Q$

3) $\frac{2*6}{6}C_6H_{2*6-4}O_4+(3*6-6)O_2 \rightarrow (2*6)CO_2+(2*6-4)H_2O$,

$2C_6H_8O_4+12O_2 \rightarrow 12CO_2+8H_2O$,

$C_6H_8O_4+6O_2 \rightarrow 6CO_2+4H_2O+Q$

4) $\frac{2*7}{7}C_7H_{2*7-4}O_4+(3*7-6)O_2 \rightarrow (2*7)CO_2+(2*7-4)H_2O$,

$2C_7H_{10}O_4+15O_2 \rightarrow 14CO_2+10H_2O+Q$

5) $\frac{2*8}{8}C_8H_{2*8-4}O_4+(3*8-6)O_2 \rightarrow (2*8)CO_2+(2*8-4)H_2O$,

$2C_8H_{12}O_4+18O_2 \rightarrow 16CO_2+12H_2O$,

$C_8H_{12}O_4+9O_2 \rightarrow 8CO_2+6H_2O+Q$

6) $\frac{2*9}{9}C_9H_{2*9-4}O_4+(3*9-6)O_2 \rightarrow (2*9)CO_2+(2*9-4)H_2O$,

$2C_9H_{14}O_4+21O_2 \rightarrow 18CO_2+14H_2O+Q$

Expression of coefficient value of oxygen O_2 - the basic participant of the equation of burning reaction of representatives of the given class $(2n+m)$, and the equation of chemical algorithm of variant II is expressed:

$$\boxed{2C_nH_{2n-4}O_4+(2n+m)O_2 \rightarrow 2nCO_2+(2n-4)H_2O+Q}$$

Consecutive relation between values (n) and (m);

n=4;	m =-2;	n=7;	m=1;
n=5;	m =-1;	n=8;	m=2;
n=6;	m = 0;	n=9;	m=3;

It is evident in the table, that if n=4, m =-2 or if n=6, m=0. So, the values (n) and (m) in representatives of homologues of this class change proportionally on unit (6).

Examples are resulted.

1) $2C_4H_{2*4-4}O_4+[2*4+(-2)]O_2 \rightarrow (2*4)CO_2+(2*4-4)H_2O$,

$2C_4H_4O_4+6O_2 \rightarrow 8CO_2+4H_2O$,

$C_4H_4O_4+3O_2 \rightarrow 4CO_2+2H_2O+Q$

2) $2C_5H_{2*5-4}O_4+[2*5+(-1)]O_2 \rightarrow (2*5)CO_2+(2*5-4)H_2O$,

$2C_5H_6O_4+9O_2 \rightarrow 10CO_2+6H_2O+Q$

3) $2C_6H_{2*6-4}O_4+(2*6+0)O_2 \rightarrow (2*6)CO_2+(2*6-4)H_2O$,

$2C_6H_8O_4+12O_2 \rightarrow 12CO_2+8H_2O$

$C_6H_8O_4+6O_2 \rightarrow 6CO_2+4H_2O+Q$

4) $2C_7H_{2*7-4}O_4+(2*7+1)O_2 \rightarrow (2*7)CO_2+(2*7-4)H_2O$,

$2C_7H_{10}O_4+15O_2 \rightarrow 14CO_2+10H_2O+Q$

5) $2C_8H_{2*8-4}O_4+(2*8+2)O_2 \rightarrow (2*8)CO_2+(2*8-4)H_2O$,

$2C_8H_{12}O_4+18O_2 \rightarrow 16CO_2+12H_2O$

$C_8H_{12}O_4+9O_2 \rightarrow 8CO_2+6H_2O+Q$

6) $2C_9H_{2*9-4}O_4+(2*9+3)O_2 \rightarrow (2*9)CO_2+(2*9-4)H_2O$,

$2C_9H_{14}O_4+21O_2 \rightarrow 18CO_2+14H_2O+Q$

Expression of coefficient value of water H_2O - one of the basic products of the equations of burning reaction of representatives of homologues of the given class will be written in the form of $[n+(m+2)]$, and variant III of chemical algorithm we will express as:

$$2C_nH_{2n-4}O_4+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+2)]H_2O+Q$$

Consecutive relation between values (n) and (m):

n=4; m=-2; n=7; m=1;
n=5; m=-1; n=8; m=2;
n=6; m=0; n=9; m=3;

Examples are resulted.

1) $2C_4H_{2*4-4}O_4+[2*4+(-2)]O_2 \rightarrow (2*4)CO_2+[4+(-2+2)]H_2O$,

$2C_4H_4O_4+6O_2 \rightarrow 8CO_2+4H_2O$

$C_4H_4O_4+3O_2 \rightarrow 4CO_2+2H_2O+Q$

2) $2C_5H_{2*5-4}O_4+[2*5+(-1)]O_2 \rightarrow (2*5)CO_2+[5+(-1+2)]H_2O$,

$2C_5H_6O_4+9O_2 \rightarrow 10CO_2+6H_2O+Q$

3) $2C_6H_{2\cdot 6-4}O_4 + (2*6+0)O_2 \to (2*6)CO_2 + [6+(0+2)]H_2O$,

$2C_6H_8O_4 + 12O_2 \to 12CO_2 + 8H_2O$,

$C_6H_8O_4 + 6O_2 \to 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2\cdot 7-4}O_4 + (2*7+1)O_2 \to (2*7)CO_2 + [7+(1+2)]H_2O$,

$2C_7H_{10}O_4 + 15O_2 \to 14CO_2 + 10H_2O + Q$.

5) $2C_8H_{2\cdot 8-4}O_4 + (2*8+2)O_2 \to (2*8)CO_2 + [8+(2+2)]H_2O$,

$2C_8H_{12}O_4 + 18O_2 \to 16CO_2 + 12H_2O$,

$C_8H_{12}O_4 + 9O_2 \to 8CO_2 + 6H_2O + Q$.

6) $2C_9H_{2\cdot 9-4}O_4 + (2*9+3)O_2 \to (2*9)CO_2 + [9+(3+2)]H_2O$,

$2C_9H_{14}O_4 + 21O_2 \to 18CO_2 + 14H_2O + Q$.

If expression of coefficient value of carbonic gas CO_2 looks $[n+(m+6)]$ variant IV of chemical algorithms of representatives of the given class looks so:

$$2C_nH_{2\cdot n-4}O_4 + (2n+m)O_2 \to [n+(m+6)]CO_2 + [n+(m+2)]H_2O + Q$$

Consecutive relation between values (n) and (m):

n=4; m =-2; n=7; m=1;
n=5; m =-1; n=8; m=2;
n=6; m = 0; n=9; m=3;

Examples are resulted:

1) $2C_4H_{2\cdot 4-4}O_4 + [2*4+(-2)]O_2 \to [4+(-2+6)]CO_2 + [4+(-2+2)]H_2O$,

$2C_4H_4O_4 + 6O_2 \to 8CO_2 + 4H_2O$,

$C_4H_4O_4 + 3O_2 \to 4CO_2 + 2H_2O + Q$.

2) $2C_5H_{2\cdot 5-4}O_4 + [2*5+(-1)]O_2 \to [5+(-1+6)]CO_2 + [5+(-1+2)]H_2O$,

$2C_5H_6O_4 + 9O_2 \to 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2\cdot 6-4}O_4 + (2*6+0)O_2 \to [6+(0+6)]CO_2 + [6+(0+2)]H_2O$,

$2C_6H_8O_4 + 12O_2 \to 12CO_2 + 8H_2O$,

$C_6H_8O_4 + 6O_2 \to 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2\cdot 7-4}O_4 + (2*7+1)O_2 \to [7+(1+6)]CO_2 + [7+(1+2)]H_2O$,

$$2C_7H_{10}O_4 + 15O_2 \rightarrow 14CO_2 + 10H_2O + Q$$

5) $2C_8H_{2*8-4}O_4 + (2*8+2)O_2 \rightarrow [8+(2+6)]CO_2 + [8+(2+2)]H_2O$,

$$2C_8H_{12}O_4 + 18O_2 \rightarrow 16CO_2 + 12H_2O$$,

$$C_8H_{12}O_4 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$$

6) $2C_9H_{2*9-4}O_4 + (2*9+3)O_2 \rightarrow [9+(3+6)]CO_2 + [9+(3+2)]H_2O$,

$$2C_9H_{14}O_4 + 21O_2 \rightarrow 18CO_2 + 14H_2O + Q$$

MONOXICARBOXYLIC ACIDS

Monoxicarboxylic acids or oxyacids are considered as one of representatives of the important class of organic compounds which include hydroxyl $-OH$ and carboxyl $-COOH$ groups in structure. So the representatives of homologues of this class are compounds which contain two different functional groups - hydroxyl $-OH$ and carboxyl $-COOH$ in structure of molecules.

Monoxicarboxylic acids are widespread in the nature, especially hydroxiacetic acid and lactic acids. We express the general formula of their representatives $C_nH_{2n}O_3$, the chemical algorithm of the equations of reaction of burning looks as following:

$$\boxed{\frac{2n}{n}C_nH_{2n}O_3 + (3n-3)O_2 \rightarrow 2nCO_2 + (2n)\ H_2O + Q}$$

Examples are resulted:

Hydroxiacetic acid: $C_2H_4O_3$

1) $\frac{2*2}{2}C_2H_{2*2}O_3 + (3*2-3)O_2 \rightarrow (2*2)CO_2 + (2*2)\ H_2O$,

$$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$$

Lactic acid: $C_3H_6O_3$

2) $\frac{2*3}{3}C_3H_{2*3}O_3 + (3*3-3)O_2 \rightarrow (2*3)CO_2 + (2*3)\ H_2O$,

$$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

$$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O + Q$$

Hydroxibutanoic acid: $CH_3-CH_2-CHOH-COOH$ or $C_4H_8O_3$

3) $\frac{2*4}{4}C_4H_{2*4}O_3 + (3*4-3)O_2 \rightarrow (2*4)CO_2 + (2*4)\ H_2O$,

$$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$$

Hydroxivaleric acid: $C_5H_{10}O_3$

4) $\frac{2*5}{5}C_5H_{2*5}O_3 + (3*5-3)O_2 \rightarrow (2*5)CO_2 + (2*5)\ H_2O$,

$$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$$

$$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$$

Hydroxicaproic acid; $C_6H_{12}O_3$

5) $\frac{2*6}{6}C_6H_{2*6}O_3 + (3*6-3)O_2 \rightarrow (2*6)CO_2 + (2*6)\ H_2O$,

$$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$$

We will write $(2n+m)$ to expression of coefficient value of oxygen O_2, the basic participant of the equation of burning reaction of representatives of the given class, and chemical algorithm of II variant is expressed so;

$$\boxed{2C_nH_{2n}O_3 + (2n+m)O_2 \rightarrow 2nCO_2 + 2n\ H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=2;	m =-1;	n=5;	m=2;
n=3;	m = 0;	n=6;	m=3;
n=4;	m = 1	n=7;	m=4;

It is visible in the table, that if n=2, m =-1 or if n=5, m=2. So, the values (n) and (m) in representatives of homologues of this class change proportionally on unit (3).

Examples are resulted.

Hydroxiacetic acid: $C_2H_4O_3$

1) $2C_2H_{2*2}O_3 + [2*2+(-1)]O_2 \rightarrow (2*2)CO_2 + (2*2)\ H_2O$,

$$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$$

Lactic acid: $C_3H_6O_3$

2) $2C_3H_{2*3}O_3 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + (2*3)\ H_2O$,

$$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

$$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O + Q$$

Hydroxibutanoic acid: $CH_3 - CH_2 - CHOH - COOH$ or $C_4H_8O_3$

3) $2C_4H_{2*4}O_3 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + (2*4)\ H_2O$,

$$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$$

Hydroxivaleric acid: $C_5H_{10}O_3$

4) $2C_5H_{2*5}O_3 + (2*5+2)O_2 \rightarrow (2*5)CO_2 + (2*5)\ H_2O$,

$$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$$,

$$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$$

Hydroxicaproic acid: $C_6H_{12}O_3$

5) $2C_6H_{2*6}O_3 + (2*6+3)O_2 \rightarrow (2*6)CO_2 + (2*6)\ H_2O$,

$$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$$

Expression of coefficient value of water H_2O - one of the basic products of the equation of burning reaction of representatives of homologues of the given class we will write in this kind $[n+(m+3)]$, and variant III of chemical algorithm we will express so:

$$\boxed{2C_nH_{2n}O_3 + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m+3)]H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=2; m =-1; n=5; m=2;
n=3; m = 0; n=6; m=3;
n=4; m = 1 n=7; m=4;

Examples are resulted:

Hydroxiacetic acid: $C_2H_4O_3$

1) $2C_2H_{2*2}O_3 + [2*2+(-1)]O_2 \rightarrow (2*2)CO_2 + [2+(-1+3)]\ H_2O$,

$$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$$

Lactic acid: $C_3H_6O_3$

2) $2C_3H_{2*3}O_3 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + [3+(0+3)]\ H_2O$,

$$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

$$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O + Q$$

Hydroxibutanoic acid: $CH_3 - CH_2 - CHOH - COOH$ or $C_4H_8O_3$

3) $2C_4H_{2*4}O_3 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + [4+(1+3)]\ H_2O$,

$$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$$

Hydroxivaleric acid: $C_5H_{10}O_3$

4) $2C_5H_{2*5}O_3 + (2*5+2)O_2 \rightarrow (2*5)CO_2 + [5+(2+3)]\ H_2O$,

$$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$$

$$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$$

Hydroxicaproic acid: $C_6H_{12}O_3$

5) $2C_6H_{2*6}O_3 + (2*6+3)O_2 \rightarrow (2*6)CO_2 + [6+(3+3)]\ H_2O$,

$$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$$

If expression of coefficient value of carbonic gas CO_2 looks $[n+(m+3)]$ variant IV of chemical algorithms of representatives of the given class looks so:

$$\boxed{2C_nH_{2n}O_3 + (2n+m)O_2 \rightarrow [n+(m+3)]CO_2 + [n+(m+3)]H_2O + Q}$$

Consecutive relation between values (n) and (m):

n=2;	m =-1;	n=5;	m=2;
n=3;	m = 0;	n=6;	m=3;
n=4;	m = 1	n=7;	m=4;

Examples are resulted:

Hydroxiacetic acid: $C_2H_4O_3$

1) $2C_2H_{2*2}O_3 + [2*2+(-1)]O_2 \rightarrow [2+(-1+3)]CO_2 + [2+(-1+3)]\ H_2O$,

$$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$$

Lactic acid: $C_3H_6O_3$

2) $2C_3H_{2*3}O_3 + (2*3+0)O_2 \rightarrow [3+(0+3)]CO_2 + [3+(0+3)]\ H_2O$,

$$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O + Q$

Hydroxibutanoic acid: $CH_3 - CH_2 - CHOH - COOH$ or $C_4H_8O_3$

3) $2C_4H_{2*4}O_3 + (2*4+1)O_2 \rightarrow [4+(1+3)]CO_2 + [4+(1+3)]H_2O$,

$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$

Hydroxivaleric acid: $C_5H_{10}O_3$

4) $2C_5H_{2*5}O_3 + (2*5+2)O_2 \rightarrow [5+(2+3)]CO_2 + [5+(2+3)]H_2O$,

$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$

$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$

Hydroxicaproic acid: $C_6H_{12}O_3$

5) $2C_6H_{2*6}O_3 + (2*6+3)O_2 \rightarrow [6+(3+3)]CO_2 + [6+(3+3)]H_2O$,

$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$

UNSATURATED ALDEHYDES AND KETONES

The general formula of unsaturated aldehydes and ketones looks $C_nH_{2n-2}O$, we will express chemical algorithm of the equations of reaction of burning in such kind:

$$\frac{2n}{n}C_nH_{2n-2}O + (3n-2)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q$$

Examples of chemical algorithms:

1) $\frac{2*3}{3}C_3H_{2*3-2}O + (3*3-2)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,

$2C_3H_4O + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$

2) $\frac{2*4}{4}C_4H_{2*4-2}O + (3*4-2)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,

$2C_4H_6O + 10O_2 \rightarrow 8CO_2 + 6H_2O$

$C_4H_6O + 5O_2 \rightarrow 4CO_2 + 3H_2O + Q$

3) $\frac{2*5}{5}C_5H_{2*5-2}O + (3*5-2)O_2 \rightarrow (2*5)CO_2 + (2*5-2)H_2O$,

$2C_5H_8O + 13O_2 \rightarrow 10CO_2 + 8H_2O + Q$

4) $\frac{2*6}{6}C_6H_{2*6-2}O + (3*6-2)O_2 \rightarrow (2*6)CO_2 + (2*6-2)H_2O$,

$2C_6H_{10}O + 16O_2 \rightarrow 12CO_2 + 10H_2O$

$$C_6H_{10}O + 8O_2 \rightarrow 6CO_2 + 5H_2O + Q$$

Expression of coefficient value of oxygen O_2, the basic participant of the equations of burning reaction of representatives of the given class, $(2n+m)$, and variant II of chemical algorithm will be:

$$\boxed{2C_nH_{2n-2}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q}$$

The table of values (n) and (m):

n=3;	m =1;	n=6;	m=4;
n=4;	m =2;	n=7;	m=5;
n=5;	m =3;	n=8;	m=6;

It is evident in the table, that difference between values (n) and (m) changes on unit (2).

Examples of algorithmic problems:

1) $2C_3H_{2\cdot 3-2}O + (2*3+1)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4O + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$

2) $2C_4H_{2\cdot 4-2}O + (2*4+2)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,
$2C_4H_6O + 10O_2 \rightarrow 8CO_2 + 6H_2O$,
$C_4H_6O + 5O_2 \rightarrow 4CO_2 + 3H_2O + Q$

3) $2C_5H_{2\cdot 5-2}O + (2*5+3)O_2 \rightarrow (2*5)CO_2 + (2*5-2)H_2O$,
$2C_5H_8O + 13O_2 \rightarrow 10CO_2 + 8H_2O + Q$

4) $2C_6H_{2\cdot 6-2}O + (2*6+4)O_2 \rightarrow (2*6)CO_2 + (2*6-2)H_2O$,
$2C_6H_{10}O + 16O_2 \rightarrow 12CO_2 + 10H_2O$,
$C_6H_{10}O + 8O_2 \rightarrow 6CO_2 + 5H_2O + Q$

Expression of coefficient value of water H_2O, one of the basic products of the equation of burning reaction of representatives of homologues of organic substances of the given class is expressed so: $(n+m)$, and variant III of chemical algorithm has the following appearance:

$$\boxed{2C_nH_{2n-2}O + (2n+m)O_2 \rightarrow 2nCO_2 + (n+m)H_2O + Q}$$

The table of values (n) and (m):

n=3;	m =1;	n=6;	m=4;
n=4;	m =2;	n=7;	m=5;
n=5;	m =3;	n=8;	m=6;

Examples of algorithmic problems:

1) $2C_3H_{2*3-2}O + (2*3+1)O_2 \rightarrow (2*3)CO_2 + (3+1)H_2O$,

$2C_3H_4O + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$

2) $2C_4H_{2*4-2}O + (2*4+2)O_2 \rightarrow (2*4)CO_2 + (4+2)H_2O$,

$2C_4H_6O + 10O_2 \rightarrow 8CO_2 + 6H_2O$,

$C_4H_6O + 5O_2 \rightarrow 4CO_2 + 3H_2O + Q$

3) $2C_5H_{2*5-2}O + (2*5+3)O_2 \rightarrow (2*5)CO_2 + (5+3)H_2O$,

$2C_5H_8O + 13O_2 \rightarrow 10CO_2 + 8H_2O + Q$

4) $2C_6H_{2*6-2}O + (2*6+4)O_2 \rightarrow (2*6)CO_2 + (6+4)H_2O$,

$2C_6H_{10}O + 16O_2 \rightarrow 12CO_2 + 10H_2O$,

$C_6H_{10}O + 8O_2 \rightarrow 6CO_2 + 5H_2O + Q$

In variant IV expression of coefficient value of one of the basic product of reaction of carbonic gas CO_2 will be $[n+(m+2)]$, and the chemical algorithm looks so:

$$\boxed{2C_nH_{2n-2}O + (2n+m)O_2 \rightarrow [n+(m+2)]CO_2 + (n+m)H_2O + Q}$$

The table of values (n) and (m):

n=3;	m =1;	n=6;	m=4;
n=4;	m =2;	n=7;	m=5;
n=5;	m =3;	n=8;	m=6;

Examples of algorithmic problems:

1) $2C_3H_{2*3-2}O+(2*3+1)O_2 \rightarrow [3+(1+2)]O_2+(3+1)H_2O$,

$2C_3H_4O+7O_2 \rightarrow 6CO_2+4H_2O+Q$

2) $2C_4H_{2*4-2}O+(2*4+2)O_2 \rightarrow [4+(2+2)]CO_2+(4+2)H_2O$,

$2C_4H_6O+10O_2 \rightarrow 8CO_2+6H_2O$

$C_4H_6O+5O_2 \rightarrow 4CO_2+3H_2O+Q$

3) $2C_5H_{2*5-2}O+(2*5+3)O_2 \rightarrow [5+(3+2)]CO_2+(5+3)H_2O$,

$2C_5H_8O+13O_2 \rightarrow 10CO_2+8H_2O+Q$

4) $2C_6H_{2*6-2}O+(2*6+4)O_2 \rightarrow [6+(4+2)]CO_2+(6+4)H_2O$,

$2C_6H_{10}O+16O_2 \rightarrow 12CO_2+10H_2O$

$C_6H_{10}O+8O_2 \rightarrow 6CO_2+5H_2O+Q$

ALDEHYDE AND KETONE ACIDS

Organic substances which contain a group of aldehyde, ketone or the group carboxyl in molecules, is called aldehyde and ketone acids. Their first representative glyoxylic acid is found in green fruit. The general formula of aldehyde and ketone acids $C_nH_{2n-2}O_3$ and chemical algorithm of the equations of reaction of burning:

$$\frac{2n}{n}C_nH_{2n-2}O_3+(3n-4)O_2 \rightarrow 2nCO_2+(2n-2)H_2O+Q$$

Examples of algorithmic problems:

Glyoxylic acid: $CHO-COOH$ or $C_2H_2O_3$

1) $\frac{2*2}{2}C_2H_{2*2-2}O_3+(3*2-4)O_2 \rightarrow (2*2)CO_2+(2*2-2)H_2O$,

$2C_2H_2O_3+2O_2 \rightarrow 4CO_2+2H_2O$

$C_2H_2O_3+O_2 \rightarrow 2CO_2+H_2O+Q$

Propane acid: $C_3H_4O_3$

2) $\frac{2*3}{3}C_3H_{2*3-2}O_3+(3*3-4)O_2 \rightarrow (2*3)CO_2+(2*3-2)H_2O$,

$$2C_3H_4O_3 + 5O_2 \rightarrow 6CO_2 + 4H_2O + Q$$

Acetacetic acid: $CH_3 - CO - CH_2 - COOH$ or $C_4H_6O_3$

3) $\frac{2*4}{4}C_4H_{2*4-2}O_3 + (3*4-4)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,

$$2C_4H_6O_3 + 8O_2 \rightarrow 8CO_2 + 6H_2O$$

$$C_4H_6O_3 + 4O_2 \rightarrow 4CO_2 + 3H_2O + Q$$

Ether acetacetic: $CH_3 - CO - CH_2 - COOC_2H_5$ or $C_6H_{10}O_3$

4) $\frac{2*6}{6}C_6H_{2*6-2}O_3 + (3*6-4)O_2 \rightarrow (2*6)CO_2 + (2*6-2)H_2O$,

$$2C_6H_{10}O_3 + 14O_2 \rightarrow 12CO_2 + 10H_2O$$

$$C_4H_6O_3 + 7O_2 \rightarrow 6CO_2 + 5H_2O + Q$$

Noting the expression of coefficient value of oxygen O_2 in the form of $(2n+m)$, we will express variant II of chemical algorithm:

$$\boxed{2C_nH_{2\cdot n-2}O_3 + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q}$$

The table of relations between values (n) and (m);

n=2;	m =-2;	n=5;	m=1;
n=3;	m =-1;	n=6;	m=2;
n=4;	m = 0;	n=7;	m=3;

It is visible in the table, that if n=2 m =-2, the values (n) and (m) change with a difference on unit (4).

Examples of algorithmic problems:

Glyoxylic acid: $CHO - COOH$ or $C_2H_2O_3$

1) $2C_2H_{2*2-2}O_3 + [2*2+(-2)]O_2 \rightarrow (2*2)CO_2 + (2*2-2)H_2O$,

$$2C_2H_2O_3 + 2O_2 \rightarrow 4CO_2 + 2H_2O$$

$$C_2H_2O_3 + O_2 \rightarrow 2CO_2 + H_2O + Q$$

Propane acid: $C_3H_4O_3$

2) $2C_3H_{2*3-2}O_3 + [2*3+(-1)]O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,

$$2C_3H_4O_3 + 5O_2 \rightarrow 6CO_2 + 4H_2O + Q$$

Acetacetic acid: $CH_3-CO-CH_2-COOH$ or $C_4H_6O_3$

3) $2C_4H_{2*4-2}O_3+(2*4+0)O_2 \rightarrow (2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6O_3+8O_2 \rightarrow 8CO_2+6H_2O$,

$C_4H_6O_3+4O_2 \rightarrow 4CO_2+3H_2O+Q$

Ether acetacetic: $CH_3-CO-CH_2-COOC_2H_5$ or $C_6H_{10}O_3$

4) $2C_6H_{2*6-2}O_3+(2*6+2)O_2 \rightarrow (2*6)CO_2+(2*6-2)H_2O$,

$2C_6H_{10}O_3+14O_2 \rightarrow 12CO_2+10H_2O$,

$C_4H_6O_3+7O_2 \rightarrow 6CO_2+5H_2O+Q$.

The coefficient value of water H_2O - one of the basic products, the equation of reaction of burning of representatives of organic compounds of the given class is expressed $[n+(m+2)]$, and the chemical algorithm of variant III looks as follows:

$$2C_nH_{2\cdot n-2}O_3+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+2)]H_2O+Q$$

The table of values (n) and (m):

n=2;	m =-2;	n=5;	m=1;
n=3;	m =-1;	n=6;	m=2;
n=4;	m = 0;	n=7;	m=3;

Examples of algorithmic problems:

Glyoxylic acid: $CHO-COOH$ or $C_2H_2O_3$

1) $2C_2H_{2*2-2}O_3+[2*2+(-2)]O_2 \rightarrow (2*2)CO_2+[2+(-2+2)]H_2O$,

$2C_2H_2O_3+2O_2 \rightarrow 4CO_2+2H_2O$,

$C_2H_2O_3+O_2 \rightarrow 2CO_2+H_2O+Q$

Propane acid: $C_3H_4O_3$

2) $2C_3H_{2*3-2}O_3+[2*3+(-1)]O_2 \rightarrow (2*3)CO_2+[3+(-1+2)]H_2O$,

$2C_3H_4O_3+5O_2 \rightarrow 6CO_2+4H_2O+Q$.

Acetacetic acid: $CH_3-CO-CH_2-COOH$ or $C_4H_6O_3$

3) $2C_4H_{2*4-2}O_3 + (2*4+0)O_2 \rightarrow (2*4)CO_2 + [4+(0+2)]H_2O$,

$2C_4H_6O_3 + 8O_2 \rightarrow 8CO_2 + 6H_2O$,

$C_4H_6O_3 + 4O_2 \rightarrow 4CO_2 + 3H_2O + Q$.

Ether acetacetic: $CH_3 - CO - CH_2 - COOC_2H_5$ or $C_6H_{10}O_3$

4) $2C_6H_{2*6-2}O_3 + (2*6+2)O_2 \rightarrow (2*6)CO_2 + [6+(2+2)]H_2O$,

$2C_6H_{10}O_3 + 14O_2 \rightarrow 12CO_2 + 10H_2O$,

$C_4H_6O_3 + 7O_2 \rightarrow 6CO_2 + 5H_2O + Q$.

In variant IV expression of coefficient value of one the basic products of reaction of carbonic gas CO_2 looks $[n+(m+4)]$, and the chemical algorithm looks so:

$$2C_nH_{2\cdot n-2}O_3 + (2n+m)O_2 \rightarrow [n+(m+4)]CO_2 + [n+(m+2)]H_2O + Q$$

The table of relation between values (n) and (m):

n=2;	m =-2;	n=5;	m=1;
n=3;	m =-1;	n=6;	m=2;
n=4;	m = 0;	n=7;	m=3;

Examples of algorithmic problems:

Glyoxylic acid: $CHO - COOH$ or $C_2H_2O_3$

1) $2C_2H_{2*2-2}O_3 + [2*2+(-2)]O_2 \rightarrow [2+(-2+4)]CO_2 + [2+(-2+2)]H_2O$,

$2C_2H_2O_3 + 2O_2 \rightarrow 4CO_2 + 2H_2O$,

$C_2H_2O_3 + O_2 \rightarrow 2CO_2 + H_2O + Q$.

Propane acid: $C_3H_4O_3$

2) $2C_3H_{2*3-2}O_3 + [2*3+(-1)]O_2 \rightarrow [3+(-1+4)]CO_2 + [3+(-1+2)]H_2O$,

$2C_3H_4O_3 + 5O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

Acetacetic acid: $CH_3 - CO - CH_2 - COOH$ or $C_4H_6O_3$

3) $2C_4H_{2*4-2}O_3 + (2*4+0)O_2 \rightarrow [4+(0+4)]CO_2 + [4+(0+2)]H_2O$,

$2C_4H_6O_3 + 8O_2 \rightarrow 8CO_2 + 6H_2O$,

$C_4H_6O_3 + 4O_2 \rightarrow 4CO_2 + 3H_2O + Q$.

Ether acetacetic: $CH_3-CO-CH_2-COOC_2H_5$ or $C_6H_{10}O_3$

4) $2C_6H_{2*6-2}O_3+(2*6+2)O_2 \rightarrow [6+(2+4)]CO_2+[6+(2+2)]H_2O$,

$2C_6H_{10}O_3+14O_2 \rightarrow 12CO_2+10H_2O$

$C_4H_6O_3+7O_2 \rightarrow 6CO_2+5H_2O+Q$

AROMATIC ALDEHYDES AND KETONES

Aromatic aldehydes and ketones are considered as one of the major classes of organic compounds. The general formula of representatives of some homologues is expressed by formula $C_nH_{2n-8}O$, and the chemical algorithm of the equations of reaction of burning looks as follows:

$$\boxed{\frac{2n}{n}C_nH_{2\cdot n-8}O + (3n-5)O_2 \rightarrow 2nCO_2 + (2n-8)H_2O + Q}$$

Examples of algorithmic problems

1) $\frac{2*7}{7}C_7H_{2*7-8}O+(3*7-5)O_2 \rightarrow (2*7)CO_2+(2*7-8)H_2O$,

$2C_7H_6O+16O_2 \rightarrow 14CO_2+6H_2O$,

$C_7H_6O+8O_2 \rightarrow 7CO_2+3H_2O+Q$

2) $\frac{2*8}{8}C_8H_{2*8-8}O+(3*8-5)O_2 \rightarrow (2*8)CO_2+(2*8-8)H_2O$,

$2C_8H_8O+19O_2 \rightarrow 16CO_2+8H_2O+Q$

Expression of coefficient value of oxygen O_2 $(2n+m)$, and chemical algorithm of variant II is

$$\boxed{2C_nH_{2\cdot n-8}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-8)H_2O + Q}$$

The table of relation between values (n) and (m):

n=7;	m=2;	n=10;	m=5;
n=8;	m=3;	n=11;	m=6;
n=9;	m=4;	n=12;	m=7;

It is possible to see in the table, that the difference between values (n) and (m) changes on unit (5).

Examples of algorithmic problems:

1) $2C_7H_{2*7-8}O+(2*7+2)O_2 \rightarrow (2*7)CO_2+(2*7-8)H_2O$,

$2C_7H_6O+16O_2 \rightarrow 14CO_2+6H_2O$,

$C_7H_6O+8O_2 \rightarrow 7CO_2+3H_2O+Q$.

2) $2C_8H_{2*8-8}O+(2*8+3)O_2 \rightarrow (2*8)CO_2+(2*8-8)H_2O$,

$2C_8H_8O+19O_2 \rightarrow 16CO_2+8H_2O+Q$.

Expression of coefficient value of water H_2O $[n+(m-3)]$, and chemical algorithm of variant III:

$$\boxed{2C_nH_{2n-8}O + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m-3)]H_2O + Q}$$

The table of relation between values (n) and (m):

n=7;	m=2;	n=10;	m=5;
n=8;	m=3;	n=11;	m=6;
n=9;	m=4;	n=12;	m=7;

Examples of algorithmic problems;

1) $2C_7H_{2*7-8}O+(2*7+2)O_2 \rightarrow (2*7)CO_2+[7+(2-3)]H_2O$,

$2C_7H_6O+16O_2 \rightarrow 14CO_2+6H_2O$,

$C_7H_6O+8O_2 \rightarrow 7CO_2+3H_2O+Q$.

2) $2C_8H_{2*8-8}O+(2*8+3)O_2 \rightarrow (2*8)CO_2+[8+(3-3)]H_2O$,

$$2C_8H_8O + 19O_2 \rightarrow 16CO_2 + 8H_2O + Q$$

Expression of coefficient value of carbonic gas CO_2 $[n+(m+5)]$ and chemical algorithm of variant IV is

$$\boxed{2C_nH_{2\cdot n-8}O + (2n+m)O_2 \rightarrow [n+(m+5)]CO_2 + [n+(m-3)]H_2O + Q}$$

The table of relation between values (n) and (m):

n=7;	m=2;	n=10;	m=5;
n=8;	m=3;	n=11;	m=6;
n=9;	m=4;	n=12;	m=7;

Examples of algorithmic problems:

1) $2C_7H_{2*7-8}O + (2*7+2)O_2 \rightarrow [7+(2+5)]CO_2 + [7+(2-3)]H_2O$,

$$2C_7H_6O + 16O_2 \rightarrow 14CO_2 + 6H_2O,$$

$$C_7H_6O + 8O_2 \rightarrow 7CO_2 + 3H_2O + Q$$

2) $2C_8H_{2*8-8}O + (2*8+3)O_2 \rightarrow [8+(3+5)]CO_2 + [8+(3-3)]H_2O$,

$$2C_8H_8O + 19O_2 \rightarrow 16CO_2 + 8H_2O + Q$$

AROMATIC ALCOHOLS

General formula $C_nH_{2n-6}O$ is used for some representatives of aromatic alcohols and for the equations of burning reaction of chemical algorithm

$\boxed{\frac{2n}{n}C_nH_{2\cdot n-6}O + (3*n-4)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q}$ is recommended

Examples of algorithmic problems:

Benzyl alcohol: C_7H_8O

1) $\frac{2*7}{7}C_7H_{2*7-6}O + (3*7-4)O_2 \rightarrow (2*7)CO_2 + (2*7-6)H_2O$,

$2C_7H_8O + 17O_2 \rightarrow 14CO_2 + 8H_2O + Q$

Phenylethyl alcohol: $C_8H_{10}O$

2) $\frac{2*8}{8}C_8H_{2*8-6}O + (3*8-4)O_2 \rightarrow (2*8)CO_2 + (2*8-6)H_2O$,

$2C_8H_{10}O + 20O_2 \rightarrow 16CO_2 + 10H_2O$,

$C_8H_{10}O + 10O_2 \rightarrow 8CO_2 + 5H_2O + Q$.

Expression of coefficient value of oxygen O_2, the basic participant of the equation of reaction of burning of representatives of the given class $(2n+m)$, and chemical algorithm of variant II:

$$\boxed{2C_nH_{2n-6}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q}$$

The table of values (n) and (m):

n=7;	m=3;	n=10;	m=6;
n=8;	m=4;	n=11;	m=7;
n=9;	m=5;	n=12;	m=8;

It is visible in the table that the difference between values (n) and (m) changes on unit (4).

Examples of algorithmic problems:

Benzyl alcohol: C_7H_8O

1) $2C_7H_{2*7-6}O + (2*7+3)O_2 \rightarrow (2*7)CO_2 + (2*7-6)H_2O$,

$2C_7H_8O + 17O_2 \rightarrow 14CO_2 + 8H_2O + Q$.

Phenylethyl alcohol: $C_8H_{10}O$

2) $2C_8H_{2*8-6}O + (2*8+4)O_2 \rightarrow (2*8)CO_2 + (2*8-6)H_2O$,

$$2C_8H_{10}O+20O_2 \rightarrow 16CO_2+10H_2O,$$

$$C_8H_{10}O+10O_2 \rightarrow 8CO_2+5H_2O+Q$$

Expression of coefficient value of water H_2O $[n+(m-2)]$, and chemical algorithm of variant III:

$$\boxed{2C_nH_{2\cdot n-6}O+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m-2)]H_2O+Q}$$

The table of values (n) and (m):

n=7;	m=3;	n=10;	m=6;
n=8;	m=4;	n=11;	m=7;
n=9;	m=5;	n=12;	m=8;

Examples of algorithmic problems:

Benzyl alcohol: C_7H_8O

1) $2C_7H_{2*7-6}O+(2*7+3)O_2 \rightarrow (2*7)CO_2+[7+(3-2)]H_2O$,

$$2C_7H_8O+17O_2 \rightarrow 14CO_2+8H_2O+Q$$

Phenylethyl alcohol: $C_8H_{10}O$

2) $2C_8H_{2*8-6}O+(2*8+4)O_2 \rightarrow (2*8)CO_2+[8+(4-2)]H_2O$,

$$2C_8H_{10}O+20O_2 \rightarrow 16CO_2+10H_2O,$$

$$C_8H_{10}O+10O_2 \rightarrow 8CO_2+5H_2O+Q$$

In variant IV expression of coefficient value of one of the basic products of reaction of carbonic gas CO_2 will be $[n+(m+4)]$, and the chemical algorithm looks so:

$$\boxed{2C_nH_{2\cdot n-6}O+(2n+m)O_2 \rightarrow [n+(m+4)]CO_2+[n+(m-2)]H_2O+Q}$$

The table of values (n) and (m):

n=7;	m=3;	n=10;	m=6;
n=8;	m=4;	n=11;	m=7;
n=9;	m=5;	n=12;	m=8;

Examples of algorithmic problems:

Benzyl alcohol: C_7H_8O

1) $2C_7H_{2\cdot7-6}O+(2*7+3)O_2\rightarrow[7+(3+4)]CO_2+[7+(3-2)]H_2O$,

$2C_7H_8O+17O_2\rightarrow14CO_2+8H_2O+Q$

Phenylethyl alcohol: $C_8H_{10}O$

2) $2C_8H_{2\cdot8-6}O+(2*8+4)O_2\rightarrow[8+(4+4)]CO_2+[8+(4-2)]H_2O$,

$2C_8H_{10}O+20O_2\rightarrow16CO_2+10H_2O$

$C_8H_{10}O+10O_2\rightarrow8CO_2+5H_2O+Q$

PRIMARY, SECONDARY AND TERTIARY AMINES

Representatives of these classes are widespread in the nature and divided into primary, secondary and tertiary amines. The general formula of representatives of homologues of amine class is expressed $C_nH_{2\cdot n+3}N$, and we will write chemical algorithm of the equations of reaction of burning in a kind:

$$\boxed{\frac{4n}{n}C_nH_{2n+3}N+(6n+3)O_2\rightarrow4nCO_2+(4n+6)H_2O+2N_2+Q}$$

Examples are resulted:

1) $\frac{4*1}{1}C_1H_{2*1+3}N+(6*1+3)O_2\rightarrow(4*1)CO_2+(4*1+6)H_2O+2N_2+Q$,

$4C\ H_5N+9O_2\rightarrow4CO_2+10H_2O+2N_2+Q$

2) $\frac{4*2}{2}C_2H_{2*2+3}N+(6*2+3)O_2\rightarrow(4*2)CO_2+(4*2+6)H_2O+2N_2+Q$,

$4C_2H_7N+15O_2\rightarrow8CO_2+14H_2O+2N_2+Q$

3) $\frac{4*3}{3}C_3H_{2*3+3}N+(6*3+3)O_2\rightarrow(4*3)CO_2+(4*3+6)H_2O+2N_2+Q$,

$4C_3H_9N+21O_2\rightarrow12CO_2+18H_2O+2N_2+Q$

If expression of coefficient value of oxygen O_2 - the basic participant of the equations of burning reaction of representatives of the given class, $(5n+m)$ that chemical algorithm of variant II:

$$\boxed{4C_nH_{2\cdot n+3}N+(5n+m)O_2\rightarrow4nCO_2+(4n+6)H_2O+2N_2+Q}$$

Consecutive relation between values (n) and (m):

n=1;	m=4;	n=4;	m=7;
n=2;	m=5;	n=5;	m=8;
n=3;	m=6;	n=6;	m=9

It is visible in the table, that if n=1, m=4 or, if n=3, m=6. So, the values (n) and (m) in representatives of homologues of this class change proportionally on unit (3).

Examples are resulted:

1) $4C_1H_{2*1+3}N + (5*1+4)O_2 \rightarrow (4*1)CO_2 + (4*1+6)H_2O + 2N_2$,

$4CH_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$

2) $4C_2H_{2*2+3}N + (5*2+5)O_2 \rightarrow (4*2)CO_2 + (4*2+6)H_2O + 2N_2$,

$4C_2H_7N + 15O_2 \rightarrow 8CO_2 + 14H_2O + 2N_2 + Q$

3) $4C_3H_{2*3+3}N + (5*3+6)O_2 \rightarrow (4*3)CO_2 + (4*3+6)H_2O + 2N_2$,

$4C_3H_9N + 21O_2 \rightarrow 12CO_2 + 18H_2O + 2N_2 + Q$

Expression of coefficient value of water H_2O - one of the basic products of the equation of burning reaction of representatives of homologues of the given class $[3n+(m+3)]$, and variant III of chemical algorithm has the following appearance:

$$\boxed{4C_nH_{2n+3}N + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+3)]H_2O + 2N_2 + Q}$$

Consecutive relation between values (n) and (m):

n=1;	m=4;	n=4;	m=7;
n=2;	m=5;	n=5;	m=8;
n=3;	m=6;	n=6;	m=9

Examples are resulted:

1) $4C_1H_{2*1+3}N + (5*1+4)O_2 \rightarrow (4*1)CO_2 + [3*1+(4+3)]H_2O + 2N_2$,

$4CH_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$

2) $4C_2H_{2*2+3}N+(5*2+5)O_2 \to (4*2)CO_2+[3*2+(5+3)]H_2O+2N_2$,

$4C_2H_7N+15O_2 \to 8CO_2+14H_2O+2N_2+Q$

3) $4C_3H_{2*3+3}N+(5*3+6)O_2 \to (4*3)CO_2+[3*3+(6+3)]H_2O+2N_2$,

$4C_3H_9N+21O_2 \to 12CO_2+18H_2O+2N_2+Q$

Expression of coefficient of value of carbonic gas CO_2 - one of the basic products of the equation of burning reaction of representatives of homologues of the given class $[3n+(m+3)]$, and variant IV of chemical algorithm has the following appearance:

$$\boxed{4C_nH_{2n+3}N+(5n+m)O_2 \to [3n+(m-3)]CO_2+[3n+(m+3)]H_2O+2N_2+Q}$$

Consecutive relation between values (n) and (m):

n=1;	m=4;	n=4;	m=7;
n=2;	m=5;	n=5;	m=8;
n=3;	m=6;	n=6;	m=9

Examples are resulted:

1) $4C_1H_{2*1+3}N+(5*1+4)O_2 \to [3*1+(4-3)]CO_2+[3*1+(4+3)]H_2O+2N_2$,

$4CH_5N+9O_2 \to 4CO_2+10H_2O+2N_2+Q$

2) $4C_2H_{2*2+3}N+(5*2+5)O_2 \to [3*2+(5-3)]CO_2+[3*2+(5+3)]H_2O+2N_2$,

$4C_2H_7N+15O_2 \to 8CO_2+14H_2O+2N_2+Q$

3) $4C_3H_{2*3+3}N+(5*3+6)O_2 \to [3*3+(6-3)]CO_2+[3*3+(6+3)]H_2O+2N_2$,

$4C_3H_9N+21O_2 \to 12CO_2+18H_2O+2N_2+Q$

AMINO ACIDS AND NITROALKANES

Amino acids are heterofunctional bonds in which atoms of hydrogen at hydrocarbon radicals are replaced by amino group $-NH_2$ and carboxyl group $-COOH$.

Depending on the number of amino and carboxyl groups in molecules they are divided into monocarboxylic, diaminocarbon acids and into aromatic heterocyclic chemical bond. The general formula of the majority monoaminocarboxylic acids and nitroalkanes is expressed $C_nH_{2n+1}NO_2$, and chemical algorithm of the equations of burning reaction of representatives of these classes will be written in a kind:

$$\boxed{\frac{4n}{n}C_nH_{2n+1}N\,O_2 + (6n-3)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q}$$

Examples of algorithms:

1) $\frac{4*1}{1}C_1H_{2*1+1}N\,O_2 + (6*1-3)O_2 \rightarrow (4*1)CO_2 + (4*1+2)H_2O + 2N_2 + Q$,

$4C\,H_3N\,O_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$

2) $\frac{4*2}{2}C_2H_{2*2+1}N\,O_2 + (6*2-3)O_2 \rightarrow (4*2)CO_2 + (4*2+2)H_2O + 2N_2 + Q$,

$4C_2H_5N\,O_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$

3) $\frac{4*3}{3}C_3H_{2*3+1}N\,O_2 + (6*3-3)O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2 + Q$,

$4C_3H_7N\,O_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$

The formula of representatives of homologues of amino acids are written in terms of

α - aminoacetic acid: H_2N-CH_2-COOH or $C_2H_5NO_2$

β -aminopropanoic acid: $H_2N-(CH_2)_2-COOH$ or $C_3H_7NO_2$

γ - aminobutyric acid: $H_2N-(CH_2)_3-COOH$ or $C_4H_9NO_2$

So, for a number of representatives of amino acids it is possible to use the chemical algorithms resulted for the equations of burning reaction of nitroalkanes. Expression of coefficient value of oxygen O_2, the basic participant of the equation of burning reaction of representatives of the given class $(5n+m)$, and chemical algorithm of variant II is expressed by the equation:

$$\boxed{4C_nH_{2\cdot n+1}NO_2 + (5n+m)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q}$$

Consecutive relation between values (n) and (m):

n=1;	m =-2;	n=5;	m=2;
n=2;	m =-1;	n=6;	m=3;
n=3;	m = 0;	n=7;	m=4;
n=4;	m = 1;	n=8;	m=5.

It is visible in the table, that if n=1, m =-2 or, if n=4, m=1. So, the values (n) and (m) in representatives of homologues of this class change proportionally on unit (3).

Examples are resulted:

1) $4C_1H_{2*1+1}NO_2 + [5*1+(-2)]O_2 \rightarrow (4*1)CO_2 + (4*1+2)H_2O + 2N_2$,
$4CH_3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$

2) $4C_2H_{2*2+1}NO_2 + [5*2+(-1)]O_2 \rightarrow (4*2)CO_2 + (4*2+2)H_2O + 2N_2$,
$4C_2H_5NO_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$

3) $4C_3H_{2*3+1}NO_2 + (5*3+0)O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2$,
$4C_3H_7NO_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$

4) $4C_4H_{2*4+1}NO_2 + (5*4+1)O_2 \rightarrow (4*4)CO_2 + (4*4+2)H_2O + 2N_2$,
$4C_4H_9NO_2 + 21O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$

Expression of coefficient value of water H_2O, - one of the basic products of the equation of burning reaction of representatives of the given class $[3n+(m+5)]$, and variant III of chemical algorithm is expressed by the equation:

$$4C_nH_{2n+1}NO_2 + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+5)]H_2O + 2N_2 + Q$$

Consecutive relation between (n) and (m) values:

n=1;	m =-2;	n=5;	m=2;
n=2;	m =-1;	n=6;	m=3;
n=3;	m = 0;	n=7;	m=4;
n=4;	m = 1;	n=8;	m=5.

Examples are resulted:

1) $4C_1H_{2*1+1}NO_2 + [5*1+(-2)]O_2 \rightarrow (4*1)CO_2 + [3*1+(-2+5)]H_2O + 2N_2$,
$4CH_3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$

2) $4C_2H_{2*2+1}NO_2 + [5*2+(-1)]O_2 \rightarrow (4*2)CO_2 + [3*2+(-1+5)]H_2O + 2N_2$,
$4C_2H_5NO_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$

3) $4C_3H_{2*3+1}NO_2 + (5*3+0)O_2 \to (4*3)CO_2 + [3*3+(0+5)]H_2O + 2N_2$,
$4C_3H_7NO_2 + 15O_2 \to 12CO_2 + 14H_2O + 2N_2 + Q$

4) $4C_4H_{2*4+1}NO_2 + (5*4+1)O_2 \to (4*4)CO_2 + [3*4+(1+5)]H_2O + 2N_2$,
$4C_4H_9NO_2 + 21O_2 \to 16CO_2 + 18H_2O + 2N_2 + Q$

If expression of coefficient value of carbonic gas CO_2 in the form of $[3n+(m+3)]$ variant IV of chemical algorithms of representatives of the given class looks as:

$$\boxed{4C_nH_{2n+1}NO_2 + (5n+m)O_2 \to [3n+(m+3)]CO_2 + [3n+(m+5)]H_2O + 2N_2 + Q}$$

Consecutive relation between values (n) and (m):

n=1;	m =-2;	n=5;	m=2;
n=2;	m =-1;	n=6;	m=3;
n=3;	m = 0;	n=7;	m=4;
n=4;	m = 1;	n=8;	m=5.

Examples are resulted:

1) $4C_1H_{2*1+1}NO_2 + [5*1+(-2)]O_2 \to [3*1+(-2+3)]CO_2 + [3*1+(-2+5)]H_2O + 2N_2$,
$4CH_3NO_2 + 3O_2 \to 4CO_2 + 6H_2O + 2N_2 + Q$

2) $4C_2H_{2*2+1}NO_2 + [5*2+(-1)]O_2 \to [3*2+(-1+3)]CO_2 + [3*2+(-1+5)]H_2O + 2N_2$,
$4C_2H_5NO_2 + 9O_2 \to 8CO_2 + 10H_2O + 2N_2 + Q$

3) $4C_3H_{2*3+1}NO_2 + (5*3+0)O_2 \to [3*3+(0+3)]CO_2 + [3*3+(0+5)]H_2O + 2N_2$,
$4C_3H_7NO_2 + 15O_2 \to 12CO_2 + 14H_2O + 2N_2 + Q$

4) $4C_4H_{2*4+1}NO_2 + (5*4+1)O_2 \to [3*4+(1+3)]CO_2 + [3*4+(1+5)]H_2O + 2N_2$,
$4C_4H_9NO_2 + 21O_2 \to 16CO_2 + 18H_2O + 2N_2 + Q$

AMIDES OF ACIDS

Amides of acids are also considered as the most important class of nitric organic compounds. We will write down the general formula of representatives of this class in the form of $C_nH_{2n+1}NO$, and chemical algorithm of the equations of burning reaction will be expressed as:

$$\frac{4n}{n}C_nH_{2n+1}NO + (6n-1)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

Examples are resulted:

Formamide: $H-CO-NH_2$ or CH_3NO

1) $\frac{4*1}{1}C_1H_{2*1+1}NO + (6*1-1)O_2 \rightarrow (4*1)CO_2 + (4*1+2)H_2O + 2N_2$,

$4CH_3NO + 5O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$

Acetamid: $CH_3-CO-NH_2$ or C_2H_5NO

2) $\frac{4*2}{2}C_2H_{2*2+1}NO + (6*2-1)O_2 \rightarrow (4*2)CO_2 + (4*2+2)H_2O + 2N_2$,

$4C_2H_5NO + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$

Propyoamid: $CH_3-CH_2-CO-NH_2$ or C_3H_7NO

3) $\frac{4*2}{2}C_3H_{2*2+1}NO + (6*3-1)O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2$,

$4C_3H_7NO + 17O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$

Expression of coefficient value of oxygen O_2 - the basic participant of the equation of burning reaction of representatives of the given class looks, $(5n+m)$, and the equation of chemical algorithm of variant II:

$$4C_nH_{2\cdot n+1}NO + (5n+m)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

Consecutive relation between (n) and (m) values;

n=1;	m=0;	n=4;	m=3;
n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;

It is possible to see, that the values (n) and (m) proportionally change with a difference on unit (1).

Examples are resulted:

1) $4C_1H_{2\cdot1+1}NO+(5*1+0)O_2 \rightarrow (4*1)CO_2+(4*1+2)H_2O+2N_2$,

$4CH_3NO+5O_2 \rightarrow 4CO_2+6H_2O+2N_2+Q$

2) $4C_2H_{2\cdot2+1}NO+(5*2+1)O_2 \rightarrow (4*2)CO_2+(4*2+2)H_2O+2N_2$,

$4C_2H_5NO+11O_2 \rightarrow 8CO_2+10H_2O+2N_2+Q$

3) $4C_3H_{2\cdot3+1}NO+(5*3+2)O_2 \rightarrow (4*3)CO_2+(4*3+2)H_2O+2N_2$,

$4C_3H_7NO+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$

Expression of coefficient value of water H_2O $[3n+(m+3)]$ and variant III of chemical algorithm:

$$4C_nH_{2\cdot n+1}NO+(5n+m)O_2 \rightarrow 4nCO_2+[3n+(m+3)]H_2O+2N_2+Q$$

Consecutive relation between values (n) and (m):

n=1;	m=0;	n=4;	m=3;
n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;

Examples are resulted:

1) $4C_1H_{2\cdot1+1}NO+(5*1+0)O_2 \rightarrow (4*1)CO_2+[3*1+(0+3)]H_2O+2N_2$,

$4CH_3NO+5O_2 \rightarrow 4CO_2+6H_2O+2N_2+Q$

2) $4C_2H_{2\cdot2+1}NO+(5*2+1)O_2 \rightarrow (4*2)CO_2+[3*2+(1+3)]H_2O+2N_2$,

$4C_2H_5NO+11O_2 \rightarrow 8CO_2+10H_2O+2N_2+Q$

3) $4C_3H_{2\cdot3+1}NO+(5*3+2)O_2 \rightarrow (4*3)CO_2+[3*3+(2+3)]H_2O+2N_2$,

$4C_3H_7NO+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$

If expression of coefficient value of carbonic gas CO_2 is in this kind $[3n+(m+1)$ variant IV of chemical algorithms of representatives of the given class looks so:

$$4C_nH_{2\cdot n+1}NO+(5n+m)O_2 \rightarrow [3n+(m+1)CO_2+[3n+(m+3)]H_2O+2N_2+Q$$

Consecutive relation between values (n) and (m):

n=1;	m=0;	n=4;	m=3;
n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5;

Examples are resulted:

1) $4C_1H_{2*1+1}NO+(5*1+0)O_2 \rightarrow [3*1+(0+1)]CO_2+[3*1+(0+3)]H_2O+2N_2$,
$4CH_3NO+5O_2 \rightarrow 4CO_2+6H_2O+2N_2+Q$

2) $4C_2H_{2*2+1}NO+(5*2+1)O_2 \rightarrow [3*2+(1+1)]CO_2+[3*2+(1+3)]H_2O+2N_2$,
$4C_2H_5NO+11O_2 \rightarrow 8CO_2+10H_2O+2N_2+Q$

3) $4C_3H_{2*3+1}NO+(5*3+2)O_2 \rightarrow [3*3+(2+1)]CO_2+[3*3+(2+3)]H_2O+2N_2$,
$4C_3H_7NO+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$

DIAMINOCARBON ACIDS

Diaminocarbon acids are representatives of the major class of organic compounds found in protein. The general formula of representatives of homologues of diaminocarboxylic acids $C_nH_{2n+2}N_2O_2$, equation of burning reactions of chemical algorithm:

$$\boxed{\frac{4n}{n}C_nH_{2*n+2}N_2O_2+(6n-2)O_2 \rightarrow 4nCO_2+(4n+4)H_2O+4N_2+Q}$$

The equation of burning reaction of lysine: $C_6H_{14}N_2O_2$

1) $\frac{4*6}{6}C_6H_{2*6+2}N_2O_2+(6*6-2)O_2 \rightarrow (4*6)CO_2+(4*6+4)H_2O+4N_2$,
$4C_6H_{14}N_2O_2+34O_2 \rightarrow 24CO_2+28H_2O+4N_2$
$2C_6H_{14}N_2O_2+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$

Other examples are resulted:

2) $\frac{4*4}{4}C_4H_{2*4+2}N_2O_2+(6*4-2)O_2 \rightarrow (4*4)CO_2+(4*4+4)H_2O+4N_2$,
$4C_4H_{10}N_2O_2+22O_2 \rightarrow 16CO_2+20H_2O+4N_2$

$$2C_4H_{10}N_2O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$$

3) $$\frac{4*7}{7}C_7H_{2*7+2}N_2O_2 + (6*7-2)O_2 \rightarrow (4*7)CO_2 + (4*7+4)H_2O + 4N_2,$$

$$4C_7H_{16}N_2O_2 + 40O_2 \rightarrow 28CO_2 + 32H_2O + 4N_2$$

$$2C_7H_{16}N_2O_2 + 20O_2 \rightarrow 14CO_2 + 16H_2O + 2N_2 + Q$$

Expression of coefficient value of oxygen O_2 - the basic participant of the equation of burning reaction $(5n+m)$ and chemical algorithm of variant II:

$$\boxed{4C_nH_{2\cdot n+2}N_2O_2 + (5n+m)O_2 \rightarrow 4nCO_2 + (4n+4)H_2O + 4N_2 + Q}$$

Consecutive relation between values (n) and (m):

n=2;	m=0;	n=5;	m=3;
n=3;	m=1;	n=6;	m=4;
n=4;	m=2;	n=7;	m=5.

It is evident in the table, that if n=2, m=0 or if n=4, m=2. So, the values (n) and (m) in representatives of homologues of this class change proportionally on unit (2).

Examples are resulted:

1) $$4C_6H_{2\cdot 6+2}N_2O_2 + (5*6+4)O_2 \rightarrow (4*6)CO_2 + (4*6+4)H_2O + 4N_2,$$

$$4C_6H_{14}N_2O_2 + 34O_2 \rightarrow 24CO_2 + 28H_2O + 4N_2 + Q$$

$$2C_6H_{14}N_2O_2 + 17O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$$

2) $$4C_4H_{2\cdot 4+2}N_2O_2 + (5*4+2)O_2 \rightarrow (4*4)CO_2 + (4*4+4)H_2O + 4N_2,$$

$$4C_4H_{10}N_2O_2 + 22O_2 \rightarrow 16CO_2 + 20H_2O + 4N_2$$

$$2C_4H_{10}N_2O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$$

3) $$4C_7H_{2*7+2}N_2O_2 + (5*7+5)O_2 \rightarrow (4*7)CO_2 + (4*7+4)H_2O + 4N_2,$$

$$4C_7H_{16}N_2O_2 + 40O_2 \rightarrow 28CO_2 + 32H_2O + 4N_2$$

$$2C_7H_{16}N_2O_2 + 20O_2 \rightarrow 14CO_2 + 16H_2O + 2N_2 + Q$$

Expression of coefficient value of water H_2O, one of the basic products of the equation of burning reaction of representatives of homologues of the given class $[3n+(m+6)]$, and variant III of chemical algorithm is expressed so:

$$\boxed{2C_nH_{2\cdot n+2}N_2O_2+(5n+m)O_2\to 4nCO_2+[3n+(m+6)]H_2O+4N_2+Q}$$

Consecutive relation between values (n) and (m):

n=2;	m=0;	n=5;	m=3;
n=3;	m=1;	n=6;	m=4;
n=4;	m=2;	n=7;	m=5.

Examples are resulted:

1) $4C_6H_{2\cdot 6+2}N_2O_2+(5*6+4)O_2\to(4*6)CO_2+[3*6+(4+6)]H_2O+4N_2$,

$4C_6H_{14}N_2O_2+34O_2\to 24CO_2+28H_2O+4N_2$,

$2C_6H_{14}N_2O_2+17O_2\to 12CO_2+14H_2O+2N_2+Q$.

2) $4C_4H_{2\cdot 4+2}N_2O_2+(5*4+2)O_2\to(4*4)CO_2+[3*4+(2+6)]H_2O+4N_2$,

$4C_4H_{10}N_2O_2+22O_2\to 16CO_2+20H_2O+4N_2$,

$2C_4H_{10}N_2O_2+11O_2\to 8CO_2+10H_2O+2N_2+Q$.

3) $4C_7H_{2\cdot 7+2}N_2O_2+(5*7+5)O_2\to(4*7)CO_2+[3*7+(5+6)]H_2O+4N_2$,

$4C_7H_{16}N_2O_2+40O_2\to 28CO_2+32H_2O+4N_2$,

$2C_7H_{16}N_2O_2+20O_2\to 14CO_2+16H_2O+2N_2+Q$.

Expression of coefficient value of carbonic gas CO_2 $[3n+(m+2)]$ and variant IV of chemical algorithm:

$$\boxed{2C_nH_{2\cdot n+2}N_2O_2+(5n+m)O_2\to[3n+(m+2)]CO_2+[3n+(m+6)]H_2O+4N_2+Q}$$

Consecutive relation between values (n) and (m):

n=2;	m=0;	n=5;	m=3;
n=3;	m=1;	n=6;	m=4;
n=4;	m=2;	n=7;	m=5.

Examples are resulted:

1) $4C_6H_{2*6+2}N_2O_2+(5*6+4)O_2 \rightarrow [3*6+(4+2)]CO_2+[3*6+(4+6)]H_2O+4N_2$,

$4C_6H_{14}N_2O_2+34O_2 \rightarrow 24CO_2+28H_2O+4N_2$,

$2C_6H_{14}N_2O_2+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$.

2) $4C_4H_{2*4+2}N_2O_2+(5*4+2)O_2 \rightarrow [3*4+(2+2)]CO_2+[3*4+(2+6)]H_2O+4N_2$,

$4C_4H_{10}N_2O_2+22O_2 \rightarrow 16CO_2+20H_2O+4N_2$,

$2C_4H_{10}N_2O_2+11O_2 \rightarrow 8CO_2+10H_2O+2N_2+Q$

3) $4C_7H_{2*7+2}N_2O_2+(5*7+5)O_2 \rightarrow [3*7+(5+2)]CO_2+[3*7+(5+6)]H_2O+4N_2$,

$4C_7H_{16}N_2O_2+40O_2 \rightarrow 28CO_2+32H_2O+4N_2$,

$2C_7H_{16}N_2O_2+20O_2 \rightarrow 14CO_2+16H_2O+2N_2+Q$

AMINODICARBON ACIDS

Aminodicarbon acids are also a part of some protein and are considered as the basic class of organic compounds. The general formula of representatives of homologues of aminodicarbon acids can be expressed in the form of $C_nH_{2n-1}N\,O_4$, and the chemical algorithm of the equation of burning reaction looks as:

$$\boxed{\frac{4n}{n}C_nH_{2n-1}N\,O_4+(6n-9)O_2 \rightarrow 4nCO_2+(4n-2)H_2O+2N_2+Q}$$

The equation of burning reaction of glutaminic acids: $C_5H_9N\,O_4$

1) $\frac{4*5}{5}C_5H_{2*5-1}N\,O_4+(6*5-9)O_2 \rightarrow (4*5)CO_2+(4*5-2)H_2O+2N_2$,

$4C_5H_9N\,O_4+21O_2 \rightarrow 20CO_2+18H_2O+2N_2+Q$

Other examples are resulted:

2) $\frac{4*3}{3}C_3H_{2*3-1}N\,O_4+(6*3-9)O_2\rightarrow(4*3)CO_2+(4*3-2)H_2O+2N_2$,
$4C_3H_5N\,O_4+9O_2\rightarrow12CO_2+10H_2O+2N_2+Q$

3) $\frac{4*4}{4}C_4H_{2*4-1}N\,O_4+(6*4-9)O_2\rightarrow(4*4)CO_2+(4*4-2)H_2O+2N_2$,
$4C_4H_7N\,O_4+15O_2\rightarrow16CO_2+14H_2O+2N_2+Q$

4) $\frac{4*6}{6}C_6H_{2*6-1}N\,O_4+(6*6-9)O_2\rightarrow(4*6)CO_2+(4*6-2)H_2O+2N_2$,
$4C_6H_{11}N\,O_4+27O_2\rightarrow24CO_2+22H_2O+2N_2+Q$

We will write $(5n+m)$ to the expression of coefficient value of oxygen O_2 - the basic participant of the equations of reaction of burning of representatives of the given class, and chemical algorithm of variant II as:

$$\boxed{4C_nH_{2n-1}NO_4+(5n+m)O_2\rightarrow4nCO_2+(4n-2)H_2O+2N_2+Q}$$

Consecutive relation between values (n) and (m):

n=3;	m =-6;	n = 7;	m =-2;
n=4;	m =-5;	n = 8;	m =-1;
n=5;	m =-4;	n = 9;	m = 0;
n=6;	m =-3;	n=10;	m = 1.

It is clear in the table, that if n=3, m = - 6; if n=7, m =-2 or if n=9, m=0. So, the values (n) and (m) in representatives of homologues of the given class proportionally change on (9) units.

Examples are resulted:

1) $4C_5H_{2*5-1}NO_4+[5*5+(-4)]O_2\rightarrow(4*5)CO_2+(4*5-2)H_2O+2N_2$,
$4C_5H_9NO_4+21O_2\rightarrow20CO_2+18H_2O+2N_2+Q$

2) $4C_3H_{2*3-1}NO_4+[5*3+(-6)]O_2\rightarrow(4*3)CO_2+(4*3-2)H_2O+2N_2$,
$4C_3H_5NO_4+9O_2\rightarrow12CO_2+10H_2O+2N_2+Q$

3) $4C_4H_{2*4-1}NO_4+[5*4+(-5)]O_2 \rightarrow (4*4)CO_2+(4*4-2)H_2O+2N_2$,

$4C_4H_7NO_4+15O_2 \rightarrow 16CO_2+14H_2O+2N_2+Q$

4) $4C_6H_{2*6-1}NO_4+[5*6+(-3)]O_2 \rightarrow (4*6)CO_2+(4*6-2)H_2O+2N_2$,

$4C_6H_{11}NO_4+27O_2 \rightarrow 24CO_2+22H_2O+2N_2$

Expression of coefficient value of water H_2O - one of the basic producıs of the equation of burning reaction of representatives of homologues of the given class we will write in the form of $[3n+(m+7)]$, and variant III of chemical algorithm as:

$$\boxed{4C_nH_{2n-1}NO_4+(5n+m)O_2 \rightarrow 4nCO_2+[3n+(m+7)]H_2O+2N_2+Q}$$

Consecutive relation between values (n) and (m):

n=3;	m =-6;	n = 7;	m =-2;
n=4;	m =-5;	n = 8;	m =-1;
n=5;	m =-4;	n = 9;	m = 0;
n=6;	m =-3;	n=10;	m = 1.

Examples are resulted:

1) $4C_5H_{2*5-1}NO_4+[5*5+(-4)]O_2 \rightarrow (4*5)CO_2+[3*5+(-4+7)]H_2O+2N_2$,

$4C_5H_9NO_4+21O_2 \rightarrow 20CO_2+18H_2O+2N_2+Q$

2) $4C_3H_{2*3-1}NO_4+[5*3+(-6)]O_2 \rightarrow (4*3)CO_2+[3*3+(-6+7)]H_2O+2N_2$,

$4C_3H_5NO_4+9O_2 \rightarrow 12CO_2+10H_2O+2N_2+Q$

3) $4C_4H_{2*4-1}NO_4+[5*4+(-5)]O_2 \rightarrow (4*4)CO_2+[3*4+(-5+7)]H_2O+2N_2$,

$4C_4H_7NO_4+15O_2 \rightarrow 16CO_2+14H_2O+2N_2+Q$

4) $4C_6H_{2*6-1}NO_4+[5*6+(-3)]O_2 \rightarrow (4*6)CO_2+[3*6+(-3+7)]H_2O+2N_2$,

$4C_6H_{11}NO_4+27O_2 \rightarrow 24CO_2+22H_2O+2N_2$

Expression of coefficient value of carbonic gas CO_2 $[3n+(m+9)]$ and variant IV of chemical algorithm:

$$\boxed{4C_nH_{2n-1}NO_4+(5n+m)O_2 \rightarrow [3n+(m+9)]CO_2+[3n+(m+7)]H_2O+2N_2+Q}$$

Consecutive relation between values (n) and (m):

n=3;	m =-6;	n = 7;	m =-2;
n=4;	m =-5;	n = 8;	m =-1;
n=5;	m =-4;	n = 9;	m = 0;
n=6;	m =-3;	n=10;	m = 1.

Examples are resulted:

1) $4C_5H_{2*5-1}NO_4 + [5*5+(-4)]O_2 \rightarrow [3*5+(-4+9)]CO_2 + [3*5+(-4+7)]H_2O + 2N_2$,
$4C_5H_9NO_4 + 21O_2 \rightarrow 20CO_2 + 18H_2O + 2N_2 + Q$

2) $4C_3H_{2*3-1}NO_4 + [5*3+(-6)]O_2 \rightarrow [3*3+(-6+9)]CO_2 + [3*3+(-6+7)]H_2O + 2N_2$,
$4C_3H_5NO_4 + 9O_2 \rightarrow 12CO_2 + 10H_2O + 2N_2 + Q$

3) $4C_4H_{2*4-1}NO_4 + [5*4+(-5)]O_2 \rightarrow [3*4+(-5+9)]CO_2 + [3*4+(-5+7)]H_2O + 2N_2$,
$4C_4H_7NO_4 + 15O_2 \rightarrow 16CO_2 + 14H_2O + 2N_2 + Q$

4) $4C_6H_{2*6-1}NO_4 + [5*6+(-3)]O_2 \rightarrow [3*6+(-3+9)]CO_2 + [3*6+(-3+7)]H_2O + 2N_2$,
$4C_6H_{11}N\,O_4 + 27O_2 \rightarrow 24CO_2 + 22H_2O + 2N_2 + Q$

HYDROXYAMINO ACIDS

Representatives of homologues of hydroxiamino acids are considered as an important class of nitric organic compounds. Expressing the general formula of representatives of homologues, included in the given class as $C_nH_{2n+1}N\,O_3$, the equation of burning reaction of chemical algorithms we will represent in the following form:

$$\frac{4n}{n}C_nH_{2*n+1}N\,O_3 + (6n-5)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

The equation of burning reaction of threonine: $C_4H_9N\,O_3$

1) $\frac{4*4}{4}C_4H_{2*4+1}N\,O_3 + (6*4-5)O_2 \rightarrow (4*4)CO_2 + (4*4+2)H_2O + 2N_2$,
$4C_4H_9N\,O_3 + 19O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$

Other examples are resulted.

2) $\frac{4*3}{3}C_3H_{2*3-1}N\,O_3 + (6*3-5)O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2$,

$$4C_3H_7N\,O_3 + 13O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$$

3) $\frac{4*6}{6}C_6H_{2*6+1}N\,O_3 + (6*6-5)O_2 \rightarrow (4*6)CO_2 + (4*6+2)H_2O + 2N_2$,

$$4C_6H_{13}N\,O_3 + 31O_2 \rightarrow 24CO_2 + 26H_2O + 2N_2 + Q$$

Expression of coefficient value of oxygen O_2, the basic participant of the equation of burning reaction of representatives of the given class we will write as $(5n+m)$, and the equation of chemical algorithm of variant II as:

$$\boxed{4C_nH_{2\cdot n+1}NO_3 + (5n+m)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q}$$

Consecutive relation between (n) and (m) values:

n=3;	m =-2;	n = 7;	m=2;
n=4;	m =-1;	n = 8;	m=3;
n=5;	m = 0;	n = 9;	m=4;
n=6;	m = 1;	n=10;	m=5;

It is shown in the table, that if n=3, m =-2; if, n=6, m=1. So, the values(n) and (m) in representatives of homologues of the given class proportionally change in such order:

Examples are resulted:

1) $4C_4H_{2*4+1}NO_3 + [5*4+(-1)]O_2 \rightarrow (4*4)CO_2 + (4*4+2)H_2O + 2N_2$,

$$4C_4H_9NO_3 + 19O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$$

2) $4C_3H_{2*3+1}NO_3 + [5*3+(-2)]O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2$,

$$4C_3H_7NO_3 + 13O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$$

3) $4C_6H_{2*6+1}NO_3 + (5*6+1)O_2 \rightarrow (4*6)CO_2 + (4*6+2)H_2O + 2N_2$,

$$4C_6H_{13}NO_3 + 31O_2 \rightarrow 24CO_2 + 26H_2O + 2N_2 + Q$$

Expression of coefficient value of water H_2O, one of the basic products of the equation of burning reaction of representatives of homologues of the given class in following $[3n+(m+7)]$, and variant III of chemical algorithm we will express so:

$$4C_nH_{2n+1}NO_3 + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+7)]H_2O + Q$$

Consecutive relation between values (n) and (m):

n=3;	m =-2;	n = 7;	m=2;
n=4;	m =-1;	n = 8;	m=3;
n=5;	m = 0;	n = 9;	m=4;
n=6;	m = 1;	n=10;	m=5;

Examples are resulted:

1) $4C_4H_{2*4+1}NO_3 + [5*4+(-1)]O_2 \rightarrow (4*4)CO_2 + [3*4+(-1+7)]H_2O + 2N_2$,
$4C_4H_9NO_3 + 19O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$

2) $4C_3H_{2*3+1}NO_3 + [5*3+(-2)]O_2 \rightarrow (4*3)CO_2 + [3*3+(-2+7)]H_2O + 2N_2$,
$4C_3H_7NO_3 + 13O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$

3) $4C_6H_{2*6+1}NO_3 + (5*6+1)O_2 \rightarrow (4*6)CO_2 + [3*6+(1+7)]H_2O + 2N_2$,
$4C_6H_{13}NO_3 + 31O_2 \rightarrow 24CO_2 + 26H_2O + 2N_2 + Q$

Expression of coefficient value of carbonic gas CO_2 $[3n+(m+5)]$ and variant IV of chemical algorithm:

$$4C_nH_{2n+1}NO_3 + (5n+m)O_2 \rightarrow [3n+(m+5)]CO_2 + [3n+(m+7)]H_2O + 2N_2 + Q$$

Consecutive relation between values (n) and (m):

n=3;	m =-2;	n = 7;	m=2;
n=4;	m =-1;	n = 8;	m=3;
n=5;	m = 0;	n = 9;	m=4;
n=6;	m = 1;	n=10;	m=5;

Examples are resulted:

1) $4C_4H_{2*4+1}NO_3 + [5*4+(-1)]O_2 \rightarrow [3*4+(-1+5)]CO_2 + [3*4+(-1+7)]H_2O + 2N_2$,

$$4C_4H_9NO_3 + 19O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$$

2) $4C_3H_{2*3+1}NO_3 + [5*3+(-2)]O_2 \rightarrow [3*3+(-2+5)]CO_2 + [3*3+(-2+7)]H_2O + 2N_2$,

$$4C_3H_7NO_3 + 13O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$$

3) $4C_6H_{2*6+1}NO_3 + (5*6+1)O_2 \rightarrow [3*6+(1+5)]CO_2 + [3*6+(1+7)]H_2O + 2N_2$,

$$4C_6H_{13}NO_3 + 31O_2 \rightarrow 24CO_2 + 26H_2O + 2N_2 + Q$$

«CHEMICAL ALGORITHMS» OF ORGANIC CONNECTIONS WITH FUNCTIONAL GROUP

Among the equations of reaction of burning of organic compounds combined with functional group $-CHO$,$-COOH$ or other functional groups, some laws of chemical algorithms are defined. For example, at formic aldehydes $H-CHO$ and acetic acids $H-COOH$ the value $(C\ H_2)$ of radicals is equal to zero (0). In these organic substances functional groups $-CHO$ and $-COOH$ are conmbined only with atoms of hydrogen. Such kinds of chemical algorithms especially confirm that $(C\ H_2)$ the radical is equal to zero (0). Examples on these algorithms are given more below. If the general formula of aldehydes $C_nH_{2n+1}CHO$ chemical algorithm of the equations of reaction of burning will have the following appearance:

$$\boxed{2C_nH_{2n+1}CHO + (3n+2)O_2 \rightarrow (2n+2)CO_2 + (2n+2)H_2O + Q}$$

Examples:

1) $2C_0H_{2*0+1}CHO + (3*0+2)O_2 \rightarrow (2*0+2)CO_2 + (2*0+2)H_2O$,

$$2HCHO + 2O_2 \rightarrow 2CO_2 + 2H_2O$$

$$HCHO + O_2 \rightarrow CO_2 + H_2O + Q$$

2) $2C_1H_{2*1+1}CHO + (3*1+2)O_2 \rightarrow (2*1+2)CO_2 + (2*1+2)H_2O$,

$$2CH_3CHO + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$$

3) $2C_2H_{2*2+1}CHO + (3*2+2)O_2 \rightarrow (2*2+2)CO_2 + (2*2+2)H_2O$,

$$2C_2H_5CHO + 8O_2 \rightarrow 6CO_2 + 6H_2O$$

$$C_2H_5CHO + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$$

The general formula of the one-basic carboniferous acids $C_nH_{2n+1}COOH$ and the equation ot reaction of burning of chemical algorithm

$$\boxed{2C_nH_{2n+1}COOH + (3n+1)O_2 \rightarrow (2n+2)CO_2 + (2n+2)H_2O + Q}$$

1) $2C_0H_{2*0+1}COOH + (3*0+1)O_2 \rightarrow (2*0+2)CO_2 + (2*0+2)H_2O$,

$2H\ COOH + O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2) $2C_1H_{2*1+1}COOH + (3*1+1)O_2 \rightarrow (2*1+2)CO_2 + (2*1+2)H_2O$,

$2CH_3COOH + 4O_2 \rightarrow 4CO_2 + 4H_2O$,

$CH_3COOH + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$

3) $2C_2H_{2*2+1}COOH + (3*2+1)O_2 \rightarrow (2*2+2)CO_2 + (2*2+2)H_2O$,

$2C_2H_5COOH + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$

The general formula of the one-basic unsaturated carboniferous acids $C_nH_{2n-1}COOH$ and the equation of reaction of burning of chemical algorithm

$$\boxed{2C_nH_{2n-1}COOH + 3nO_2 \rightarrow (2n+2)CO_2 + 2nH_2O + Q}$$

1) $2C_3H_{2*3-1}COOH + (3*3)O_2 \rightarrow (2*3+2)CO_2 + (2*3)H_2O$,

$2C_3H_5COOH + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$

2) $2C_4H_{2*4-1}COOH + (3*4)O_2 \rightarrow (2*4+2)CO_2 + (2*4)H_2O$,

$2C_4H_7COOH + 12O_2 \rightarrow 10CO_2 + 8H_2O$,

$C_4H_7COOH + 6O_2 \rightarrow 5CO_2 + 4H_2O + Q$

3) $2C_{17}H_{2*17-1}COOH + (3*17)O_2 \rightarrow (2*17+2)CO_2 + (2*17)H_2O$,

$2C_{17}H_{33}COOH + 51O_2 \rightarrow 36CO_2 + 34H_2O$

The general formula of the bibasic carboniferous acids $HOOCC_nH_{2n}COOH$ and the equation of burning reaction of chemical algorithm:

$$\boxed{2HOOCC_nH_{2n}COOH + (3n+1)O_2 \rightarrow (2n+4)CO_2 + (2n+2)H_2O + Q}$$

1) $2HOOCC_1H_{2*1}COOH + (3*1+1)O_2 \rightarrow (2*1+4)CO_2 + (2*1+2)H_2O$,

$2HOOCCH_2COOH + 4O_2 \rightarrow 6CO_2 + 4H_2O$,

$HOOCCH_2COOH + 2O_2 \rightarrow 3CO_2 + 2H_2O + Q$

2) $2HOOCC_2H_{2*2}COOH + (3*2+1)O_2 \rightarrow (2*2+4)CO_2 + (2*2+2)H_2O$,

$$2HOOCC_2H_4COOH + 7O_2 \rightarrow 8CO_2 + 6H_2O + Q$$

3) $2HOOCC_5H_{2*5}COOH + (3*5+1)O_2 \rightarrow (2*5+4)CO_2 + (2*5+2)H_2O$,

$$2HOOCC_5H_{10}COOH + 16O_2 \rightarrow 14CO_2 + 12H_2O$$

$$HOOCC_5H_{10}COOH + 8O_2 \rightarrow 7CO_2 + 6H_2O + Q$$

The general formula of more unsaturated monobasic carboniferous acids $C_nH_{2n-3}COOH$ and the equation of burning reaction of chemical algorithm:

$$\boxed{2C_nH_{2n-3}COOH + (3n-1)O_2 \rightarrow (2n+2)CO_2 + (2n-2)H_2O + Q}$$

1) $2C_3H_{2*3-3}COOH + (3*3-1)O_2 \rightarrow (2*3+2)CO_2 + (2*3-2)H_2O + Q$

$$2C_3H_3COOH + 8O_2 \rightarrow 8CO_2 + 4H_2O$$

$$C_3H_3COOH + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$$

2) $2C_4H_{2*4-3}COOH + (3*4-1)O_2 \rightarrow (2*4+2)CO_2 + (2*4-2)H_2O$,

$$2C_4H_5COOH + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$$

3) $2C_5H_{2*5-3}COOH + (3*5-1)O_2 \rightarrow (2*5+2)CO_2 + (2*5-2)H_2O$,

$$2C_5H_7COOH + 14O_2 \rightarrow 12CO_2 + 8H_2O$$

$$C_5H_7COOH + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$$

THE MATHEMATICAL ANALYSIS «THE CHEMICAL ALGORITHMS »

Analyses once again confirm a conclusion about certain consecutive repetition among the equations of reaction of burning, the classical law of chemistry, equality of weights of the substances which have reacted with weights of substances, formed as a result of reaction. The equations of reaction of burning include molecules, atoms of carbon, hydrogen or atoms of carbon, hydrogen and oxygen, the sequence coefficient is equal 2n/n, and the value of weight of initial organic substance proportionally raises or decreases on 28 a.w.u, the basic participant of reaction of oxygen O_2 - on 96 a.w.u and the basic products of reaction of carbonic gas CO_2 - on 88 a.w.u and water H_2O - on 36 a.w.u.

Examples are resulted:

1) $2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O + Q$

$2*16=32 + 4*32=128 = 2*44=88 + 4*18=72$

2) $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$

2*30=60 + 7*32=224 = 4*44=176 + 6*18=108

3) $2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O + Q$

2*44=88 + 10*32=320 = 6*44=264 + 8*18=144

4) $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$

2*58= 116 + 13*32=416 = 8*44=352 + 10*18=180

Examples of the class of aldehydes:

1) $2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$

2*30=60 + 2*32=64 = 2*44=88 + 2*18=36

2) $2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$

2*44=88 + 5*32=160 = 4*44=176 + 4*18=72

3) $2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$

2*58=116 + 8*32=256 = 6*44=264 + 6*18=108

4) $2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$

2*72=144 + 11*32=352 = 8*44=352 + 8*18=144

Among the equations of reaction of burning of the organic substances consisting of atoms of carbon, hydrogen, nitrogen or carbon, hydrogen, nitrogen and oxygen, sequence coefficient 4n/n, the value of weight of initial organic substance proportionally raises or decreases on 56 a.w.u, weights of the basic participant of reaction of oxygen O_2 - on 192 a.w.u and weights of the basic products of reaction of carbonic gas CO_2 on 176 a.w.u and water H_2O - on 72 a.w.u.

Examples are resulted:

1) $4CH_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$

4*31=124 + 9*32=288 = 4*44=176 + 10*18=180 + 2*28=56

2) $4C_2H_7N + 15O_2 \rightarrow 8CO_2 + 14H_2O + 2N_2 + Q$

4*45=180 + 15*32=480 = 8*44=352 + 14*18=252 + 2*28=56

3) $4C_3H_9N + 21O_2 \rightarrow 12CO_2 + 18H_2O + 2N_2 + Q$

4*59=236 + 21*32=672 = 12*44=528 + 18*18=324 + 2*28=56

Examples of the class of nitroalkanes:

1) $4CH_3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$

4*61=244 + 3*32=96 = 4*44=176 + 6*18=108 + 2*28=56

2) $4C_2H_5NO_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$

4*75=300 + 9*32=288 = 8*44=352 + 10*18=180 + 2*28=56

3) $4C_3H_7NO_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$

4*89=356 + 15*32=480 = 12*44=528 + 14*18=252 + 2*28=56

4) $4C_4H_9NO_2 + 21O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$

4*103=412 + 21*32=672 = 16*44=704 + 18*18=324 + 2*28=56

Comparing weights of the substances which have entered reaction of a number of equations with weights of substances, formed in reaction, it is possible to see consecutive change of quantity of substances. This consecutive change of quantity of substances submits to the same law in change of high-molecular compounds (protein, oils, carbohydrates, etc.) in low-molecular compounds (amino acids, glycerin, high-molecular carboxylic acids, glucose, carbonic gas, water, etc.).

Results confirm the classical law that **«the weight of the substances entered reaction is equal to weight of the substances formed as a result of reaction»** is expedient to express as a logic continuation of the law. **«In chemical reactions the quantity of weight of substance increases or decreases, and one of consecutive changes»** can be characterized as followed: **«Among the equations of reaction of burning the quantity of weight of the substances entered reaction, and**

quantity of weight of the substances formed as a result of reaction, increase or decrease on one of the consecutive changes».

These results once again confirm the possibility of algorithmization and modeling of chemical reactions by mathematical ways.

It is possible to assert that the chemical processes occurring in the animate and inanimate nature, quantity of weights of the substances participating in given chemical processes, occur on the basis of the certain and consecutive increase and reduction. So, each chemical process submits to any mathematical laws.

The table of "chemical algorithms» expressions coefficient the value for oxygen (O_2), carbonic gas (CO_2) and waters (H_2O)

The basic classes of organic connections	Expression of coefficient of the value of oxygen O_2	Expression of coefficient of the value of carbon dioxide (CO_2)	Expression of coefficient of the value of water (H_2O)
1. Limiting hydrocarbons	2n + m	[n + (m – 1)]	[n + (m + 1)]
2. Cycloparaffins and numbers ethylene hydrocarbons	2n + m	(n + m)	n + m
3. Numbers diene and acetylene hydrocarbons	2n + m	[n + (m + 1)]	[n + (m – 1)]
4. Aromatic hydrocarbons	2n + m	[n + (m + 3)]	[n + (m – 3)]
5. One-nuclear alcohols and simple aethers	2n + m	n + m	[n + (m + 2)]
6. Two-nuclear alcohols	2n + m	[n + (m + 1)]	[n + (m + 3)]
7. Aldehydes, ketones and unsaturated alcohols	2n + m	[n + (m + 1)]	[n + (m + 1)]
8 The one-basic carboxylic acids and difficult aethers	2n + m	[n + (m + 2)]	[n + (m + 2)]
9. The one-basic unsaturated carboxylic acids, dialdehydes and diketones	2n + m	[n + (m + 3)]	[n + (m +1)]
10. More unsaturated carboxylic acids	2n + m	[n + (m + 4)]	n + m
11. The bibasic carboxylic acids	2n + m	[n + (m + 5)]	[n + (m + 3)]
12. The bibasic unsaturated carboxylic acids	2n + m	[n + (m + 6)]	[n + (m +2)]
13. Monoxicarboxylic acids	2n + m	[n + (m + 3)]	[n + (m + 3)]
14. Unsaturated aldehydes and ketones	2n + m	[n + (m + 2)]	n + m
15. Aldehyde ketone acids	2n + m	[n + (m + 4)]	[n + (m + 2)]
16.Aromatic aldehydes and ketones	2n + m	[n + (m + 5)]	[n + (m – 3)]
17. Aromatic alcohols	2n + m	[n + (m + 4)]	[n + (m – 2)]
18. Amines	5n + m	[3n + (m – 3)]	[3n + (m + 3)]
19. Amino acids and nitroalkanes	5n + m	[3n + (m + 3)]	[3n + (m + 5)]
20. Amides acids	5n + m	[3n + (m + 1)]	[3n + (m + 3)]
21. Diaminocarbon acids	5n + m	[3n + (m + 2)]	[3n + (m + 6)]
22. Aminodicarbon acids	5n + m	[3n + (m + 9)]	[3n + (m + 7)]
23 Hydroxy-amino acids	5n + m	[3n + (m + 5)]	[3n + (m + 7)]

The value table (n) and (m) the first representative of "chemical algorithm» homologues the basic class of organic connections

The basic classes of organic connections	The general formula of main classes of organic connections	The formula homologues the first representative	The value of numbers (n) And (m)
1. . . Limiting hydrocarbons	C_nH_{2n+2}	$C\ H_4$	n = 1 m = 2
2. Cycloparaffins and numbers ethylene hydrocarbons	$C_nH_{2\cdot n}$	C_2H_4	n = 2 m = 2
3. . Numbers diene and acetylene hydrocarbons	$C_nH_{2\cdot n-2}$	C_2H_2	n = 2 m = 1
4. Aromatic hydrocarbons	$C_nH_{2\cdot n-6}$	C_6H_6	n = 6 m = 3
5. One-nuclear alcohols and simple aethers	$C_nH_{2\cdot n+2}O$	$C\ H_4O$	n = 1 m = 1
6 Two-nuclear alcohols	$C_nH_{2n+2}O_2$	$C_2H_6O_2$	n = 2 m = 1
7. . Aldehydes, ketones and unsaturated alcohols	$C_nH_{2n}O$	$C\ H_2O$	n = 1 m = 0
8. The one-basic carboxylic carboxylic acids and difficult aethers	$C_nH_{2n}O_2$	$C\ H_2O_2$	n = 1 m = -1
9. The one-basic unsaturated carboxylic acids, dialdehydes and diketones	$C_nH_{2n-2}O_2$	$C_3H_4O_2$	n = 3 m = 0
10 More unsaturated carboxylic acids	$C_nH_{2n-4}O_2$	$C_4H_4O_2$	n = 4 m = 0
11. The bibasic carboxylic acids	$C_nH_{2\cdot n-2}O_4$	$C_2H_2O_4$	n = 2 m = -3
12. The bibasic unsaturated carboxylic acids	$C_nH_{2n-4}O_4$	$C_4H_4O_4$	n = 4 m = -2
13. . Monoxicarboxylic acids	$C_nH_{2n}O_3$	$C_3H_4O_3$	n = 2 m = -1
14. Unsaturated aldehydes and ketones	$C_nH_{2n-2}O$	C_3H_4O	n = 3 m = 1
15. Aldehyde ketone acids	$C_nH_{2n-2}O_3$	$C_2H_2O_3$	n = 2 m = -2
16. Aromatic aldehydes and ketones	$C_nH_{2\cdot n-8}O$	C_7H_6O	n = 7 m = 2
17. Aromatic alcohols	$C_nH_{2n-6}O$	C_7H_8O	n = 7 m = 3
18. Amines	$C_nH_{2n+3}N$	$C\ H_3N$	n = 1 m = 4
19. Amino acids and nitroalkanes	$C_nH_{2n+1}N\ O_2$	$C\ H_3N\ O_2$	n = 1 m = -2
20. Амиды acids	$C_nH_{2n+1}N\ O$	$C\ H_3N\ O$	n = 1 m = 0
21. Diaminocarbon acids	$C_nH_{2n+2}N_2O_2$	$C_2H_6N_2O_2$	n = 2 m = 0
22. Aminodicarbon acids	$C_nH_{2n-1}N\ O_4$	$C_3H_5N\ O_4$	n = 3 m = -6
23. . Hydroxy-amino acids	$C_nH_{2n+1}N\ O_3$	$C_3H_7N\ O_3$	n = 3 m = -2

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Contents

O'ZBEKISTON RESPUBLIKASI XALQ TA'LIMI VAZIRLIGI

SURXONDARYO VILOYAT PEDAGOG KADRLARNI QAYTA TAYYORLASH VA MALAKASINI OSHIRISH INSTITUTI

Xolmurod Egamberdiev

KIMYOVIY ALGORITMLARNING NAZARIY ASOSLARI

(Ilmiy metodik qo'llanma)

TOSHKENT–2011

Ushbu ilmiy- uslubiy qo'llanmada organik kimyo fanida birinchi marta "kimyoviy algoritm", "indeks–ifoda", "izchillik koeffisienti" va "koeffisient qiymati ifodasi" kabi tushunchalarni tatbiq etishga harakat qilingan.

Mazkur tushunchalar asosida ma'lum bir sinfga kiradigan umumiy formula bilan ifodalanadigan organik moddalar gomologlari vakillarining yonish reaksiya tenglamalarini tuzish va koeffisientlar qo'yib tenglashtirishning bir necha variantlari keltirilgan. Shuningdek, qo'llanmada **"Kimyoviy reaksiyalarda moddalar massalari miqdorlarining ma'lum bir izchillikda o'zgarib, ortib yoki kamayib borishi"** qonuni asoslab berilgan.

Muallif tomonidan ishlab chiqilgan "kimyoviy algoritm"larga oid qoidalar ham kimyo fanini qiziqib o'rganuvchi o'quvchilarni befarq qoldirmaydi. Qo'llanma maktab o'quvchilari, talabalar, o'qituvchilar va tadqiqotchi-kimyogarlarga mo'ljallab yozilgan.

Ma'sul muharrir:

kimyo fanlari nomzodi, dotsent
Habibulla Tojimuhamedov

Taqrizchilar:

kimyo fanlari doktori, professor
Anvar Abdishukurov

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KIMYOVIY REAKSIYALARNI ALGORITMLAShNING ISTIQBOLLARI

Mustaqillikning dastlabki yillaridanoq amaliy ishlarga keng yo'l ochib berildi hamda bu borada mamlakatimizda kimyo fani va sanoatini rivojlantirishda ulkan yutuqlar qo'lga kiritila boshladi. Buxoro neftni qayta ishlash zavodining ishga tushirilishi, Farg'onadagi neftni qayta ishlash zavodining rekonstruksiya qilinishi, Sho'rtangaz kimyo majmuasining qurib foydalanishga topshirilishi, shuningdek, bugungi kunda zamonaviy texnologiyalar bilan jihozlangan Zarafshon va Olmaliqdagi kon metallurgiya zavodlari yoki yaqin yillarda qurib foydalanishga topshirilgan Qoraqalpog'iston Respublikasidagi Qo'ng'irot soda zavodida ishlab chiqarilayotgan jahon standartlariga to'la javob bera oladigan eksportbop kimyoviy mahsulotlar mamlakatimiz iqtisodiyotini yuksaltirishda o'zining munosib hissasini qo'shmoqda.

Mamlakatimizda kimyo sanoatining rivojlanishi kimyoviy ta'limni rivojlantirish bilan chambarchas va uzviy bog'liq. Negaki, o'sib kelayotgan yoshlarimiz orasidan shu sohaning yetuk mutaxassislarini tayyorlash ham ustuvor vazifalardan biri sifatida belgilangan.

Xususan, 2004–2009-yillarga mo'ljallangan maktab ta'limini rivojlantirishning Davlat umummilliy dasturiga muvofiq bugungi kunga kelib akademik litseylar, kasb-hunar kollejlarida tabiiy fanlarning o'qitilishi uchun yaratilayotgan beqiyos imkoniyatlar yoki Respublikamizdagi deyarli barcha umumta'lim maktablarining kimyo - biologiya, fizika o'quv xonalarining xalqaro talablar darajasida qayta qurilishi va laboratoriya xonalarining zamonaviy asboblar, uskunalar va reaktivlar bilan ta'minlanishi ham bu sohaga alohida e'tibor berilayotganligiga dalolatdir.

XXI asrga kelib ta'limning turli bo'g'inlarida (maktablar, akademik litseylar, kasb - hunar kollejlari va oliy o'quv yurtlari) kimyoviy ta'limni takomillashtirishni hayotning o'zi taqozo etmoqda.

Chunonchi, hozirgi zamon odami qanday kasbni egallamasin, minglab turdagi tabiiy, sun'iy va sintetik usullarda olingan oziq - ovqat, dori - darmon, kiyim - kechak va sanoat mahsulotlaridan keng foydalanadi. Bundan tashqari qishloq xo'jaligi, qurilish yoki xalq xo'jaligining kerakli zaruriy, ehtiyojbop mahsulotlari ham bugungi kun zamonaviy kimyoviy ishlab chiqarishning mahsulidir. Mazkur mahsulotlarning kimyoviy tarkibi va xossalarini har bir kishining bilishi, ulardan to'g'ri, oqilona va tejab foydalana olishlari uchun ham juda zarurdir.

Shu sababli bugungi yosh avlodga maktab partasidayoq dastlabki kimyoviy bilim va tushunchalar puxtaroq o'rgatilishi lozim. Shuningdek, zamonaviy yosh kimyogarning kimyoviy jarayonlarni teranroq anglashlari uchun ham fizik, ham matematik bilimlar, qonunlar va qonuniyatlarni chuqurroq bilishlari hamda amalda tatbiq eta olishlari ayni muddaodir.

Prezidentimiz Islom Abdug'aniyevich Karimov ta'kidlaganlaridek: «Muhammad Muso Xorazmiyning o'nlik sanoq sistemasini, algoritm va algebra tushunchalarini dunyoda birinchi bo'lib ilm-fan sohasida joriy etgani va shu asosda aniq fanlar rivoji uchun o'z vaqtida mustahkam asos yaratgan umuminsoniy taraqqiyot rivojida qanday katta ahamiyatga ega bo'lganini barchamiz yaxshi bilamiz»[4]. Mazkur ilmiy-uslubiy qo'llanmada "algoritm" tushunchasini "kimyoviy algoritm" tushunchasi sifatida talqin etishga harakat qilingan. Muallifning "kimyoviy algoritm"larga oid dastlabki ilmiy ishlanmalari Toshkentda 2008 yil 28-aprel– 4-may kunlari 42-Mendeleev olimpiadasi munosabati bilan o'tkazilgan "Maktab kimyo ta'limining dolzarb muammolari" mavzusidagi xalqaro konferensiya materiallari to'plamiga maqola sifatida kiritilgan. Shuningdek, mazkur ilmiy va metodik ishlanmaning to'ldirilgan va qayta ishlangan mukammalroq variantlari "Uchitel Uzbekistana" (№41, 10.10.2008- yil) "Surxon Ziyosi" (№ 10-11, 2008 yil) sahifalarida e'lon qilingan.

Kimyoning hozirgi zamondagi eng muhim vazifasi - oldindan belgilangan xossali moddalar olish va sanoat ishlab chiqarishini jadallashtirishdan, chiqindisiz texnologiyalarni yaratishdan iborat. Uning yana bir muhim vazifasi - kimyoviy o'zgarishlar energiyasidan foydalanishdir. Bugungi kunda nanotexnologiyalar sohasida erishilayotgan yutuqlar fikrimizga yorqin misoldir. Kimyoni ajoyib o'zgarishlar industriyasi deyish mumkin. U tabiatda bo'lmaydigan materiallarni sintez qilishga, ulardan turli- tuman mashina va asboblar yaratish uchun, turar-joy binolari qurish va xalq iste'moli mollari ishlab chiqarish uchun foydalanishga imkon berdi. Sintetik kauchuklar, plastmassalar, sun'iy tolalar, sun'iy yoqilg'ilar, bo'yoqlar, dori-darmonlar, tibbiyotda muvaffaqiyat bilan qo'llanilayotgan biopolimerlar va insoniyat uchun zarur bo'lgan boshqa juda ko'plab moddalar kimyo sanoatining asosiy mahsulotlaridir. Kimyoning imkoniyatlari bitmas-tuganmasdir. Faqat neftning o'zidan 20 mingdan ortiq, toshko'mirdan esa bundan ham ko'poq organik moddalarni olish mumkin. Sanoatda hozirgi vaqtda 500 mingga yaqin (asosan organik) moddalar ishlatilmoqda. Umuman olganda, odamzod foydalanayotgan mahsulotlarning 97 % i kimyoviy ishlab chiqarish jarayoni mahsulidir.

Demak, zamonaviy kimyo fani va sanoati insoniyat hayoti va faoliyatining hamma sohalarini qamrab oldi, desak to'g'riroq bo'ladi. Organik kimyo faniga oid o'quv qo'llanmalari, ilmiy va ilmiy-ommabop adabiyotlarda keltirilishicha, har kuni jahondagi turli mamlakatlarning ilmiy - tadqiqot institutlari laboratoriyalarida yuzlab turdagi organik moddalar hosil qilinmoqda.

Ayrim ma'lumotlarga qaraganda, ularning soni 38 millionga yetgan. Zamonaviy kimyoning uch sohasi-kinetika, stereokimiyo va eritmalar to'g'risidagi ta'limotning asoschisi, dunyoda birinchi Nobel mukofotining sohibi gollandiyalik mashhur kimyogar Yakob Genrix Vant- Goff Janubiy Gollandiya provinsiyasining Delfte oliy politexnika maktabiga 1869 yilda kirish imtihonlarini topshiradi. Shunda imtihon oluvchi professorning "Organik sintez qaergacha borib qolishi mumkin" degan savoliga o'n etti yashar maktab bitiruvchisi "Hujayragacha" deb javob beradi.

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[4] Islom Karimov «Yuksak ma'naviyat –yengilmas kuch» T.: « Ma'naviyat », 2008. 41-bet.

Darhaqiqat, ulug' olim bashorat qilganidek bugungi kunga kelib, zamonaviy organik kimyo fani sohasida erishilgan yutuqlar tufayli, tirik organizmlar hujayrasida kechayotgan kimyoviy jarayonlarni yanada chuqurroq o'rganish imkoniyatlari paydo bo'ldi.

XX asrning oxiri, XXI asrning boshlariga kelib DNK kodi tuzilishining kashf qilinishi, tirik organizmlarni "klonlash" borasida amalga oshirilgan ishlar, haqiqatan ham so'nggi yillarda organik kimyo fani sohasida erishilgan yutuqlar tufaylidir.

Organik kimyodagi muhim bilim va tushunchalardan biri yonish reaksiya tenglamalaridir. Organik kimyo kimyoviy ta'limning qaysi bo'g'inida o'qitilishidan qat'i - nazar kimyoni o'rganuvchilar har qanday organik modda yonish xususiyati bilan noorganik moddalardan farqlanishini yaxshi anglaydilar. Maktab, kasb-hunar kollejlari, akademik litseylar yoki oliy o'quv yurtlari uchun mo'ljallab yozilgan organik kimyo darsliklarida organik birikmalarning ma'lum bir sinfi gomologlari vakillarining fizikaviy va kimyoviy xossalari to'g'risidagi bilimlar batafsil yoritilgan bo'lsada, ularning yonish reaksiya tenglamalarini tuzish va tenglashtirishga oid tushunchalar deyarli o'z aksini topmagan.

Tahlillar shuni ko'rsatadiki, keyingi yillarda nashr qilingan darslik va o'quv qo'llanmalarida turli sinflarga mansub organik moddalar gomologlari vakillarining umumiy yonish reaksiya tenglamalari keltirilgan. Yoki ayrim kimyoviy ta'limga oid jurnallarda jumladan, "Ximiya v shkole" 2008 (№ 11), yoki G.P. Xomchenkoning; ("Kimyo" oliy o'quv yurtlariga kiruvchilar uchun (T.: "O'qituvchi", 2007, 427-bet) o'quv qo'llanmasida: $C_nH_{2n+2}+(1.5n+0.5)O_2 \rightarrow nCO_2+(n+1)H_2O$ professorlar N.E.Kuzmenko va V.I.Tereninlarda (Ximiya-2005 "Vstupitelniye ekzameni v MGU", M., .2005.67-bet), $C_nH_{2n+1}CHO+(\frac{3n+2}{2})O_2 \rightarrow (n+1)CO_2+(n+1)H_2O$ hamda O.S.Gabrielyan va boshqalarning (Ximiya. 10 klass. "Drofa", M., 2005. 74-bet) $C_nH_{2n+2}+(\frac{3n+1}{2})O_2 \rightarrow nCO_2+(n+1)H_2O$ o'quv qo'llanmalarida keltirilgan umumiy tenglamalar va mazkur tenglamalardagi kasr sonlar yonish reaksiya tenglamalari uchun koeffisientlar tanlash va aniqlashni ancha murakkablashtiradi.

Muallif tomonidan ishlab chiqilgan ushbu ilmiy-uslubiy ishlanmada esa, turli sinflarga mansub organik moddalarning yonish reaksiya tenglamalari "kimyoviy algoritmlari" matematik qonunyatlarga batamom mos keladi.

Ilmiy ishlanmada organik moddalarning yonish reaksiya tenglamalarini tuzish va koeffisientlar qo'yib tenglashtirish qandaydir mavhumlikka emas, balki aniq matematik qonuniyatlarga bo'ysunishi asoslab berilgan. Faqat "matematik algoritmlar" emas, balki "kimyoviy algoritmlar" ham kimyo fanida mavjud ekanligi o'z tasdig'ini topgan.

Avvalo, muallif tomonidan organik kimyo fanida birinchi marta "kimyoviy algoritm", "indeks-ifoda", "ketma-ketlik" yoki "izchillik koeffisienti", hamda "koeffisient qiymati ifodasi" kabi tushunchalarni tatbiq etishga harakat qilingan.

Ya'ni muallif organik moddalardagi vodorod (H) atomlari sonini ko'rsatuvchi kattalikni "indeks-ifoda" deb nomlagan. Ushbu "indeks-ifoda"larning qiymatlari 2n, 2n + m, 2n - m bo'lishi mumkinligini tasdiqlagan holda, ana shu kattaliklarning qisman yoki aynan takrorlanishi orqali, yonish reaksiyalari tenglamalari qatorida asosiy reaksiya mahsulotlari bo'lgan karbonat angidrid CO_2 va suv H_2O uchun koeffisientlar qiymatlarini aniqlovchi sonlar hosil bo'ladi, deb hisoblaydi. Muallif "izchillik koeffisienti" iborasini tatbiq qilish orqali esa organik moddalarning ma'lum bir sinfiga kiruvchi gomologlari vakillarining yonish reaksiyalari tenglamalari qatorida reaksiyaga kirishgan va hosil bo'lgan moddalar koeffisient qiymatlarining yoki massalari miqdorlarining ma'lum bir izchillikda o'zgarib, ortib borishini aniqlagan. Ushbu qonuniyatlardan kelib chiqib, algoritm-bu ma'lum bir izchillikda bajariladigan matematik amallar tartibidir deb izohlar ekan, "kimyoviy algoritm" tushunchasiga alohida ta'rif berishga harakat qilgan.

Shuningdek, qo'llanmada molekulasi tarkibi faqat uglerod, vodorod yoki uglerod, vodorod va kisloroddan iborat bo'lgan organik moddalarning yonish reaksiya tenglamalari qatorida "izchillik koeffisienti" (2n/n) yoki (2) qiymatlariga ega ekanligi aniqlangan. Organik moddalarning qaysi sinfiga kirishidan qat'i-nazar, molekulasi shunday tarkibli organik moddalar gomologlari vakillari yonish reaksiya tenglamalari qatorida kislorodning koeffisient qiymati (3) birlikka, asosiy yonish reaksiya mahsulotlari bo'lgan karbonat angidirid CO_2 va suvning H_2O koeffisient qiymatlari esa (2) birlikka ortib yoki kamayib borishi asoslab berilgan.

Molekulasi tarkibida uglerod, vodorod, azot yoki uglerod, vodorod, azot va kislorod tutgan organik moddalarning yonish reaksiya tenglamalari qatorida "izchillik koeffisienti" (4n/n) yoki (4) qiymatlarga teng bo'lganda reaksiyaning asosiy ishtirokchisi kislorodning koeffisient qiymati (6) birlikka, asosiy reaksiya mahsulotlari bo'lgan karbonat angidrid CO_2 va suvning H_2O koeffisient qiymatlari esa (4) birikka ortib yoki kamayib borishi misollar asosida izohlangan.

Muallif musbat va manfiy sonlarga oid algebraik tushunchalardan foydalanib, "kimyoviy algoritm"larning turli variantlarini ishlab chiqishga harakat qilgan. Jumladan, to'yingan uglevodorodlarda n = 1 bo'lganda m = 2 ga, alьdegidlarda n = 1 bo'lganda m = 0 ga, bir asosli karbon kislotalarda n = 1 bo'lganda m=-1 ga yoki alьdegido va ketoni kislotalarda n = 2 bo'lganda, m = -2 ga tengligi va shu kabi qonuniyatlar boshqa "kimyoviy algoritmlar" misolida ham asoslangan.

Demak, "kimyoviy algorit"mlarning turli variantlarini ishlab chiqishda musbat va manfiy sonlarga oid algebraik tushunchalardan samarali foydalanish mumkinligi ham ko'rsatib berilgan.

Ma'lumki, organik moddalardan chumoli alьdegidi $H-CHO$ va ushbu formula $H-COOH$ bilan ifodalanadigan chumoli kislotasida $-CHO$ yoki $-COOH$ funksional guruhlari faqat vodorod (H) atomlari bilan bog'langan, ya'ni mazkur moddalarda ($C\ H_2$) radikalining qiymati (0) ga teng. Muallif tomonidan ishlab chiqilgan "kimyoviy algoritmlar" ham mazkur moddalarda ($C\ H_2$) radikalining aynan (0) ga tengligini yana bir bor tasdiqlydi.

Muallif izlanish va tadqiqotlarini davom ettirar ekan, mashhur rus olimi M. V. Lomonosov tomonidan kashf etilgan **"Kimyoviy reaksiyaga kirishgan moddalarning massasi reaksiya natijasida hosil bo'lgan moddalarning massasiga tengligiga"** doir klassik qonunining yonish reaksiyalari tenglamalari qatorida mazkur moddalar massalari miqdorlarining ma'lum bir izchillikda o'zgarib, ortib yoki kamayib borishi bilan bog'liq tahlillari ham e'tiborga loyiqdir. Ya'ni muallif qo'llanmaning "Kimyoviy algoritmlarning matematik tahlillari" mavzusida o'z xulosalarini shunday izohlaydi.

Yonish reaksiyalari tenglamalari qatorida molekulasi tarkibida uglerod, vodorod yoki uglerod, vodorod va kislorod tutgan hamda izchillik koeffisienti 2n/n bo'lgan birikmalarda dastlabki organik moddaning massasi 28.a.m.b.[5] ga, reaksiyaning asosiy ishtirokchisi kislorod O_2 massasi 96. a.m.b. ga va asosiy reaksiya mahsulotlari karbonat angidridning CO_2 massasi 88. a.m.b. ga hamda suvning H_2O massasi esa 36. a.m.b. qiymatiga proporsional ravishda ortib yoki kamayib boradi.

Shuningdek, yonish reaksiyalari tenglamalari qatorida molekulasi tarkibida uglerod, vodorod, azot yoki uglerod, vodorod, azot va kislorod tutgan hamda izchillik koeffisienti 4n/n bo'lgan birikmalarda dastlabki organik moddaning massasi 56 a.m.b ga reaksiyaning asosiy ishtirokchisi kislorodning O_2 massasi 192 a.m.b ga, va reaksiyaning asosiy mahsulotlari karbonat angidridning CO_2 massasi 176 a.m.b ga hamda suvning H_2O massasi esa 72 a.m.b. gi qiymatiga prporsional ravishda ortib yoki kamayib boradi. Muallif ushbu natijalar asosida **"reaksiyaga kirishgan moddalarning massasi reaksiya natijasida hosil bo'lgan moddalarning massasiga tengligiga"** doir kimyo fani klassik qonunining mantiqiy davomi sifatida **"Yonish reaksiyalari tenglamalari qatorida reaksiyaga kirishgan va hosil bo'lgan moddalar massalarining miqdorlari ma'lum bir izchillikda o'zgarib, ortib yoki kamayib borish"**qonunini **"Kimyoviy reaksiyalarda moddalar massalari miqdorlarining ma'lum bir izchillikda o'zgarib, ortib yoki kamayib borish"** qonuni deb ta'riflashni maqsadga muvofiq deb hisoblaydi.

Qo'llanmaga ilova qilingan (1- ilova) kislorod O_2, karbonat angidrid CO_2 va suvning H_2O koeffisient qiymati ifodalari jadvali ham kimyoviy algoritmlarni o'rganuvchilarning (n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik ma'lum bir izchillikda o'zgarib borishini yaxshiroq tushunib olishlariga yaqindan yordam beradi. 2-ilovada "kimyoviy algoritm"larning organik moddalar gomologlarining dastlabki vakili uchun keltirilgan (n) va (m) qiymatlari jadvali II, III, IV variantlari uchun reaksiya tenglamalarini tuzish va koeffisientlar tanlab, tenglashtirishni osonlashtiradi.

Mamlakatimizda kimyo sanoati jadal rivojlanayotgan bir paytda "kimyoviy algoritm"larga oid tushunchalarning o'quv qo'llanmalari yoki darsliklarga kiritilishi uning kimyo fani va ta'limini rivojlantirishdagi nufuzini yanada

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[5] a.m.b – atom massa birligi.

oshirishga xizmat qiladi.

"Kimyoviy algoritm"lar ga oid tushunchalarning maktab, akademik lisey, kasb-hunar kollejlari va oliy o'quv yurtlari darsliklariga kiritilishi tufayli kimyoni o'rganuvchilar kimyoviy jarayonlar qandaydir mavhumlikka emas, balki aniq matematik qonuniyatlarga asoslanishini teranroq anglaydilar. Bizning fikrimizcha, "kimyoviy algoritm"lar organik kimyo fanida shu yo'nalishdagi dastlabki ilmiy ishlanmalar bo'lib hisoblanadi va mazkur ilmiy ishlanmalar fanlarning turli sohalarida (termokimyo, biokimyo, polimerlar kimyosi, molekulyar biologiya va boshqalar) kimyoviy reaksiyalarni algoritmlashning yangi-yangi ufqlarini ochadi. Bundan tashqari, muallif tomonidan ishlab chiqilgan "kimyoviy algoritm"larga oid qoidalar organik kimyo fanining nafaqat ilmiy-uslubiy, balki nazariy masalalarini hal qilishda ham muhim rol o'ynaydi, desak haqiqatga yaqinroq bo'ladi.

Bugungi kunda organik kimyo fani shiddat bilan rivojlanayotgan bir paytda zamonaviy matematik bilimlarni puxta o'zlashtirgan mamlakatimizning iqtidorli yosh kimyogarlari "kimyoviy algoritm"larni chuqurroq o'rganishga kirishadilar va uning yangi-yangi qirralarini topishga harakat qiladilar deb ishonch bildiramiz.

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KIMYOVIY ALGORITM»LARNING ASOSIY TUSHUNCHALARI VA QOIDALARI

Barcha fundamental fanlarda tabiat qonunlarini yozish uchun matematik abstraksiya va modellardan doimo samarali foydalanib kelingan. Bizning asrimizga kelib, kompyuter va hisoblash texnikasi insoniyat hayotining hamma qirralariga tobora shiddat bilan kirib kelayotganligi ham matematik qonuniyatlar tabiiy fanlar, xususan, kimyo fani uchun muhim ahamiyat kasb etmoqda. Shuning uchun bugungi zamonaviy kimyogar matematik modellar va qonuniyatlarni mukammal bilishi, uni kimyoviy jarayonlarni chuqurroq va kengroq tasavvur qilishlari uchun amalda tatbiq qila olish ko'nikmalariga ega bo'lishi lozim. Ayniqsa, yonish reaksiya tenglamalari uchun koeffisientlar tanlab, tenglashtirishda matematik algoritmlarning qulay imkoniyatlari mavjud.

Algoritm – bu ma'lum bir izchillikda bajariladigan matematik amallar tartibidir. Ma'lumki, organik moddalarni kislorodda yonishining asosiy mahsulotlari karbonat angidrid va suv ekanligini yaxshi bilamiz.

Yonish reaksiya tenglamalaridagi dastlabki organik moddalar molekulasi tarkibidagi asosiy elementlardan biri vodorod atomlari sonini bildiruvchi "indeks-ifoda"lar (*2n+2, 2n-2, 2n, 2n-6* va hokazo) yonish reaksiya tenglamalarining asosiy mahsulotlari bo'lgan karbonat angidrid va suv H_2O uchun koeffisientlar qiymatlarini aniqlovchi sonlar bo'lib hisoblanadi.

Demak, "matematik algoritm" tushunchasini "kimyoviy algoritm" tushunchasiga almashtirib, organik moddalarning yonish reaksiya tenglamalarini tuzish va koeffisientlar qo'yib tenglashtirish uchun qo'llaniladigan algoritmlarni "kimyoviy algoritm"lar tushunchasi sifatida qabul qilish maqsadga muvofiqdir.

Kimyoviy algoritm – bu kimyoviy reaksiya tenglamalarini tuzish va koeffisientlar qo'yib tenglashtirish uchun qo'llaniladigan va ma'lum bir izchillikda bajariladigan matematik amallar tartibidir.

Molekulasi tarkibi faqat uglerod va vodorod yoki uglerod, vodorod va kisloroddan iborat bo'lgan organik birikmalarda vodorod atomlari sonini ko'rsatuvchi "indeks-ifoda"ning qiymati *2n* bo'lganda barcha yonish reaksiya tenglamalarining asosiy mahsulotlari karbonat angidrid CO_2 va suv H_2O uchun ham koeffisientlar qiymati *(2n)* "indeks-ifoda"ning qiymatiga teng bo'ladi.

Molekulasi tarkibidagi vodorod atomlari sonini ko'rsatuvchi "indeks-ifoda"lari o'zgaruvchan bo'lgan organik moddalarda, shuningdek, alkanlar C_nH_{2n+2}, asetilen va dien C_nH_{2n-2}, aromatik C_nH_{2n-6}, to'yinmagan bir asosli karbon kislotalar va alьdegidlar $C_nH_{2n-2}O_2$, $C_nH_{2n-2}O$, ikki asosli karbon kislotalar $C_nH_{2n-2}O_4$ va boshqalarda, asosiy yonish reaksiya mahsulotlaridan biri bo'lgan karbonat angidridning CO_2 koeffisient qiymati dastlabki organik modda tarkibidagi uglerod atomlari soni bilan izchillik koeffisienti qiymati ko'paytmasiga teng bo'lgan holda, suvning H_2O koeffisient qiymatlari esa, dastlabki organik modda indeks- ifodalarining qiymatlariga, ya'ni *2n+2* (alkanlarda), *2n-2* (asetilen va dien), *2n-6* (aromatik), *2n-2* ga (to'yinmagan karbon kislota va alьdegidlar) teng bo'ladi.

Organik moddalarning boshqa sinf vakillarining yonish reaksiya tenglamalarida ham ana shunday qonuniyat kuzatiladi.

Tarkibida azot saqlovchi hamda vodorodning "indeks-ifodasi" *(2n+3)* bo'lgan aminlarda -$C_nH_{2n+3}N$, shuningdek, molekulasi tarkibida C, H, O, N tutgan organik moddalarda vodorodlar sonini bildiruvchi, ya'ni "indeks-ifodasi" *(2n+1)* ga teng bo'lgan nitroalkanlar va aminokislotalar -$C_nH_{2n+1}NO_2$, kislota amidlari -$C_nH_{2n+1}NO$, oksiaminokislotalar-$C_nH_{2n+1}NO_3$, "indeks-ifoda"si *(2n+2)* bo'lgan diaminokarbon kislotalar-$C_nH_{2n+2}N_2O_2$ va "indeks-ifoda"si *(2n-1)* bo'lgan aminodikarbon kislotalarda-$C_nH_{2n-1}NO_4$ yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri bo'lgan karbonat angidridning CO_2 koeffisient qiymati dastlabki organik modda tarkibidagi uglerod atomlari soni bilan izchillik koeffisienti qiymati ko'paytmasiga teng bo'lgan holda, suvning H_2O koeffisient qiymati esa, organik modda indeks-ifodasining ikki karra nisbati qiymatiga, ya'ni

4n+6 (aminlarda), *4n+2* (nitroalkanlar, aminokislotalar, kislota amidlari, oksiaminokislotalar), *4n+4* (diaminokarbon kislotalar), *4n-2* (aminodikarbon kislotalarda) qiymatlariga teng bo'ladi.

Molekulasi tarkibida C, H yoki C, H, O atomlaridan iborat bo'lgan har qanday organik moddalarning yonish reaksiya tenglamalari "kimyoviy algoritm"ini ikki xil ko'rinishda, masalan, aromatik uglevodorodlar vakillarining reaksiya tenglamalari "kimyoviy algoritm"ini:

$$2n/nC_nH_{2n-6} + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q$$

yoki $2C_nH_{2n-6} + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q$ ko'rinishda ifodalash mumkin. Bunda dastlabki organik moddaning koeffisient qiymatini bildiruvchi *(2n/n)* yoki (2) kattaligi algoritmik amallarning ketma-ketlik va izchillikda bajarilishini ta'minlaydi va bu kattalikni "kimyoviy algoritm"larning "izchillik koeffisienti" deb ham qabul qilish maqsadga muvofiqdir.

Shuningdek, yonish reaksiya tenglamalari "kimyoviy algoritm"larida kislorodning koeffisient qiymati ham ma'lum bir qonuniyat asosida ortib boradi. Ya'ni, ma'lum bir sinfga kiruvchi organik moddalar vakillari gomologlarining yonish reaksiyalari tenglamalari qatorida ($C\,H_2$) radikalga o'zgarib borishi bilan, unga proporsional ravishda kislorodning koeffisient qiymatini bildiruvchi sonlar ham *(3)* birlikka, yonish reaksiya tenglamalarining asosiy mahsulotlari bo'lgan karbonat angidrid CO_2 va suvning H_2O koeffisientlar qiymatlari esa *(2)* birlikka ortib boradi.

Masalan, benzolning C_6H_6 yonish reaksiya tenglamasida kislorodning koeffisient qiymati 3n-3=3*[6]6-3=18-3=15 ga teng bo'lsa, u holda, toluol C_7H_8 da 3n-3=3*7-3=18 ga teng bo'ladi. Molekulasi tarkibida C, H, N yoki C, H, N, O atomlarini tutgan organik moddalarning yonish reaksiya tenglamalari "kimyoviy algoritmi"ni ham nitroalkanlar misolida:

$$4n/nC_nH_{2n+1}NO_2 + (6n-3)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

yoki $4C_nH_{2n+1}NO_2 + (6n-3)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$ bilan ifodalash mumkin. Bunda ham dastlabki organik modda koeffisient qiymatini bildiruvchi (4n/n) yoki (4) kattaligi dastlabki organik moddaning koeffisient qiymati bo'lib hisoblanadi va yonish reaksiya tenglamalari qatorida algoritmik amallar bajarilishining ketma-ketligini ta'minlaydi. Mazkur toifaga kiruvchi organik moddalar vakillarining gomologlari yonish reaksiya tenglamalari qatorida ($C\,H_2$) radikalga o'zgarib borishi bilan unga proporsional ravishda kislorodning koeffisient qiymati ham *(6)* birlikka, yonish reaksiya tenglamalarinig asosiy mahsulotlari bo'lgan karbonat angidrid CO_2 va suv H_2O uchun koeffisientlar qiymati esa *(4)* birlikka ortib boradi. Masalan, nitrometanning CH_3NO_2 yonish reaksiya tenglamasida kislorodning koeffisient qiymati *6n-3=6*1-3=3* ga teng bo'lsa, nitroetanda $C_2H_5NO_2$ kislorodning koeffisient qiymati *6n-3=6*2-3=9* teng

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*[6] Yulduzcha bilan kopaytiruv belgisi Ifodalangan.

bo'lgan holda, nitropropanda $C_3H_7NO_2$: *6n-3=6*3-3=15* ga teng bo'ladi.

Umuman, aksariyat organik moddalarning sifat va miqdoriy tarkibini ko'rsatuvchi umumiy formula bilan ifodalanadigan ma'lum bir sinfga kiruvchi organik moddalar gomologlari vakillari yonish reaksiya tenglamalari kimyoviy algoritmlarida organik modda molekulasi tarkibidagi vodorod atomlari sonini bildiruvchi "indeks-ifoda"larning qisman yoki aynan takrorlanishidan yonish reaksiya tenglamalaıining asosiy mahsulotlari bo'lgan karbonat angidrid CO_2 va suv H_2O uchun koeffisient qiymatlari hosil bo'ladi. Demak, "kimyoviy algoritm"lar yaxlit bilimlar tizimi bo'lib, uning tarkibiga quyidagi tushuncha va qoidalarni kiritish mumkin:

1. Har qanday organik modda tarkibidagi vodorod atomlari sonini ko'rsatuvchi kattalik "indeks-ifoda" deb ataladi.

2. Organik moddalarning qaysi sinfiga kirishidan qat'i nazar, har qanday organik modda tarkibidagi vodorod atomlari sonini ko'rsatuvchi "indeks-ifoda"ning qiymati (*2n, 2n+m, 2n-m*) bo'lishi mumkin.

3. Algoritmik amallarning ketma-ketlik yoki izchilligini ta'minlovchi (*2n/n*) *(2)*, (*4n/n*) yoki *(4)* qiymatlari dastlabki organik moddaning koeffisient qiymati bo'lib hisoblanadi va "kimyoviy algoritm"larning ketma-ketlik yoki izchillik koeffisienti deb ataladi.

4. Yonish reaksiyalari tenglamalari qatorida ketma-ketlik yoki izchillik koeffisienti (*2n/n*) yoki *(2)* qiymatga teng bo'lganda, organik moddalar gomologlari vakillari (CH_2) radikalga o'zgarib borishi bilan, unga proporsional ravishda reaksiyaning asosiy ishtirokchisi kislorodning (O_2) koeffisienti qiymati *(3)* birlikka, reaksiyaning asosiy mahsulotlari bo'lgan karbonat angidrid CO_2 va suvning H_2O koeffisient qiymatlari esa *(2)* birlikka ortib yoki kamayib boradi.

5. Yonish reaksiyalari tenglamalari qatorida ketma-ketlik, yoki izchillik koeffisienti (*4n/n*) yoki *(4)* qiymatga teng bo'lganda, organik moddalar gomologlari vakillari (CH_2) radikalga o'zgarib borishi bilan, unga proporsional ravishda reaksiyaning asosiy ishtirokchisi kislorodning koeffisient qiymati *(6)* birlikka, reaksiyaning asosiy mahsulotlari bo'lgan karbonat angidrid CO_2 va suvning H_2O koeffisient qiymatlari esa *(4)* birlikka ortib yoki kamayib boradi.

6. Yonish reaksiyalari tenglamalari qatorida "kimyoviy algoritm"larning ketma-ketlik yoki izchillik koeffisienti (*2n/n*) yoki *(2)* qiymatga teng bo'lganda, yonish reaksiya tenglamalarining asosiy mahsulotlari bo'lgan karbonat angidridning CO_2 koeffisient qiymati dastlabki organik modda

tarkibidagi uglerod atomlari soni bilan izchillik koeffisienti qiymati ko'paytmasiga, suvning H_2O koeffisient qiymati esa dastlabki organik modda "indeks-ifodasi"ning qiymatiga teng bo'ladi.

7. Yonish reaksiyalari tenglamalari qatorida "kimyoviy algoritm"larning ketma-ketlik yoki izchillik koeffisienti (*4n/n*) yoki *(4)* qiymatga teng bo'lganda, yonish reaksiya tenglamalarining asosiy mahsulotlari bo'lgan karbonat angidridning CO_2 koeffisient qiymati dastlabki organik modda tarkibidagi uglerod atomlari soni bilan izchillik koeffisienti qiymati ko'paytmasiga, suvning H_2O koeffisient qiymati esa, dastlabki organik modda "indeks- ifodasi"ning ikki baravar qiymatiga teng bo'ladi.

Tadqiqotlar shuni ko'rsatadiki, kimyoviy algoritmlarning turli shakllari mavjud bo'lib, ular uchun umumiy bo'lgan quydagi qoidani ham tatbiq etish maqsadga muvofiqdir.

Yonish reaksiyalari tenglamalari qatorida yonish reaksiya tenglamalarining asosiy mahsulotlari bo'lgan karbonat angidridning CO_2 koeffisient qiymati dastlabki organik modda tarkibidagi uglerod atomlari soni bilan "izchillik koeffisienti" qiymati ko'paytmasiga, suvning H_2O koeffisient qiymati ham dastlabki organik modda indeks ifodasi qiymatiga azotli organik birikmalarda esa, dastlabki organik modda "indeks - ifodasi" qiymatining ikki baravariga teng bo'ladi.

Qo'llanmada dastlab to'yingan uglevodorodlar gomologlari vakillarining yonish reaksiya tenglamalariga doir kimyoviy algoritmlar keltirilgan

TO'YINGAN UGLEVODORODLAR

To'yingan uglevodorodlar tabiatda keng tarqalgan bo'lib, ular odatda, sof holda emas, balki murakkab aralashmalar holida uchraydi. Ularning eng asosiy manbalari neftь va tabiiy gaz bo'lib hisoblanadi. Bu sinf vakillarining ko'pgina aralashmalari o'simliklarda ham topilgan. Masalan, normal geptan C_7H_{16} qarag'ay daraxtidan ajratib olingan. Eykozan $C_{20}H_{42}$ petrushka bargida, nonakozan $C_{29}H_{60}$ karam bargida topilgan. To'yingan uglevodorodlar gomologlari vakillarining umumiy formulasi C_nH_{2n+2} ekanligini bilgan holda, ularning yonish reaksiya tenglamalari kimyoviy algoritmini ushbu ko'rinishda ifodalash mumkin:

$$\frac{2n}{n}C_nH_{2n+2} + (3n+1)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q$$

Yuqorida keltirilgan algoritmdan foydalanib, metanning yonish reaksiya tenglamasi quydagicha tuziladi.

Metanning kislorodda yonishi: CH_4

1) $\frac{2*1}{1}C_1H_{2*1+2}+(3*1+1)O_2 \to (2*1)CO_2+(2*1+2)H_2O$,

$2CH_4+4O_2 \to 2CO_2+4H_2O$,

Tenglamaning chap va o'ng tomonini bir xil songa qisqartirib, kichik koeffisientlarni aniqlaymiz.

$CH_4+2O_2 \to CO_2+2H_2O+Q$.

Etanning kislorodda yonishi: C_2H_6

2) $\frac{2*2}{2}C_2H_{2*2+2}+(3*2+1)O_2 \to (2*2)CO_2+(2*2+2)H_2O$,

$2C_2H_6+7O_2 \to 4CO_2+6H_2O+Q$.

Propanning kislorodda yonishi: C_3H_8

3) $\frac{2*3}{3}C_3H_{2*3+2}+(3*3+1)O_2 \to (2*3)CO_2+(2*3+2)H_2O$,

$2C_3H_8+10O_2 \to 6CO_2+8H_2O$,

$C_3H_8+5O_2 \to 3CO_2+4H_2O+Q$.

Butanning kislorodda yonishi: C_4H_{10}

4) $\frac{2*4}{4}C_4H_{2*4+2}+(3*4+1)O_2 \to (2*4)CO_2+(2*4+2)H_2O$,

$2C_4H_{10}+13O_2 \to 8CO_2+10H_2O+Q$.

Pentanning kislorodda yonishi: C_5H_{12}

5) $\frac{2*5}{5}C_5H_{2*5+2}+(3*5+1)O_2 \to (2*5)CO_2+(2*5+2)H_2O$,

$2C_5H_{12}+16O_2 \to 10CO_2+12H_2O$,

Tenglamaning chap va o'ng tomonini bir xil songa qisqartirib, kichik koeffisientlarni aniqlaymiz.

$C_5H_{12}+8O_2 \to 5CO_2+6H_2O+Q$.

Geksanning kislorodda yonishi: C_6H_{14}

6) $\frac{2*6}{6}C_6H_{2*6+2}+(3*6+1)O_2 \to (2*6)CO_2+(2*6+2)H_2O$,

$2C_6H_{14}+19O_2 \to 12CO_2+14H_2O+Q$.

Geptanning kislorodda yonishi: C_7H_{16}

7) $\frac{2*7}{7}C_7H_{2*7+2}+(3*7+1)O_2 \to (2*7)CO_2+(2*7+2)H_2O$,

$2C_7H_{16}+22O_2 \to 14CO_2+16H_2O+Q$,

$C_7H_{16}+11O_2 \to 7CO_2+8H_2O+Q$.

Oktanning kislorodda yonishi: C_8H_{18}

8) $\frac{2*8}{8}C_8H_{2*8+2} + (3*8+1)O_2 \rightarrow (2*8)CO_2 + (2*8+2)H_2O$,

$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O + Q$.

Nonanning kislorodda yonishi: C_9H_{20}

9) $\frac{2*9}{9}C_9H_{2*9+2} + (3*9+1)O_2 \rightarrow (2*9)CO_2 + (2*9+2)H_2O$,

$2C_9H_{20} + 28O_2 \rightarrow 18CO_2 + 20H_2O + Q$,

$C_9H_{20} + 14O_2 \rightarrow 9CO_2 + 10H_2O + Q$.

Dekanning kislorodda yonishi: $C_{10}H_{22}$

10) $\frac{2*10}{10}C_{10}H_{2*10+2} + (3*10+1)O_2 \rightarrow (2*10)CO_2 + (2*10+2)H_2O$,

$2C_{10}H_{22} + 31O_2 \rightarrow 20CO_2 + 22H_2O + Q$.

Bu sinf gomologlari vakillari kimyoviy algoritmining ushbu II variantida yonish reaksiya tenglamalarinng asosiy ishtirokchilaridan biri - kislorod O_2 moddasi uchun koeffisient qiymati ifodasi $(2n+m)$ keltirilgan. Shuningdek koeffisientlar tanlab tenglashtirishda (n) va (m) sonlaridan foydalanilgan va ular orasidagi ketma-ketlikdagi bog'liqlik ko'rsatib berilgan. Bunda (n) va (m) qiymatlari bitta birlikka farq qiladi, ya'ni n = 1 bo'lganda, m = 2 yoki n = 5 bo'lganda, m = 6 ga teng bo'ladi. Demak, (n) va (m) qiymatlarning o'zaro nisbatlari proporsional ravishda (1) birlikka farq qilib, o'zgarib borishi kuzatiladi. Mazkur kimyoviy algoritm quydagicha ifodalanadi:

$$\boxed{2C_nH_{2n+2} + (2n+m)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1; m=2; n=4 ; m=5; n=7; m=8;
n=2; m=3; n=5; m=6; n=8; m=9;
n=3; m=4; n=6; m=7; n=9; m=10;

Algoritmik amallarga misollar:

1) $2C_1H_{2*1+2} + (2*1+2)O_2 \rightarrow (2*1)CO_2 + (2*1+2)H_2O$,

$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2+2}+(2*2+3)O_2 \rightarrow (2*2)CO_2+(2*2+2)H_2O$,
$2C_2H_6+7O_2 \rightarrow 4CO_2+6H_2O+Q$.

3) $2C_3H_{2*3+2}+(2*3+4)O_2 \rightarrow (2*3)CO_2+(2*3+2)H_2O$,
$2C_3H_8+10O_2 \rightarrow 6CO_2+8H_2O$,
$C_3H_8+5O_2 \rightarrow 3CO_2+4H_2O+Q$.

4) $2C_4H_{2*4+2}+(2*4+5)O_2 \rightarrow (2*4)CO_2+(2*4+2)H_2O$,
$2C_4H_{10}+13O_2 \rightarrow 8CO_2+10H_2O+Q$.

5) $2C_5H_{2*5+2}+(2*5+6)O_2 \rightarrow (2*5)CO_2+(2*5+2)H_2O$,
$2C_5H_{12}+16O_2 \rightarrow 10CO_2+12H_2O$,
$C_5H_{12}+8O_2 \rightarrow 5CO_2+6H_2O+Q$.

6) $2C_6H_{2*6+2}+(2*6+7)O_2 \rightarrow (2*6)CO_2+(2*6+2)H_2O$,
$2C_6H_{14}+19O_2 \rightarrow 12CO_2+14H_2O+Q$.

7) $2C_7H_{2*7+2}+(2*7+8)O_2 \rightarrow (2*7)CO_2+(2*7+2)H_2O$,
$2C_7H_{16}+22O_2 \rightarrow 14CO_2+16H_2O+Q$,
$C_7H_{16}+11O_2 \rightarrow 7CO_2+8H_2O+Q$.

8) $2C_8H_{2*8+2}+(2*8+9)O_2 \rightarrow (2*8)CO_2+(2*8+2)H_2O$,
$2C_8H_{18}+25O_2 \rightarrow 16CO_2+18H_2O+Q$.

9) $2C_9H_{2*9+2}+(2*9+10)O_2 \rightarrow (2*9)CO_2+(2*9+2)H_2O$,
$2C_9H_{20}+28O_2 \rightarrow 18CO_2+20H_2O+Q$,
$C_9H_{20}+14O_2 \rightarrow 9CO_2+10H_2O+Q$

10) $2C_{10}H_{2*10+2}+(2*10+11)O_2 \rightarrow (2*10)CO_2+(2*10+2)H_2O$,
$2C_{10}H_{22}+31O_2 \rightarrow 20CO_2+22H_2O+Q$.

Kimyoviy algoritmlarning III variantida yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri - suv H_2O uchun (n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik ko'rsatib berilgan.

Bunda suvning koeffisient qiymatini aniqlovchi ifoda ushbu ko'rinishda bo'ladi: $[n+(m+1)]$

$$\boxed{2C_nH_{2n+2}+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+1)]H_2O+Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1; m=2; n=4 ; m=5; n=7; m=8;
n=2; m=3; n=5; m=6; n=8; m=9;
n=3; m=4; n=6; m=7; n=9; m=10;

Algoritmik amallarga misollar:

1) $2C_1H_{2*1+2} + (2*1+2)O_2 \rightarrow (2*1)CO_2 + [1+(2+1)]H_2O$,
$2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$,
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2+2} + (2*2+3)O_2 \rightarrow (2*2)CO_2 + [2+(3+1)]H_2O$,
$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O + Q$.

3) $2C_3H_{2*3+2} + (2*3+4)O_2 \rightarrow (2*3)CO_2 + [3+(4+1)]H_2O$,
$2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$,
$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + Q$.

4) $2C_4H_{2*4+2} + (2*4+5)O_2 \rightarrow (2*4)CO_2 + [4+(5+1)]H_2O$,
$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O + Q$.

5) $2C_5H_{2*5+2} + (2*5+6)O_2 \rightarrow (2*5)CO_2 + [5+(6+1)]H_2O$,

$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$,
$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O + Q$.

6) $2C_6H_{2*6+2} + (2*6+7)O_2 \rightarrow (2*6)CO_2 + [6+(7+1)]\ H_2O$,

$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O + Q$.

7) $2C_7H_{2*7+2} + (2*7+8)O_2 \rightarrow (2*7)CO_2 + [7+(8+1)]H_2O$,
$2C_7H_{16} + 22O_2 \rightarrow 14CO_2 + 16H_2O + Q$,
$C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O + Q$.

8) $2C_8H_{2*8+2} + (2*8+9)O_2 \rightarrow (2*8)CO_2 + [8+(9+1)]H_2O$,
$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O + Q$

9) $2C_9H_{2*9+2} + (2*9+10)O_2 \rightarrow (2*9)CO_2 + [9+(10+1)]H_2O$,
$2C_9H_{20} + 28O_2 \rightarrow 18CO_2 + 20H_2O + Q$,
$C_9H_{20} + 14O_2 \rightarrow 9CO_2 + 10H_2O + Q$.

10) $2C_{10}H_{2*10+2}+(2*10+11)O_2 \rightarrow (2*10)CO_2+[10+(11+1)]H_2O$,
$2C_{10}H_{22}+31O_2 \rightarrow 20CO_2+22H_2O+Q$.

Ushbu sinf vakillari kimyoviy algoritmlarining IV variantini ushbu ko'rinishda bo'ladi:

$$\boxed{2C_nH_{2n+2}+(2n+m)O_2 \rightarrow [n+(m-1)]CO_2+[n+(m+1)]H_2O}$$

Yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri - karbonat angidrid CO_2 uchun koeffisientlar qiymati ifodasini quydagicha ifodalaymiz: $[n+(m-1)]$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1; m=2; n=4; m=5; n=7; m=8;
n=2; m=3; n=5; m=6; n=8; m=9;
n=3; m=4; n=6; m=7; n=9; m=10;

Algoritmik amallarga misollar:

1) $2C_1H_{2*1+2}+(2*1+2)O_2 \rightarrow [1+(2-1)]CO_2+[1+(2+1)]H_2O$,
$2CH_4+4O_2 \rightarrow 2CO_2+4H_2O$,
$CH_4+2O_2 \rightarrow CO_2+2H_2O+Q$.

2) $2C_2H_{2*2+2}+(2*2+3)O_2 \rightarrow [2+(3-1)]CO_2+[2+(3+1)]H_2O$
$2C_2H_6+7O_2 \rightarrow 4CO_2+6H_2O+Q$

3) $2C_3H_{2*3+2}+(2*3+4)O_2 \rightarrow [3+(4-1)]CO_2+[3+(4+1)]H_2O$
$2C_3H_8+10O_2 \rightarrow 6CO_2+8H_2O$,
$C_3H_8+5O_2 \rightarrow 3CO_2+4H_2O+Q$.

4) $2C_4H_{2*4+2}+(2*4+5)O_2 \rightarrow [4+(5-1)]CO_2+[4+(5+1)]H_2O$,
$2C_4H_{10}+13O_2 \rightarrow 8CO_2+10H_2O$.

5) $2C_5H_{2*5+2}+(2*5+6)O_2 \rightarrow [5+(6-1)]CO_2+[5+(6+1)]H_2O$,
$2C_5H_{12}+16O_2 \rightarrow 10CO_2+12H_2O$,
$C_5H_{12}+8O_2 \rightarrow 5CO_2+6H_2O+Q$.

6) $2C_6H_{2*6+2}+(2*6+7)O_2 \rightarrow [6+(7-1)]CO_2+[6+(7+1)]H_2O$,
$2C_6H_{14}+19O_2 \rightarrow 12CO_2+14H_2O+Q$.

7) $2C_7H_{2*7+2}+(2*7+8)O_2 \rightarrow [7+(8-1)]CO_2+[7+(8+1)]H_2O$,
$2C_7H_{16}+22O_2 \rightarrow 14CO_2+16H_2O+Q$,
$C_7H_{16}+11O_2 \rightarrow 7CO_2+8H_2O+Q$.

SIKLOPARAFINLAR VA ETILEN QATORI UGLEVODORDLAR

Molekulasida uglerod atomlari soni tegishli to'yingan uglevodorodlardagi kabi, ammo vodorod atomlarining soni kam va turli birikish reaksiyalariga to'yingan birikmalarga nisbatan oson kirishadigan uglevodorodlar etilen qatori yoki to'yinmagan uglevodordlardir. Etilen qatori hamda molekulasining tuzilishi halqadan yoki boshqacha qilib aytganda, sikldan iborat bo'lgan, ya'ni sikloparafinlar gomologlari vakillarining umumiy formulasi ham ushbu ko'rinishda C_nH_{2n} ifodalanadi. Demak, sikloparafinlar va etilen qatori uglevodorodlar gomologlari vakillarining yonish reaksiya tenglamalarini kimyoviy algoritmi quydagicha bo'ladi:

$$\frac{2n}{n}C_nH_{2n}+3nO_2 \rightarrow 2nCO_2+2nH_2O+Q$$

Etenning kisloroda yonish reaksiya tenglamasi: (C_2H_4)

1) $\frac{2*2}{2}C_2H_{2*2}+(3*2)O_2 \rightarrow (2*2)CO_2+(2*2)H_2O$,
$2C_2H_4+6O_2 \rightarrow 4CO_2+4H_2O$,

Tenglamaning chap va o'ng tomonini bir xil songa qisqartirib, kichik koeffisientlarni aniqlaymiz:

$C_2H_4+3O_2 \rightarrow 2CO_2+2H_2O+Q$.

Propenning kisloroda yonish reaksiya tenglamasi: C_3H_6

2) $\frac{2*3}{3}C_3H_{2*3}+(3*3)O_2 \rightarrow (2*3)CO_2+(2*3)H_2O$,
$2C_3H_6+9O_2 \rightarrow 6CO_2+6H_2O+Q$.

Butenning yonish reaksiya tenglamasi: C_4H_8

3) $\frac{2*4}{4}C_4H_{2*4}+(3*4)O_2 \rightarrow (2*4)CO_2+(2*4)H_2O$,
$2C_4H_8+12O_2 \rightarrow 8CO_2+8H_2O$,
$C_4H_8+6O_2 \rightarrow 4CO_2+4H_2O+Q$.

Pentenning yonish reaksiya tenglamasi: C_5H_{10}

4) $\frac{2*5}{5}C_5H_{2*5} + (3*5)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10} + 15O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

Geksenning yonish reaksiya tenglamasi: C_6H_{12}

5) $\frac{2*6}{6}C_6H_{2*6} + (3*6)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,

$2\ C_6H_{12} + 18\ O_2 \rightarrow 12\ CO_2 + 12\ H_2O$,

Kichik koeffisientlar aniqlanadi:

$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

Geptenning yonish reaksiya tenglamasi: C_7H_{14}

6) $\frac{2*7}{7}C_7H_{2*7} + (3*7)O_2 \rightarrow (2*7)CO_2 + (2*7)H_2O$,

$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$.

Oktenning yonish reaksiya tenglamasi: C_8H_{16}

7) $\frac{2*8}{8}C_8H_{2*8} + (3*8)O_2 \rightarrow (2*8)CO_2 + (2*8)H_2O$,

$2C_8H_{16} + 24O_2 \rightarrow 16CO_2 + 16H_2O$,

$C_8H_{16} + 12O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

Nonenning yonish reaksiya tenglamasi: C_9H_{18}

8) $\frac{2*9}{9}C_9H_{2*9} + (3*9)O_2 \rightarrow (2*9)CO_2 + (2*9)H_2O$,

$2C_9H_{18} + 27O_2 \rightarrow 18CO_2 + 18H_2O$.

Kimyoviy algoritmlarning ushbu II variantida yonish reaksiya tenglamalarining asosiy ishtirokchilaridan biri kislorod O_2- moddasi uchun koeffisientlar tanlab tenglashtirishda (n) va (m) qiymatlaridan foydalanilgan hamda ular orasidagi ketma-ketlikdagi bog'liqlik ko'rsatib berilgan. Mazkur sinflar gomologlari vakillarining yonish reaksiya tenglamalari kimyoviy algoritmining II varianti ushbu ko'rinishda ifodalanadi:

$$\boxed{2C_nH_{2n} + (2n+m)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik quydagi jadvalda keltirilgan:

n=2;	m=2;	n=5;	m=5;
n=3;	m=3;	n=6;	m=6;
n=4;	m=4;	n=7;	m=7;

Bunda kislorodning O_2 - koeffisient qiymati ifodasi quydagicha ifodalanadi $(2n+m)$ hamda (n) va (m) qiymatlari hech qanday farq qilmaydi, ya'ni n = 2 bo'lganda, m = 2 ga yoki n = 5 bo'lganda, m = 5 ga teng bo'ladi. Demak, (n) va (m) qiymatlarining o'zaro nisbatlari ana shunday tartibda o'zgarib boradi.

Algoritmik amallarga misollar:

1) $2C_2H_{2*2}+(2*2+2)O_2 \rightarrow (2*2)CO_2+(2*2)H_2O$,
$2C_2H_4+6O_2 \rightarrow 4CO_2+4H_2O$,
$C_2H_4+3O_2 \rightarrow 2CO_2+2H_2O+Q$.

2) $2C_3H_{2*3}+(2*3+3)O_2 \rightarrow (2*3)CO_2+(2*3)H_2O$,
$2C_3H_6+9O_2 \rightarrow 6CO_2+6H_2O+Q$.

3) $2C_4H_{2*4}+(2*4+4)O_2 \rightarrow (2*4)CO_2+(2*4)H_2O$,
$2C_4H_8+12O_2 \rightarrow 8CO_2+8H_2O$,
$C_4H_8+6O_2 \rightarrow 4CO_2+4H_2O+Q$.

4) $2C_5H_{2*5}+(2*5+5)O_2 \rightarrow (2*5)CO_2+(2*5)H_2O$,
$2C_5H_{10}+15O_2 \rightarrow 10CO_2+10H_2O+Q$.

5) $2C_6H_{2*6}+(2*6+6)O_2 \rightarrow (2*6)CO_2+(2*6)H_2O$,
$2\,C_6H_{12}+18\,O_2 \rightarrow 12\,CO_2+12\,H_2O$,
$C_6H_{12}+9O_2 \rightarrow 6CO_2+6H_2O+Q$.

6) $2C_7H_{2*7}+(2*7+7)O_2 \rightarrow (2*7)CO_2+(2*7)H_2O$,
$2C_7H_{14}+21O_2 \rightarrow 14CO_2+14H_2O+Q$.

Yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri- suvning H_2O koeffisient qiymati ifodasi $(n+m)$ va III variant kimyoviy algoritmi:

$$2C_nH_{2n}+(2n+m)O_2 \rightarrow 2nCO_2+(n+m)H_2O+Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;
n=4; m=4; n=7; m=7;

Algoritmik amallarga misollar:

1) $2C_2H_{2*2} + (2*2+2)O_2 \rightarrow (2*2)CO_2 + (2+2)H_2O$,
$2C_2H_4 + 6O_2 \rightarrow 4CO_2 + 4H_2O$,
$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

2) $2C_3H_{2*3} + (2*3+3)O_2 \rightarrow (2*3)CO_2 + (3+3)H_2O$,
$2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

3) $2C_4H_{2*4} + (2*4+4)O_2 \rightarrow (2*4)CO_2 + (4+4)H_2O$,
$2C_4H_8 + 12O_2 \rightarrow 8CO_2 + 8H_2O$,
$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

4) $2C_5H_{2*5} + (2*5+5)O_2 \rightarrow (2*5)CO_2 + (5+5)H_2O$,
$2C_5H_{10} + 15O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

5) $2C_6H_{2*6} + (2*6+6)O_2 \rightarrow (2*6)CO_2 + (6+6)H_2O$,
$2C_6H_{12} + 18O_2 \rightarrow 12CO_2 + 12H_2O$,
$C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

6) $2C_7H_{2*7} + (2*7+7)O_2 \rightarrow (2*7)CO_2 + (7+7)H_2O$,
$2C_7H_{14} + 21O_2 \rightarrow 14CO_2 + 14H_2O + Q$.

Yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi $(n+m)$ va lV variant kimyoviy algoritmi:

$$2C_nH_{2n} + (2n+m)O_2 \rightarrow (n+m)CO_2 + (n+m)H_2O + Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;
n=4; m=4; n=7; m=7;

Algoritmik amallarga misollar:

1) $2C_2H_{2*2}+(2*2+2)O_2 \rightarrow (2+2)CO_2+(2+2)H_2O$,
$2C_2H_4+6O_2 \rightarrow 4CO_2+4H_2O$,
$C_2H_4+3O_2 \rightarrow 2CO_2+2H_2O+Q$.

2) $2C_3H_{2*3}+(2*3+3)O_2 \rightarrow (3+3)CO_2+(3+3)H_2O$,
$2C_3H_6+9O_2 \rightarrow 6CO_2+6H_2O+Q$.

3) $2C_4H_{2*4}+(2*4+4)O_2 \rightarrow (4+4)CO_2+(4+4)H_2O$,
$2C_4H_8+12O_2 \rightarrow 8CO_2+8H_2O$,
$C_4H_8+6O_2 \rightarrow 4CO_2+4H_2O+Q$.

4) $2C_5H_{2*5}+(2*5+5)O_2 \rightarrow (5+5)CO_2+(5+5)H_2O$,
$2C_5H_{10}+15O_2 \rightarrow 10CO_2+10H_2O+Q$.

5) $2C_6H_{2*6}+(2*6+6)O_2 \rightarrow (6+6)CO_2+(6+6)H_2O$,
$2C_6H_{12}+18O_2 \rightarrow 12CO_2+12H_2O$,
$C_6H_{12}+9O_2 \rightarrow 6CO_2+6H_2O+Q$.

6) $2C_7H_{2*7}+(2*7+7)O_2 \rightarrow (7+7)CO_2+(7+7)H_2O$,
$2C_7H_{14}+21O_2 \rightarrow 14CO_2+14H_2O+Q$.

DIEN VA ASETILEN QATORI UGLEVODORODLAR

Molekulasida ikkita qo'shbog' bor to'yinmagan qator uglevodorodlari dien uglevodorodlar deyiladi. Asetilen qatori gomologlari vakillari molekulasida esa uchlamchi bog' bo'ladi. Ammo har ikkala sinf gomologlari vakillari uchun ushbu umumiy formuladan C_nH_{2n-2} foydalaniladi. Asetilen qatori va dien uglevodorodlarning tipik vakillari etin, propin, butin, pentin yoki butadien-1.3, pentadien-1.4 kabi ko'pgina birikmalarining xossalari organik kimyoda keng o'rganiladi va sanoatda xilma-xil maqsadlar uchun ishlatiladi. Masalan, asetilen - kislorod gazlari aralashmasi metallarni qirqish va payvandlashda ishlatilsa, butadien-1.3 sintetik kauchuk olish uchun asosiy xomashyo bo'lib hisoblanadi. Mazkur sinflar gomologlari vakillarining yonish reaksiya tenglamalarining kimyoviy algoritmini quydagicha ifodalaymiz:

$$\frac{2n}{n}C_nH_{2n-2}+(3n-1)O_2 \rightarrow 2nCO_2+(2n-2)H_2O+Q$$

Etinning yonish reaksiya tenglamasini tuzamiz: C_2H_2

1) $\frac{2*2}{2}C_2H_{2*2-2}+(3*2-1)O_2 \rightarrow (2*2)CO_2+(2*2-2)H_2O$,

$2C_2H_2+5O_2 \rightarrow 4CO_2+2H_2O+Q$.

Propinning yonish reaksiya tenglamasini tuzamiz: C_3H_4

2) $\frac{2*3}{3}C_3H_{2*3-2}+(3*3-1)O_2 \rightarrow (2*3)CO_2+(2*3-2)H_2O$,

$2C_3H_4+8O_2 \rightarrow 6CO_2+4H_2O$,

Ushbu reaksiya uchun kichik koeffisientlar topiladi.

$C_3H_4+4O_2 \rightarrow 3CO_2+2H_2O+Q$.

Butinning yonish reaksiya tenglamasini tuzamiz: C_4H_6

3) $\frac{2*4}{4}C_4H_{2*4-2}+(3*4-1)O_2 \rightarrow (2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6+11O_2 \rightarrow 8CO_2+6H_2O+Q$.

Pentinning yonish reaksiya tenglamasini tuzamiz: C_5H_8

4) $\frac{2*5}{5}C_5H_{2*5-2}+(3*5-1)O_2 \rightarrow (2*5)CO_2+(2*5-2)H_2O$,

$2C_5H_8+14O_2 \rightarrow 10CO_2+8H_2O$,

$C_5H_8+7O_2 \rightarrow 5CO_2+4H_2O+Q$.

Geksinning C_6H_{10} yonish reaksiya tenglamasi uchun koeffisientlar quyidagicha tanlanadi:

5) $\frac{2*6}{6}C_6H_{2*6-2}+(3*6-1)O_2 \rightarrow (2*6)CO_2+(2*6-2)H_2O$,

$2C_6H_{10}+17O_2 \rightarrow 12CO_2+10H_2O+Q$.

Mazkur sinflar gomologlari vakillari yonish reaksiya tenglamalari kimyoviy algoritmining II varianti ushbu ko'rinishda ifodalanadi:

$$\boxed{2C_nH_{2n-2}+(2n+m)O_2 \rightarrow 2nCO_2+(2n-2)H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik proporsional ravishda (1) birlikka o'zgarib boradi. Bunda kislorodning O_2 koeffisient qiymati ifodasi ushbu $(2n+m)$ ko'rinishda bo'ladi.

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5;
n=4; m=3; n=7; m=6;

Algoritmik amallarga misollar:

1) $2C_2H_{2*2-2} + (2*2+1)O_2 \rightarrow (2*2)CO_2 + (2*2-2)H_2O$,
$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_3H_{2*3-2} + (2*3+2)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

3) $2C_4H_{2*4-2} + (2*4+3)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,
$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

4) $2C_5H_{2*5-2} + (2*5+4)O_2 \rightarrow (2*5)CO_2 + (2*5-2)H_2O$,
$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$,
$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$.

5) $2C_6H_{2*6-2} + (2*6+5)O_2 \rightarrow (2*6)CO_2 + (2*6-2)H_2O$,
$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$.

6) $2C_7H_{2*7-2} + (2*7+6)O_2 \rightarrow (2*7)CO_2 + (2*7-2)H_2O$,
$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O$,
$C_7H_{12} + 10O_2 \rightarrow 7CO_2 + 6H_2O + Q$.

Bu sinflar gomologlari vakillari yonish reaksiya tenglamalari kimyoviy algoritmining III varianti quydagicha ifodalanadi:

$$\boxed{2C_nH_{2n-2} + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m-1)]H_2O + Q}$$

Suvning H_2O koeffisient qiymati ushbu $[n+(m-1)]$
ifoda bilan aniqlanadi.

(n) va (m) qiymatlari jadvali:

n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5;
n=4; m=3; n=7; m=6;

Algoritmik amallarga misollar:

1) $2C_2H_{2*2-2} + (2*2+1)O_2 \rightarrow (2*2)CO_2 + [2+(1-1)]H_2O$,

$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_3H_{2*3-2} + (2*3+2)O_2 \rightarrow (2*3)CO_2 + [3+(2-1)]H_2O$,
$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

3) $2C_4H_{2*4-2} + (2*4+3)O_2 \rightarrow (2*4)CO_2 + [4+(3-1)]H_2O$,
$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

4) $2C_5H_{2*5-2} + (2*5+4)O_2 \rightarrow (2*5)CO_2 + [5+(4-1)]H_2O$,
$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$,
$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$.

5) $2C_6H_{2*6-2} + (2*6+5)O_2 \rightarrow (2*6)CO_2 + [6+(5-1)]H_2O$,
$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$.

6) $2C_7H_{2*7-2} + (2*7+6)O_2 \rightarrow (2*7)CO_2 + [7+(6-1)]H_2O$,
$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O + Q$,
$C_7H_{12} + 10O_2 \rightarrow 7CO_2 + 6H_2O + Q$.

Dien va asetilen qatori uglevodorodlar gomologlari vakillari yonish reaksiya tenglamalarining IV varianti uchun karbonat angidridning CO_2 koeffisient qiymati ifodasini $[n+(m+1)]$ ko'rinishda yozib, ushbu kimyoviy algoritmdan foydalanamiz.

$$\boxed{2C_nH_{2n-2} + (2n+m)O_2 \rightarrow [n+(m+1)]CO_2 + [n+(m-1)]H_2O + Q}$$

(n) va (m) qiymatlari jadvali:

n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5;
n=4; m=3; n=7; m=6;

Algoritmik amallarga misollar:

1) $2C_2H_{2*2-2} + (2*2+1)O_2 \rightarrow [2+(1+1)]CO_2 + [2+(1-1)]H_2O$,
$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_3H_{2*3-2} + (2*3+2)O_2 \rightarrow [3+(2+1)]CO_2 + [3+(2-1)]H_2O$,
$2C_3H_4 + 8O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

3) $2C_4H_{2*4-2} + (2*4+3)O_2 \rightarrow [4+(3+1)]CO_2 + [4+(3-1)]H_2O$,
$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

4) $2C_5H_{2*5-2} + (2*5+4)O_2 \rightarrow [5+(4+1)]CO_2 + [5+(4-1)]H_2O$,
$2C_5H_8 + 14O_2 \rightarrow 10CO_2 + 8H_2O$,
$C_5H_8 + 7O_2 \rightarrow 5CO_2 + 4H_2O + Q$.

5) $2C_6H_{2*6-2} + (2*6+5)O_2 \rightarrow [6+(5+1)]CO_2 + [6+(5-1)]H_2O$,
$2C_6H_{10} + 17O_2 \rightarrow 12CO_2 + 10H_2O + Q$.

6) $2C_7H_{2*7-2} + (2*7+6)O_2 \rightarrow [7+(6+1)]CO_2 + [7+(6-1)]H_2O$,
$2C_7H_{12} + 20O_2 \rightarrow 14CO_2 + 12H_2O$,
$C_7H_{12} + 10O_2 \rightarrow 7CO_2 + 6H_2O + Q$.

AROMATIK UGLEVODORODLAR

Aromatik uglevodorodlar gomologlari vakillarining umumiy formulasini ushbu ko'rinishda C_nH_{2n-6} yozish mumkin. Benzol aromatik uglevodordlarning eng oddiy vakilidir. Uning birinchi gomologi metil benzol, ya'ni toluoldir C_7H_8. Boshqa ba'zi hosilalari kabi toluolning ham izomeri yo'q. Benzol yoki uning hosilalari uchun yonish reaksiya tenglamalari kimyoviy algoritmi shunday ifodalanadi:

$$\frac{2n}{n}C_nH_{2n-6} + (3n-3)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q$$

Benzolning C_6H_6 yonish reaksiya tenglamasi quyidagicha tuziladi:

1) $\frac{2*6}{6}C_6H_{2*6-6} + (3*6-3)O_2 \rightarrow (2*6)CO_2 + (2*6-6)H_2O$,
$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$.

Toluolning kislorodda yonishi: C_7H_8

2) $\frac{2*7}{7}C_7H_{2*7-6}+(3*7-3)O_2 \rightarrow (2*7)CO_2+(2*7-6)H_2O$,

$2C_7H_8+18O_2 \rightarrow 14CO_2+8H_2O$,

Kichik koeffisientlar aniqlanadi:

$C_7H_8+9O_2 \rightarrow 7CO_2+4H_2O+Q$.

Ksilolning C_8H_{10} yonish reaksiya tenglamasi quyidagicha tuziladi:

3) $\frac{2*8}{8}C_8H_{2*8-6}+(3*8-3)O_2 \rightarrow (2*8)CO_2+(2*8-6)H_2O$,

$2C_8H_{10}+21O_2 \rightarrow 16CO_2+10H_2O+Q$.

Trimetil benzolning kislorodda yonishi: C_9H_{12}

4) $\frac{2*9}{9}C_9H_{2*9-6}+(3*9-3)O_2 \rightarrow (2*9)CO_2+(2*9-6)H_2O$,

$2C_9H_{12}+24O_2 \rightarrow 18CO_2+12H_2O$,

Kichik koeffisientlar aniqlanadi:

$C_9H_{12}+12O_2 \rightarrow 9CO_2+6H_2O+Q$.

Yana bitta misol keltirilgan.

5) $\frac{2*10}{10}C_{10}H_{2*10-6}+(3*10-3)O_2 \rightarrow (2*10)CO_2+(2*10-6)H_2O$,

$2C_{10}H_{14}+27O_2 \rightarrow 20CO_2+14H_2O+Q$.

Aromatik uglevodorodlar C_nH_{2n-6}, benzol yoki uning hosilalari uchun yonish reaksiya tenglamalari kimyoviy algoritmining II varianti shunday ifodalanadi:

$$\boxed{2C_nH_{2n-6}+(2n+m)O_2 \rightarrow 2nCO_2+(2n-6)H_2O+Q}$$

Aromatik uglevodorodlar gomologlari vakillari uchun ushbu II variantida yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorod O_2 uchun koeffisientlar tanlashda ushbu ifodadan $(2n+m)$ foydalaniladi.

(n) va (m) qiymatlari jadvali:

n=6;	m=3;	n=10;	m=7;
n=7;	m=4;	n=11;	m=8;
n=8;	m=5;	n=12;	m=9;
n=9;	m=6;	n=13;	m=10;

Algoritmik amallarga misollar:

1) $2C_6H_{2*6-6} + (2*6+3)O_2 \rightarrow (2*6)CO_2 + (2*6-6)H_2O$,
$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$.

2) $2C_7H_{2*7-6} + (2*7+4)O_2 \rightarrow (2*7)CO_2 + (2*7-6)H_2O$,
$2C_7H_8 + 18O_2 \rightarrow 14CO_2 + 8H_2O$,
$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$.

3) $2C_8H_{2*8-6} + (2*8+5)O_2 \rightarrow (2*8)CO_2 + (2*8-6)H_2O$,
$2C_8H_{10} + 21O_2 \rightarrow 16CO_2 + 10H_2O + Q$.

4) $2C_9H_{2*9-6} + (2*9+6)O_2 \rightarrow (2*9)CO_2 + (2*9-6)H_2O$,
$2C_9H_{12} + 24O_2 \rightarrow 18CO_2 + 12H_2O$,
$C_9H_{12} + 12O_2 \rightarrow 9CO_2 + 6H_2O + Q$.

5) $2C_{10}H_{2*10-6} + (2*10+7)O_2 \rightarrow (2*10)CO_2 + (2*10-6)H_2O$,
$2C_{10}H_{14} + 27O_2 \rightarrow 20CO_2 + 14H_2O + Q$.

Yonish reaksiya tenlamalarining asosiy mahsulotlaridan biri - suv H_2O uchun koeffisient qiymati ifodasi $[n+(m-3)]$ bo'lsa, aromatik uglevodorodlar C_nH_{2n-6}, benzol yoki uning hosilalari kimyoviy algoritmining III varianti ushbu ko'rinishda yoziladi:

$$\boxed{2C_nH_{2n-6} + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m-3)]H_2O + Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=6; m=3; n=10; m=7;
n=7; m=4; n=11; m=8;
n=8; m=5; n=12; m=9;
n=9; m=6; n=13; m=10;

Algoritmik amallarga misollar:

1) $2C_6H_{2*6-6} + (2*6+3)O_2 \rightarrow (2*6)CO_2 + [6+(3-3)]H_2O$,
$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$.

2) $2C_7H_{2*7-6} + (2*7+4)O_2 \rightarrow (2*7)CO_2 + [7+(4-3)]H_2O$,
$2C_7H_8 + 18O_2 \rightarrow 14CO_2 + 8H_2O$,
$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$.

3) $2C_8H_{2*8-6} + (2*8+5)O_2 \rightarrow (2*8)CO_2 + [8+(5-3)]H_2O$,
$2C_8H_{10} + 21O_2 \rightarrow 16CO_2 + 10H_2O + Q$.

4) $2C_9H_{2*9-6} + (2*9+6)O_2 \rightarrow (2*9)CO_2 + [9+(6-3)]H_2O$,
$2C_9H_{12} + 24O_2 \rightarrow 18CO_2 + 12H_2O$,
$C_9H_{12} + 12O_2 \rightarrow 9CO_2 + 6H_2O + Q$.

5) $2C_{10}H_{2*10-6} + (2*10+7)O_2 \rightarrow (2*10)CO_2 + [10+(7-3)]H_2O$,
$2C_{10}H_{14} + 27O_2 \rightarrow 20CO_2 + 14H_2O + Q$.

Aromatik uglevodorodlar C_nH_{2n-6}, benzol yoki uning hosilalari uchun karbonat angidridning CO_2 koeffisient qiymati ifodasini $[n+(m+3)]$ shaklida yozsak, yonish reaksiya tenglamalari kimyoviy algoritmining IV variantn quydagicha bo'ladi:

$$2C_nH_{2n-6} + (2n+m)O_2 \rightarrow [n+(m+3)]CO_2 + [n+(m-3)]H_2O + Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=6 ;	m=3;	n=10 ;	m=7;
n=7 ;	m=4;	n=11;	m=8;
n=8;	m=5;	n=12;	m=9;
n=9;	m=6;	n=13;	m=10;

Algoritmik amallarga misollar:

1) $2C_6H_{2*6-6} + (2*6+3)O_2 \rightarrow [6+(3+3)]CO_2 + [6+(3-3)]H_2O$,
$2C_6H_6 + 15O_2 \rightarrow 12CO_2 + 6H_2O + Q$.

2) $2C_7H_{2*7-6} + (2*7+4)O_2 \rightarrow [7+(4+3)]CO_2 + [7+(4-3)]H_2O$,
$2C_7H_8 + 18O_2 \rightarrow 14CO_2 + 8H_2O$,
$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O + Q$.

3) $2C_8H_{2*8-6} + (2*8+5)O_2 \rightarrow [8+(5+3)]CO_2 + [8+(5-3)]H_2O$,
$2C_8H_{10} + 21O_2 \rightarrow 16CO_2 + 10H_2O + Q$

4) $2C_9H_{2*9-6} + (2*9+6)O_2 \to [9+(6+3)]CO_2 + [9+(6-3)]H_2O$,
$2C_9H_{12} + 24O_2 \to 18CO_2 + 12H_2O$,
$C_9H_{12} + 12O_2 \to 9CO_2 + 6H_2O + Q$.

5) $2C_{10}H_{2*10-6} + (2*10+7)O_2 \to [10+(7+3)]CO_2 + [10+(7-3)]H_2O$,
$2C_{10}H_{14} + 27O_2 \to 20CO_2 + 14H_2O + Q$.

BIR ATOMLI SPIRTLAR VA ODDIY EFIRLAR

Molekulasi tarkibida uglevodorod radikallaridagi bir yoki bir necha vodord atomlarining gidroksil guruhlarga almashingan birikmalar spirtlar deyiladi. Molekulasi tarkibidagi gidroksil guruhlarning soniga qarab ular bir atomli va ko'p atomli bo'lishi mumkin. Shuningdek, bir atomli spirtlar va oddiy efirlar gomologlari vakillari ushbu $C_nH_{2n+2}O$ umumiy formula bilan ifodalanadi.

Quyida bir atomli spirtlar va oddiy efirlar gomologlari vakillari yonish reaksiya tenglamalarining kimyoviy algoritmi keltirilgan:

$$\boxed{\frac{2n}{n}C_nH_{2n+2}O + 3nO_2 \to 2nCO_2 + (2n+2)H_2O + Q}$$

Metanolning yonish reaksiya tenglamasi: (CH_3OH)

1) $\frac{2*1}{1}C_1H_{2*1+2}O + (3*1)O_2 \to (2*1)CO_2 + (2*1+2)H_2O$,
$2CH_4O + 3O_2 \to 2CO_2 + 4H_2O + Q$.

Etanolning yonish reaksiya tenglamasi: C_2H_5OH

2) $\frac{2*2}{2}C_2H_{2*2+2}O + (3*2)O_2 \to (2*2)CO_2 + (2*2+2)H_2O$,
$2C_2H_6O + 6O_2 \to 4CO_2 + 6H_2O$,
$C_2H_6O + 3O_2 \to 2CO_2 + 3H_2O + Q$.

Propanolning yonish reaksiya tenglamasi: C_3H_7OH

3) $\frac{2*3}{3}C_3H_{2*3+2}O + (3*3)O_2 \to (2*3)CO_2 + (2*3+2)H_2O$,
$2C_3H_8O + 9O_2 \to 6CO_2 + 8H_2O + Q$.

Butanolning yonishi: C_4H_9OH

4) $\frac{2*4}{4}C_4H_{2*4+2}O + (3*4)O_2 \to (2*4)CO_2 + (2*4+2)H_2O$,
$2C_4H_{10}O + 12O_2 \to 8CO_2 + 10H_2O$,

Kichik koeffisientlar aniqlanadi.
$C_4H_{10}O + 6O_2 \rightarrow 4CO_2 + 5H_2O + Q$.

Mazkur sinflar vakillari kimyoviy algoritmining II varianti quydagicha bo'ladi:

$$\boxed{2C_nH_{2n+2}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q}$$

(n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik:

n=1; m=1; n=4 ; m=4;
n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;

Kislorod O_2 uchun - koeffisient qiymati ifodasi $(2n+m)$ ga va (n) ning qiymati ham (m) ga teng bo'ladi. Bunda (n) va (m) qiymatlari farq qilmaydi, ya'ni n = 1 bo'lganda, m = 1 yoki n = 5 bo'lganda, m = 5 ga teng bo'ladi. Demak, (n) va (m) qiymatlariining o'zaro nisbatlari proporsional ravishda ana shunday tartibda o'zgarib boradi.

Metanolning yonish reaksiya tenglamasi: CH_3OH

1) $2C_1H_{2*1+2}O + (2*1+1)O_2 \rightarrow (2*1)CO_2 + (2*1+2)H_2O$,
$2C\,H_4O + 3O_2 \rightarrow 2CO_2 + 4H_2O + Q$.

Etanolning yonish reaksiya tenglamasi: C_2H_5OH

2) $2C_2H_{2*2+2}O + (2*2+2)O_2 \rightarrow (2*2)CO_2 + (2*2+2)H_2O$,
$2C_2H_6O + 6O_2 \rightarrow 4CO_2 + 6H_2O$,
$C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O + Q$.

Propanolning yonish reaksiya tenglamasi: C_3H_7OH

3) $2C_3H_{2*3+2}O + (2*3+3)O_2 \rightarrow (2*3)CO_2 + (2*3+2)H_2O$,
$2C_3H_8O + 9O_2 \rightarrow 6CO_2 + 8H_2O + Q$.

Butanolning yonishi: C_4H_9OH

4) $2C_4H_{2*4+2}O + (2*4+4)O_2 \rightarrow (2*4)CO_2 + (2*4+2)H_2O$,
$2C_4H_{10}O + 12O_2 \rightarrow 8CO_2 + 10H_2O$,

Kichik koeffisientlar aniqlanadi.

$C_4H_{10}O+6O_2 \rightarrow 4CO_2+5H_2O+Q$.

Mazkur sinflar vakillari kimyoviy algaritmining III varianti qiydagicha va suvning H_2O koeffisient qiymati ifodasi ushbu korinishda $[n+(m+2)]$ boladi.

$$\boxed{2C_nH_{2n+2}O+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+2)]H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bogliqlik ;

n=1; m=1; n=4; m=4;
n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;

Metanolning yonish reaksiyas tenglamasi : CH_3OH

1) $2C_1H_{2*1+2}O+(2*1+1)O_2 \rightarrow (2*1)CO_2+[1+(1+2)]H_2O$,
$2C\ H_4O+3O_2 \rightarrow 2CO_2+4H_2O+Q$.

Etanolning yonish reaksiya tenglamasi: C_2H_5OH

2) $2C_2H_{2*2+2}O+(2*2+2)O_2 \rightarrow (2*2)CO_2+[2+(2+2)]H_2O$,
$2C_2H_6O+6O_2 \rightarrow 4CO_2+6H_2O$,
$C_2H_6O+3O_2 \rightarrow 2CO_2+3H_2O+Q$.

Propanolning yonish reaksiya tenglamasi : C_3H_7OH

3) $2C_3H_{2*3+2}O+(2*3+3)O_2 \rightarrow (2*3)CO_2+[3+(3+2)]H_2O$,
$2C_3H_8O+9O_2 \rightarrow 6CO_2+8H_2O+Q$.

Butanolning yonishi: C_4H_9OH

4) $2C_4H_{2*4+2}O+(2*4+4)O_2 \rightarrow (2*4)CO_2+[4+(4+2)]H_2O$,
$2C_4H_{10}O+12O_2 \rightarrow 8CO_2+10H_2O$,

Kichik koeffisientlar aniqlanadi.

$C_4H_{10}O+6O_2 \rightarrow 4CO_2+5H_2O+Q$.

IV variantda reaksiyaning asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi $(n+m)$ va kimyoviy algaritmi esa quyidagi korinishda boladi:

$$\boxed{2C_nH_{2n+2}O+(2n+m)O_2 \rightarrow (n+m)CO_2+[n+(m+2)]H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik:

n=1; m=1; n=4 ; m=4;
n=2; m=2; n=5; m=5;
n=3; m=3; n=6; m=6;

Metanolning yonish reaksiya tenglamasi: CH_3OH

1) $2C_1H_{2*1+2}O + (2*1+1)O_2 \rightarrow (1+1)CO_2 + [1+(1+2)]H_2O$,
$2C\ H_4O + 3O_2 \rightarrow 2CO_2 + 4H_2O + Q$.

Etanolning yonish reaksiya tenglamasi: C_2H_5OH

2) $2C_2H_{2*2+2}O + (2*2+2)O_2 \rightarrow (2+2)CO_2 + [2+(2+2)]H_2O$,
$2C_2H_6O + 6O_2 \rightarrow 4CO_2 + 6H_2O$,
$C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O + Q$.

Propanolning yonish reaksiya tenglamasi: C_3H_7OH

3) $2C_3H_{2*3+2}O + (2*3+3)O_2 \rightarrow (3+3)CO_2 + [3+(3+2)]H_2O$,
$2C_3H_8O + 9O_2 \rightarrow 6CO_2 + 8H_2O + Q$.

Butanolning yonishi: C_4H_9OH

4) $2C_4H_{2*4+2}O + (2*4+4)O_2 \rightarrow (4+4)CO_2 + [4+(4+2)]H_2O$,
$2C_4H_{10}O + 12O_2 \rightarrow 8CO_2 + 10H_2O$,
Kichik koeffisientlar aniqlanadi.

$C_4H_{10}O + 6O_2 \rightarrow 4CO_2 + 5H_2O + Q$.

IKKI ATOMLI SPIRTLAR

Ikki atomli spirtlar glikollar deb ham ataladi. "Glikol" so'zi grekcha bo'lib, "glikos" – "shirin" demakdir. Haqiqatan ham, ikki atomli spirtlarning ta'mi shirin bo'ladi. Ularning tipik vakili etilenglikol sanoatning turli tarmoqlarida keng ko'lamda ishlatiladigan organik birikmalardir. U suv bilan aralashtirilganda suvning muzlash haroratini pasaytirib yuborishi sababli antifrizlar, ya'ni past haroratda muzlaydigan aralashmalar tayyorlashda ishlatiladi. Mazkur sinf gomologlari vakillarining umumiy formulasini ushbu ko'rinishda $C_nH_{2n+2}O_2$ va yonish reaksiya tenglamalari kimyoviy algoritmini esa quydagicha ifodalaymiz:

$$\frac{2n}{n}C_nH_{2n+2}O_2 + (3*n-1)O_2 \rightarrow 2nCO_2 + (2n+2)H_2O + Q$$

Algoritmik amallarga misollar:

Etilenglikol: $HO-CH_2-CH_2-OH$ *yoki* $C_2H_6O_2$

1) $\frac{2*2}{2}C_2H_{2*2+2}O_2+(3*2-1)O_2 \rightarrow (2*2)CO_2+(2*2+2)H_2O$,
$2C_2H_6O_2+5O_2 \rightarrow 4CO_2+6H_2O+Q$.

Trimetilenglikol: $HO-CH_2-CH_2-CH_2-OH$ *yoki* $C_3H_8O_2$

2) $\frac{2*3}{3}C_3H_{2*3+2}O_2+(3*3-1)O_2 \rightarrow (2*3)CO_2+(2*3+2)H_2O$,
$2C_3H_8O_2+8O_2 \rightarrow 6CO_2+8H_2O$,
$C_3H_8O_2+4O_2 \rightarrow 3CO_2+4H_2O+Q$.

Tetrametilenglikol: $HO-(CH_2)_4-OH$ *yoki* $C_4H_{10}O_2$

3) $\frac{2*4}{4}C_4H_{2*4+2}O_2+(3*4-1)O_2 \rightarrow (2*4)CO_2+(2*4+2)H_2O$,
$2C_4H_{10}O_2+11O_2 \rightarrow 8CO_2+10H_2O+Q$.

Yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(2n+m)$ bo'lganda, II variant kimyoviy algoritmi quydagicha bo'ladi:

$$\boxed{2C_nH_{2\cdot n+2}O_2+(2n+m)O_2 \rightarrow 2nCO_2+(2n+2)H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik:

n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5;
n=4; m=3; n=7; m=6

Jadvaldan ko'rinib turibdiki, (n) va (m) qiymatlari (1) birlikka farq qiladi, ya'ni n = 2 bo'lganda, m = 1 ga yoki n = 5 bo'lganda, m = 4 ga teng bo'ladi. Demak, (n) va (m) qiymatlarining o'zaro nisbatlari ana shunday tartibda o'zgarib boradi.

Algoritmik amallarga misollar:

Etilenglikol: $HO-CH_2-CH_2-OH$ yoki $C_2H_6O_2$

1) $2C_2H_{2*2+2}O_2+(2*2+1)O_2 \rightarrow (2*2)CO_2+(2*2+2)H_2O$,
$2C_2H_6O_2+5O_2 \rightarrow 4CO_2+6H_2O+Q$.

Trimetilenglikol: $HO-CH_2-CH_2-CH_2-OH$ yoki $C_3H_8O_2$

2) $2C_3H_{2*3+2}O_2+(2*3+2)O_2 \rightarrow (2*3)CO_2+(2*3+2)H_2O$,
$2C_3H_8O_2+8O_2 \rightarrow 6CO_2+8H_2O$,
$C_3H_8O_2+4O_2 \rightarrow 3CO_2+4H_2O+Q$.

Tetrametilenglikol: $HO-(CH_2)_4-OH$ yoki $C_4H_{10}O_2$

3) $2C_4H_{2*4+2}O_2+(2*4+3)O_2 \rightarrow (2*4)CO_2+(2*4+2)H_2O$,
$2C_4H_{10}O_2+11O_2 \rightarrow 8CO_2+10H_2O+Q$.

Suvning H_2O koeffisient qiymati ifodasi $[n+(m+3)]$ va III variant kimyoviy algoritmi:

$$2C_nH_{2n+2}O_2+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+3)]H_2O+Q$$

(n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik:

n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5;
n=4; m=3; n=7; m=6.

Algoritmik amallarga misollar:

Etilenglikol: $HO-CH_2-CH_2-OH$ yoki $C_2H_6O_2$

1) $2C_2H_{2*2+2}O_2+(2*2+1)O_2 \rightarrow (2*2)CO_2+[2+(1+3)]H_2O$,
$2C_2H_6-O_2+5O_2 \rightarrow 4CO_2+6H_2O+Q$.

Trimetilenglikol: $HO-CH_2-CH_2-CH_2-OH$ yoki $C_3H_8O_2$

2) $2C_3H_{2*3+2}O_2+(2*3+2)O_2 \rightarrow (2*3)CO_2+[3+(2+3)]H_2O$,
$2C_3H_8O_2+8O_2 \rightarrow 6CO_2+8H_2O$,
$C_3H_8O_2+4O_2 \rightarrow 3CO_2+4H_2O+Q$.

Tetrametilenglikol: $HO-(CH_2)_4-OH$ *yoki* $C_4H_{10}O_2$

3) $2C_4H_{2*4+2}O_2+(2*4+3)O_2 \rightarrow (2*4)CO_2+[4+(3+3)]H_2O$,

$2C_4H_{10}O_2+11O_2 \rightarrow 8CO_2+10H_2O+Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasini $[n+(m+1)]$ shaklida yozib, IV variant kimyoviy algoritmini quydagicha tuzamiz:

$$\boxed{2C_nH_{2n+2}O_2+(2n+m)O_2 \rightarrow [n+(m+1)]CO_2+[n+(m+3)]H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik:

n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5;
n=4; m=3; n=7; m=6;

Algoritmik amallarga misollar:

Etilenglikol: $HO-CH_2-CH_2-OH$ *yoki* $C_2H_6O_2$

1) $2C_2H_{2*2+2}O_2+(2*2+1)O_2 \rightarrow [2+(1+1)]CO_2+[2+(1+3)]H_2O$,

$2C_2H_6O_2+5O_2 \rightarrow 4CO_2+6H_2O+Q$.

Trimetilenglikol: $HO-CH_2-CH_2-CH_2-OH$ *yoki* $C_3H_8O_2$

2) $2C_3H_{2*3+2}O_2+(2*3+2)O_2 \rightarrow [3+(2+1)]CO_2+[3+(2+3)]H_2O$,

$2C_3H_8O_2+8O_2 \rightarrow 6CO_2+8H_2O$,

$C_3H_8O_2+4O_2 \rightarrow 3CO_2+4H_2O+Q$.

Tetrametilenglikol: $HO-(CH_2)_4-OH$ *yoki* $C_4H_{10}O_2$

3) $2C_4H_{2*4+2}O_2+(2*4+3)O_2 \rightarrow (4+(3+1)]CO_2+[4+(3+3)]H_2O$,

$2C_4H_{10}O_2+11O_2 \rightarrow 8CO_2+10H_2O+Q$.

ALDEGIDLAR, KETONLAR VA TO'YINMAGAN SPIRTLAR

Aldegidlar, ketonlar, va to'yinmagan spirtlar ham organik birikmalarning muhim sinflari bo'lib hisoblanadi. Bu sinflar gomologlari vakillarini umumiy formulasini $C_nH_{2n}O$ shaklida ifodalash mumkin. Shuningdek, aldegidlar sinfining asosiy vakillari formaldegid va asetaldegidlarning fizikaviy va kimyoviy xossalari to'g'risidagi bilimlar darsliklar va o'quv qo'llanmalarda atroflicha yoritilgan. Xalqaro nomenklaturaga ko'ra aldegidlarning nomlanishi tegishli uglevodorod nomiga - "al" suffiksi qo'shish bilan hosil qilinadi. Aldegidlarning umumiy formulasini ushbu ko'rinishda $C_nH_{2n+1}CHO$ yoki mazkur sinflar gomologlari vakillari uchun umumiy bo'lgan ushbu formuladan foydalanadigan bo'lsak

$C_nH_{2n}O$, ular uchun yonish reaksiya tenglamalari kimyoviy algoritmi quydagicha bo'ladi:

$$\boxed{\frac{2n}{n}C_nH_{2n}O + (3n-1)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q}$$

Metanalning CH_2O yonish reaksiya tenglamasi uchun koeffisientlar quyidagicha aniqlanadi:

1) $\frac{2*1}{1}C_1H_{2*1}O + (3*1-1)O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,

$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$,

$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$.

Etanal: C_2H_4O

2) $\frac{2*2}{2}C_2H_{2*2}O + (3*2-1)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,

$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

Propanal: C_3H_6O

3) $\frac{2*3}{3}C_3H_{2*3}O + (3*3-1)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,

$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$,

$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$.

Butanal: C_4H_8O

4) $\frac{2*4}{4}C_4H_{2*4}O + (3*4-1)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,

$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

Pentanal: $C_5H_{10}O$

5) $\frac{2*5}{5}C_5H_{2*5}O + (3*5-1)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$,

$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

Geksanalning $C_6H_{12}O$ yonish reaksiya tenglamasi:

6) $\frac{2*6}{6}C_6H_{2*6}O + (3*6-1)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,

$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

Mazkur sinflar gomologlari vakillarining umumiy formulasini ushbu ko'rinishda $C_nH_{2n}O$ yozib va kislorodning O_2 koeffisient qiymati ifodasini $(2n+m)$ shaklida ifodalab, yonish reaksiya tenglamalarining II variantі uchun quydagi kimyoviy algoritmdan foydalanish maqsadga muvofiqdir:

$$\boxed{2C_nH_{2n}O + (2n + m)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1; m=0; n=5; m=4;
n=2; m=1; n=6; m=5;
n=3; m=2; n=7; m=6;
n=4; m=3; n=8; m=7 va hokazo

Misollar keltirilgan:

1) $2C_1H_{2\cdot1}O + (2*1+0)O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,
$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$,
$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$.

2) $2C_2H_{2\cdot2}O + (2*2+1)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,
$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

3) $2C_3H_{2\cdot3}O + (2*3+2)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,
$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$,
$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$.

4) $2C_4H_{2\cdot4}O + (2*4+3)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,
$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

5) $2C_5H_{2\cdot5}O + (2*5+4)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,
$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$,
$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

6) $2C_6H_{2\cdot6}O + (2*6+5)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,
$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

Suvning H_2O koeffisient qiymatini aniqlash uchun $[n+(m+1)]$ ifodadan foydalansak, kimyoviy algoritmning III varianti hosil bo'ladi:

$$\boxed{2C_nH_{2n}O + (2n + m)O_2 \rightarrow 2nCO_2 + [n + (m + 1)]H_2O + Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1;	m=0;	n=5;	m=4;
n=2;	m=1;	n=6;	m=5;
n=3;	m=2;	n=7;	m=6;
n=4;	m=3;	n=8;	m=7 va hokazo

Misollar keltirilgan:

1) $2C_1H_{2*1}O + (2*1+0)O_2 \rightarrow (2*1)CO_2 + [1+(0+1)]H_2O$,
$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$,
$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$.

2) $2C_2H_{2*2}O + (2*2+1)O_2 \rightarrow (2*2)CO_2 + [2+(1+1)]H_2O$,
$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

3) $2C_3H_{2*3}O + (2*3+2)O_2 \rightarrow (2*3)CO_2 + [3+(2+1)]H_2O$,
$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$,
$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$.

4) $2C_4H_{2*4}O + (2*4+3)O_2 \rightarrow (2*4)CO_2 + [4+(3+1)]H_2O$,
$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

5) $2C_5H_{2*5}O + (2*5+4)O_2 \rightarrow (2*5)CO_2 + [5+(4+1)]H_2O$,
$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$,
$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

6) $2C_6H_{2*6}O + (2*6+5)O_2 \rightarrow (2*6)CO_2 + [6+(5+1)]H_2O$,
$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

Karbonat angidridning CO_2 koeffisient qiymatini aniqlash uchun ushbu $[n+(m+1)]$ ifodadan foydalanib, mazkur sinf gomologlari vakillari uchun IV variant kimyoviy algoritmini quydagicha tuzamiz:

$$\boxed{2C_nH_{2n}O + (2n+m)O_2 \rightarrow [n+(m+1)]CO_2 + [n+(m+1)]H_2O + Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1;	m=0;	n=5;	m=4;
n=2;	m=1;	n=6;	m=5;
n=3;	m=2;	n=7;	m=6;
n=4;	m=3;	n=8;	m=7 va hokazo

Misollar keltirilgan:

1) $2C_1H_{2\cdot1}O + (2*1+0)O_2 \rightarrow [1+(0+1)]CO_2 + [1+(0+1)]H_2O$,
$2CH_2O + 2O_2 \rightarrow 2CO_2 + 2H_2O$,
$CH_2O + O_2 \rightarrow CO_2 + H_2O + Q$.

2) $2C_2H_{2\cdot2}O + (2*2+1)O_2 \rightarrow [2+(1+1)]CO_2 + [2+(1+1)]H_2O$,
$2C_2H_4O + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

3) $2C_3H_{2\cdot3}O + (2*3+2)O_2 \rightarrow [3+(2+1)]CO_2 + [3+(2+1)]H_2O$,
$2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$,
$C_3H_6O + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$.

4) $2C_4H_{2\cdot4}O + (2*4+3)O_2 \rightarrow [4+(3+1)]CO_2 + [4+(3+1)]H_2O$,
$2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

5) $2C_5H_{2\cdot5}O + (2*5+4)O_2 \rightarrow [5+(4+1)]CO_2 + [5+(4+1)]H_2O$,
$2C_5H_{10}O + 14O_2 \rightarrow 10CO_2 + 10H_2O$,
$C_5H_{10}O + 7O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

6) $2C_6H_{2\cdot6}O + (2*6+5)O_2 \rightarrow [6+(5+1)]CO_2 + [6+(5+1)]H_2O$,
$2C_6H_{12}O + 17O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

BIR ASOSLI KARBON KISLOTALAR VA MURAKKAB EFIRLAR

Karbon kislotalarni molekulasi tarkibida uglevodorod radikallaridagi bir yoki bir necha vodorod atomlarining karboksil guruhlar bilan almashingan organik birikmalar deb qarash mumkin. Shuningdek, bir asosli karbon kislotalarning ba'zi vakillari dastlab yog'lar tarkibidan olinganligi sababli, ular yog' kislotalar ham deb yuritiladi. Ularning birinchi vakili chumoli kislota $H-COOH$ dastlab chumoli axlatidan ajratib olinganligi uchun ham shunday nomlangan. Ikkinchi vakili sirka kislota CH_3-COOH esa insoniyatga birinchi ma'lum bo'lgan kislotalardan biridir. Qadimgi zamonlardayoq bu modda achigan vinodan, ya'ni sirkadan ajratib olingan.

Chumoli, sirka, propion, moy, valerian, kapron, enant, palmitin va stearin kislotalar bir asosli karbon kislotalarning asosiy vakillari bo'lib hisoblanadi. Karbon kislotalar tabiatda keng tarqalgan bo'lib, ular sanoatda va turmushda juda ko'p maqsadlar uchun ishlatiladi. Bir asosli karbon kislotlar gomologlari vakillarining umumiy formulasini $C_nH_{2n+1}-COOH$ yoki bir asosli karbon kislotalar va murakkab efirlar vakillarining umumiy formulasini quydagi shaklda ifodalasak $C_nH_{2n}O_2$ ularning yonish reaksiya tenglamalari kimyoviy algoritmining dastlabki varianti ushbu ko'rinishda bo'ladi:

$$\frac{2n}{n}C_nH_{2n}O_2 + (3n-2)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

Chumoli kislotaning yonish reaksiya tenglamasi:

1) $\frac{2*1}{1}C_1H_{2*1}O_2 + (3*1-2)O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O,$

$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

Sirka kislotaning yonish reaksiya tenglamasi:

2) $\frac{2*2}{2}C_2H_{2*2}O_2 + (3*2-2)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O,$

$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,

$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

Propion kislotaning yonish reaksiya tenglamasi:

3) $\frac{2*3}{3}C_3H_{2*3}O_2 + (3*3-2)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O,$

$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

Moy kislotaning yonish reaksiya tenglamasi:

4) $\frac{2*4}{4}C_4H_{2*4}O_2 + (3*4-2)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O,$

$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,

$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

Valerian kislotaning yonish tenglamasi uchun koeffisientlar quyidagicha tanlanadi:

5) $\frac{2*5}{5}C_5H_{2*5}O_2 + (3*5-2)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,

$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

Mazkur sinflar gomologlari vakillari yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(2n+m)$ va kimyoviy algoritmining II varianti quydagicha bo'ladi:

$$2C_nH_{2n}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + 2nH_2O + Q$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1; m=-1; n=5; m=3;
n=2; m=0; n=6; m=4;
n=3; m=1; n=7; m=5;
n=4; m=2; n=8; m=6.

Ko'rinib turibdiki, n = 1 bo'lganda, m =- 1 ga n = 2 bo'lganda, m = 0 ga yoki n = 4 bo'lganda, m = 2 ga teng bo'lib, (n) va (m) qiymatlari orasidagi farq ham shunday tartibda o'zgarib boradi.

Algoritmik amallarga misollar:

1) $2C_1H_{2*1}O_2 + [2*1 + (-1)]O_2 \rightarrow (2*1)CO_2 + (2*1)H_2O$,
$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2}O_2 + (2*2 + 0)O_2 \rightarrow (2*2)CO_2 + (2*2)H_2O$,
$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,
$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

3) $2C_3H_{2*3}O_2 + (2*3 + 1)O_2 \rightarrow (2*3)CO_2 + (2*3)H_2O$,
$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

4) $2C_4H_{2*4}O_2 + (2*4 + 2)O_2 \rightarrow (2*4)CO_2 + (2*4)H_2O$,
$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,
$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

5) $2C_5H_{2*5}O_2 + (2*5 + 3)O_2 \rightarrow (2*5)CO_2 + (2*5)H_2O$,
$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

6) $2C_6H_{2*6}O_2 + (2*6 + 4)O_2 \rightarrow (2*6)CO_2 + (2*6)H_2O$,
$2C_6H_{12}O_2 + 16O_2 \rightarrow 12CO_2 + 12H_2O$,
$C_6H_{12}O_2 + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

Suvning H_2O koeffisient qiymati ifodasini $[n + (m + 2)]$ shaklida yozsak, III variant kimyoviy algoritmi quydagicha bo'ladi:

$$2C_nH_{2n}O_2 + (2n + m)O_2 \rightarrow 2nCO_2 + [n + (m + 2)]H_2O + Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1; m=-1; n=5; m=3;
n=2; m=0; n=6; m=4;
n=3; m=1; n=7; m=5;
n=4; m=2; n=8; m=6.

Algoritmik amallarga misollar:

1) $2C_1H_{2*1}O_2 + [2*1 + (-1)]O_2 \rightarrow (2*1)CO_2 + [1 + (-1 + 2)]H_2O$,

$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2}O_2 + (2*2 + 0)O_2 \rightarrow (2*2)CO_2 + [2 + (0 + 2)]H_2O$,
$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,
$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

3) $2C_3H_{2*3}O_2 + (2*3 + 1)O_2 \rightarrow (2*3)CO_2 + [3 + (1 + 2)]H_2O$,
$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

4) $2C_4H_{2*4}O_2 + (2*4 + 2)O_2 \rightarrow (2*4)CO_2 + [4 + (2 + 2)]H_2O$,

$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,
$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

5) $2C_5H_{2*5}O_2 + (2*5 + 3)O_2 \rightarrow (2*5)CO_2 + [5 + (3 + 2)]H_2O$,
$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

6) $2C_6H_{2*6}O_2 + (2*6 + 4)O_2 \rightarrow (2*6)CO_2 + [6 + (4 + 2)]H_2O$,

$2C_6H_{12}O_2 + 16O_2 \rightarrow 12CO_2 + 12H_2O$,
$C_6H_{12}O_2 + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasi quydagicha $[n + (m + 2)]$ bo'lganda, mazkur sinf vakillarining IV variant kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$\boxed{2C_nH_{2*n}O_2 + (2n + m)O_2 \rightarrow [n + (m + 2)]CO_2 + [n + (m + 2)]H_2O + Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=1; m=-1; n=5; m=3;
n=2; m=0; n=6; m=4;
n=3; m=1; n=7; m=5;
n=4; m=2; n=8; m=6.

Algoritmik amallarga misollar:

1) $2C_1H_{2*1}O_2 + [2*1 + (-1)]O_2 \rightarrow [1 + (-1 + 2)]CO_2 + [1 + (-1 + 2)]H_2O$,
$2CH_2O_2 + O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

2) $2C_2H_{2*2}O_2 + (2*2 + 0)O_2 \rightarrow [2 + (0 + 2)]CO_2 + [2 + (0 + 2)]H_2O$,
$2C_2H_4O_2 + 4O_2 \rightarrow 4CO_2 + 4H_2O$,
$C_2H_4O_2 + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

3) $2C_3H_{2*3}O_2 + (2*3 + 1)O_2 \rightarrow [3 + (1 + 2)]CO_2 + [3 + (1 + 2)]H_2O$,
$2C_3H_6O_2 + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

4) $2C_4H_{2*4}O_2 + (2*4 + 2)O_2 \rightarrow [4 + (2 + 2)]CO_2 + [4 + (2 + 2)]H_2O$,
$2C_4H_8O_2 + 10O_2 \rightarrow 8CO_2 + 8H_2O$,
$C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

5) $2C_5H_{2*5}O_2 + (2*5 + 3)O_2 \rightarrow [5 + (3 + 2)]CO_2 + [5 + (3 + 2)]H_2O$,
$2C_5H_{10}O_2 + 13O_2 \rightarrow 10CO_2 + 10H_2O + Q$.

6) $2C_6H_{2*6}O_2 + (2*6 + 4)O_2 \rightarrow [6 + (4 + 2)]CO_2 + [6 + (4 + 2)]H_2O$,
$2C_6H_{12}O_2 + 16O_2 \rightarrow 12CO_2 + 12H_2O$,
$C_6H_{12}O_2 + 8O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

TO'YINMAGAN BIR ASOSLI KARBON KISLOTALAR, DIALDEGIDLAR VA DIKETONLAR

Molekulasi tarkibida to'yinmagan uglevodorodlar radikallaridagi bitta vodorod atomining karboksil *-COOH* guruhiga almashinishidan hosil bo'lgan organik birikmalar to'yinmagan bir asosli karbon kislotalar $C_nH_{2n-1}COOH$ sinfi vakillari bo'lib hisoblanadi. Akril va metakril kislotalar organik moddalar ushbu sinfining tipik vakillaridir. Organik moddalarning mazkur sinfi hamda dialdegidlar va diketonlar sinflari gomologlari vakillarinig umumiy formulasini quydagicha: $C_nH_{2*n-2}O_2$ va yonish reaksiya tenglamalari kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$\frac{2*n}{n}C_nH_{2*n-2}O_2+(3*n-3)O_2\rightarrow 2nCO_2+(2*n-2)H_2O+Q$$

Misollar keltirilgan:

Akril kislotasi: $C_3H_4O_2$

1) $\frac{2*3}{3}C_3H_{2*3-2}O_2+(3*3-3)O_2\rightarrow(2*3)CO_2+(2*3-2)H_2O$,

$2C_3H_4O_2+6O_2\rightarrow 6CO_2+4H_2O$,

$C_3H_4O_2+3O_2\rightarrow 3CO_2+2H_2O+Q$.

Metakril kislotasi: $C_4H_6O_2$

2) $\frac{2*4}{4}C_4H_{2*4-2}O_2+(3*4-3)O_2\rightarrow(2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6O_2+9O_2\rightarrow 8CO_2+6H_2O+Q$.

Olein kislotasi: $C_{18}H_{34}O_2$

3) $\frac{2*18}{18}C_{18}H_{2*18-2}O_2+(3*18-3)O_2\rightarrow(2*18)CO_2+(2*18-2)H_2O$,

$2C_{18}H_{34}O_2+51O_2\rightarrow 36CO_2+34H_2O+Q$.

Reaksiyaning asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(2n+m)$ bo'lganda, bu sinflar vakillari yonish reaksiya tenglamalarining II variant kimyoviy algoritmi quydagicha bo'ladi:

$$2C_nH_{2n-2}O_2+(2n+m)O_2\rightarrow 2nCO_2+(2n-2)H_2O+Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=3;	m=0;	n= 7;	m=4;	----	----
n=4;	m=1;	n= 8;	m=5;	n=16;	m=13;
n=5;	m=2;	n= 9;	m=6;	n=17;	m=14;
n=6;	m=3;	n=10;	m=7;	n=18;	m=15.

Jadvaldan ko'rinib turibdiki, n = 3 ga teng bo'lganda, m = 0 ga n = 4 ga teng bo'lganda, esa m = 1 ga teng bo'lib, (n) va (m) orasidagi farq (3) birlikka o'zgarib borar ekan.

Misollar keltirilgan:

Akril kislotasi: $C_3H_4O_2$

1) $2C_3H_{2*3-2}O_2 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4O_2 + 6O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4O_2 + 3O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

Metakril kislotasi: $C_4H_6O_2$

2) $2C_4H_{2*4-2}O_2 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,
$2C_4H_6O_2 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

Olein kislotasi: $C_{18}H_{34}O_2$

3) $2C_{18}H_{2*18-2}O_2 + (2*18+15)O_2 \rightarrow (2*18)CO_2 + (2*18-2)H_2O$,
$2C_{18}H_{34}O_2 + 51O_2 \rightarrow 36CO_2 + 34H_2O + Q$.

Suvning H_2O koeffisient qiymati ifodasi $[n+(m+1)]$ va III variant kimyoviy algoritmi:

$$2C_nH_{2*n-2}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m+1)]H_2O + Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=3;	m=0;	n= 7;	m=4;	--- --- -	- -- ---
n=4;	m=1;	n= 8;	m=5;	n=16;	m=13;
n=5;	m=2;	n= 9;	m=6;	n=17;	m=14;
n=6;	m=3;	n=10;	m=7;	n=18;	m=15.

Misollar keltirilgan:

Akril kislotasi: $C_3H_4O_2$

1) $2C_3H_{2*3-2}O_2 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + [3+(0+1)]H_2O$,
$2C_3H_4O_2 + 6O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4O_2 + 3O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

Metakril kislotasi: $C_4H_6O_2$

2) $2C_4H_{2*4-2}O_2 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + [4+(1+1)]H_2O$,
$2C_4H_6O_2 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

Olein kislotasi: $C_{18}H_{34}O_2$

3) $2C_{18}H_{2*18-2}O_2+(2*18+15)O_2\rightarrow(2*18)CO_2+[18+(15+1)]H_2O$,

$2C_{18}H_{34}O_2+51O_2\rightarrow 36CO_2+34H_2O+Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+3)]$ va IV variant kimyoviy algoritmi keltirilgan:

$$2C_nH_{2n-2}O_2+(2n+m)O_2\rightarrow[n+(m+3)]CO_2+[n+(m+1)]H_2O+Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=3;	m=0;	n= 7;	m=4;	--- -- -	- -- ---
n=4;	m=1;	n= 8;	m=5;	n=16;	m=13;
n=5;	m=2;	n= 9;	m=6;	n=17;	m=14;
n=6;	m=3;	n=10;	m=7;	n=18;	m=15.

Misollar keltirilgan:

Akril kislotasi: $C_3H_4O_2$

1) $2C_3H_{2*3-2}O_2+(2*3+0)O_2\rightarrow[3+(0+3)]CO_2+[3+(0+1)]H_2O$,

$2C_3H_4O_2+6O_2\rightarrow 6CO_2+4H_2O$,

$C_3H_4O_2+3O_2\rightarrow 3CO_2+2H_2O+Q$.

Metakril kislotasi: $C_4H_6O_2$

2) $2C_4H_{2*4-2}O_2+(2*4+1)O_2\rightarrow[4+(1+3)]CO_2+[4+(1+1)]H_2O$,

$2C_4H_6O_2+9O_2\rightarrow 8CO_2+6H_2O+Q$.

Olein kislotasi: $C_{18}H_{34}O_2$

3) $2C_{18}H_{2*18-2}O_2+(2*18+15)O_2\rightarrow[18+(15+3)]CO_2+[18+(15+1)]H_2O$,

$2C_{18}H_{34}O_2+51O_2\rightarrow 36CO_2+34H_2O+Q$

KO'PROQ TO'YINMAGAN KARBON KISLOTALAR

Mazkur sinf gomologlari vakillari ham o'simlik va hayvonlar organizmi to'qimalarida ko'proq uchraydi. Ularning umumiy formulasini ushbu ko'rinishda $C_nH_{2n-4}O_2$ va yonish reaksiya tenglamalari kimyoviy algoritmini esa quydagicha ifodalaymiz:

$$\frac{2*n}{n}C_nH_{2*n-4}O_2+(3*n-4)O_2\rightarrow 2nCO_2+(2*n-4)H_2O+Q$$

Misollar keltirilgan:

1) $\frac{2*4}{4}C_4H_{2*4-4}O_2+(3*4-4)O_2\rightarrow(2*4)CO_2+(2*4-4)H_2O$,
$2C_4H_4O_2+8O_2\rightarrow 8CO_2+4H_2O$,
$C_4H_4O_2+4O_2\rightarrow 4CO_2+2H_2O+Q$.

2) $\frac{2*5}{5}C_5H_{2*5-4}O_2+(3*5-4)O_2\rightarrow(2*5)CO_2+(2*5-4)H_2O$,
$2C_5H_6O_2+11O_2\rightarrow 10CO_2+6H_2O+Q$.

3) $\frac{2*6}{6}C_6H_{2*6-4}O_2+(3*6-4)O_2\rightarrow(2*6)CO_2+(2*6-4)H_2O$,
$2C_6H_8O_2+14O_2\rightarrow 12CO_2+8H_2O$,
$C_6H_8O_2+7O_2\rightarrow 6CO_2+4H_2O+Q$.

4) $\frac{2*7}{7}C_7H_{2*7-4}O_2+(3*7-4)O_2\rightarrow(2*7)CO_2+(2*7-4)H_2O$,
$2C_7H_{10}O_2+17O_2\rightarrow 14CO_2+10H_2O+Q$.

5) $\frac{2*18}{18}C_{18}H_{2*18-4}O_2+(3*18-4)O_2\rightarrow(2*18)CO_2+(2*18-4)H_2O$,
$2C_{18}H_{32}O_2+50O_2\rightarrow 36CO_2+32H_2O$,
$C_{18}H_{32}O_2+25O_2\rightarrow 18CO_2+16H_2O+Q$.

Ushbu sinf gomologlari vakillari yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasini quydagi ko'rinishda yozib $(2n+m)$, II variant kimyoviy algoritmini shunday ifodalaymiz:

$$2C_nH_{2n-4}O_2+(2n+m)O_2\rightarrow 2nCO_2+(2n-4)H_2O+Q$$

(n) va (m) qiymatlari jadvali:

n=4;	m=0;	n=7 ;	m=3;	n=10;	m= 6;
n=5;	m=1;	n=8;	m=4;	n=--;	m= --;
n=6;	m=2;	n=9;	m=5;	n=18;	m=14.

Jadvaldan ko'rinib turibdiki, n = 4 bo'lganda, m = 0 ga yoki n = 18 bo'lganda, m = 14 ga teng bo'ladi. Demak, bu sinf gomologlari vakillarida ham (n) va (m) qiymatlari proporsional ravishda (4) birlikka farq qilib, o'zgarib borishini ko'rish mumkin.

Algoritmik amallarga misollar:

1) $2C_4H_{2*4-4}O_2 + (2*4+0)O_2 \rightarrow (2*4)CO_2 + (2*4-4)H_2O$,
$2C_4H_4O_2 + 8O_2 \rightarrow 8CO_2 + 4H_2O$,
$C_4H_4O_2 + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_5H_{2*5-4}O_2 + (2*5+1)O_2 \rightarrow (2*5)CO_2 + (2*5-4)H_2O$,
$2C_5H_6O_2 + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2*6-4}O_2 + (2*6+2)O_2 \rightarrow (2*6)CO_2 + (2*6-4)H_2O$,
$2C_6H_8O_2 + 14O_2 \rightarrow 12CO_2 + 8H_2O$,
$C_6H_8O_2 + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2*7-4}O_2 + (2*7+3)O_2 \rightarrow (2*7)CO_2 + (2*7-4)H_2O$,
$2C_7H_{10}O_2 + 17O_2 \rightarrow 14CO_2 + 10H_2O + Q$.

5) $2C_{18}H_{2*18-4}O_2 + (2*18+14)O_2 \rightarrow (2*18)CO_2 + (2*18-4)H_2O$,
$2C_{18}H_{32}O_2 + 50O_2 \rightarrow 36CO_2 + 32H_2O$,
$C_{18}H_{32}O_2 + 25O_2 \rightarrow 18CO_2 + 16H_2O + Q$.

Suvning H_2O koeffisient qiymati ifodasi $(n+m)$
va III variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-4}O_2 + (2n+m)O_2 \rightarrow 2nCO_2 + (n+m)H_2O + Q}$$

(n) va (m) qiymatlari jadvali:

n=4;	m=0;	n=7 ;	m=3;	n=10;	m=6;
n=5;	m=1;	n=8;	m=4;	n=--;	m= --;
n=6;	m=2;	n=9;	m=5;	n=18;	m=14.

Algoritmik amallarga misollar:

1) $2C_4H_{2*4-4}O_2 + (2*4+0)O_2 \rightarrow (2*4)CO_2 + (4+0)H_2O$,
$2C_4H_4O_2 + 8O_2 \rightarrow 8CO_2 + 4H_2O$,
$C_4H_4O_2 + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_5H_{2*5-4}O_2 + (2*5+1)O_2 \rightarrow (2*5)CO_2 + (5+1)H_2O$,
$2C_5H_6O_2 + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2*6-4}O_2 + (2*6+2)O_2 \rightarrow (2*6)CO_2 + (6+2)H_2O$,
$2C_6H_8O_2 + 14O_2 \rightarrow 12CO_2 + 8H_2O$,
$C_6H_8O_2 + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2*7-4}O_2 + (2*7+3)O_2 \rightarrow (2*7)CO_2 + (7+3)H_2O$,
$2C_7H_{10}O_2 + 17O_2 \rightarrow 14CO_2 + 10H_2O + Q$.

5) $2C_{18}H_{2*18-4}O_2 + (2*18+14)O_2 \rightarrow (2*18)CO_2 + (18+14)H_2O$,
$2C_{18}H_{32}O_2 + 50O_2 \rightarrow 36CO_2 + 32H_2O$,
$C_{18}H_{32}O_2 + 25O_2 \rightarrow 18CO_2 + 16H_2O + Q$.

Reaksiyaning asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+4)]$ va IV variant kimyoviy algoritmi:

$$2C_nH_{2n-4}O_2 + (2n+m)O_2 \rightarrow [n+(m+4)]CO_2 + (n+m)H_2O + Q$$

(n) va (m) qiymatlari jadvali:

n=4;	m=0;	n=7;	m=3;	n=10;	m=6;
n=5;	m=1;	n=8;	m=4;	n=--;	m= --;
n=6;	m=2;	n =9;	m=5;	n=18;	m=14.

Algoritmik amallarga misollar:

1) $2C_4H_{2*4-4}O_2 + (2*4+0)O_2 \rightarrow [4+(0+4)]CO_2 + (4+0)H_2O$,
$2C_4H_4O_2 + 8O_2 \rightarrow 8CO_2 + 4H_2O$,
$C_4H_4O_2 + 4O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

2) $2C_5H_{2*5-4}O_2 + (2*5+1)O_2 \rightarrow [5+(1+4)]CO_2 + (5+1)H_2O$,
$2C_5H_6O_2 + 11O_2 \rightarrow 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2*6-4}O_2 + (2*6+2)O_2 \rightarrow [6+(2+4)]CO_2 + (6+2)H_2O$,
$2C_6H_8O_2 + 14O_2 \rightarrow 12CO_2 + 8H_2O$,
$C_6H_8O_2 + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2*7-4}O_2 + (2*7+3)O_2 \rightarrow [7+(3+4)]CO_2 + (7+3)H_2O$,
$2C_7H_{10}O_2 + 17O_2 \rightarrow 14CO_2 + 10H_2O + Q$.

5) $2C_{18}H_{2*18-4}O_2 + (2*18+14)O_2 \rightarrow [18+(14+4)]CO_2 + (18+14)H_2O$,
$2C_{18}H_{32}O_2 + 50O_2 \rightarrow 36CO_2 + 32H_2O$
$C_{18}H_{32}O_2 + 25O_2 \rightarrow 18CO_2 + 16H_2O + Q$.

IKKI ASOSLI KARBON KISLOTALAR

Molekulasi tarkibida uglevodorodlar radikallaridagi ikki vodorod atomi ikki karboksil guruhi $-COOH$ bilan almashingan hosilalari ikki asosli to'yingan karbon kislotalar gomologlari vakillari bo'lib hisoblanadi. Ularning asosiy vakillaridan biri oksalat kislotasi $HOOC-COOH$ o'simliklarda tuz holida uchraydi. Malon kislotasining $HOOC-CH_2-COOH$ esa sholg'om suvida borligi aniqlangan hamda u dastavval sintez usuli bilan sirka kislotadan olingan. Qahrabo kislotasi $HOOC-(CH_2)_2-COOH$ ham tabiatda keng tarqalgan ikki asosli kislotalardan biri bo'lib, qahraboda, qo'ng'ir ko'mirda, o'simliklarda ayniqsa, ho'l mevalarda ko'proq bo'ladi.

Ikki asosli karbon kislotalarning umumiy formulasini ushbu ko'rinishda $C_nH_{2*n-2}O_4$ va yonish reaksiya tenglamalari kimyoviy algoritmini esa quydagicha ifodalaymiz:

$$\frac{2*n}{n}C_nH_{2*n-2}O_4 + (3*n-5)O_2 \rightarrow 2nCO_2 + (2*n-2)H_2O + Q$$

Oksalat kislotasi: $HOOC-COOH$ yoki $C_2H_2O_4$

1) $\frac{2*2}{2}C_2H_{2*2-2}O_4 + (3*2-5)O_2 \rightarrow (2*2)CO_2 + (2*2-2)H_2O$,
$2C_2H_2O_4 + O_2 \rightarrow 4CO_2 + 2H_2O + Q$.

Malon kislotasi: $HOOC-CH_2-COOH$ yoki $C_3H_4O_4$

2) $\frac{2*3}{3}C_3H_{2*3-2}O_4 + (3*3-5)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4O_4 + 4O_2 \rightarrow 6CO_2 + 4H_2O$,
$C_3H_4O_4 + 2O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

Qahrabo kislotasi: $HOOC-(CH_2)_2-COOH$ yoki $C_4H_6O_4$

3) $\frac{2*4}{4}C_4H_{2*4-2}O_4+(3*4-5)O_2 \rightarrow (2*4)CO_2+(2*4-2)H_2O$,
$2C_4H_6O_4+7O_2 \rightarrow 8CO_2+6H_2O+Q$.

Glutar kislotasi: $HOOC-(CH_2)_3-COOH$ yoki $C_5H_8O_4$

4) $\frac{2*5}{5}C_5H_{2*5-2}O_4+(3*5-5)O_2 \rightarrow (2*5)CO_2+(2*5-2)H_2O$,
$2C_5H_8O_4+10O_2 \rightarrow 10CO_2+8H_2O$,
$C_5H_8O_4+5O_2 \rightarrow 5CO_2+4H_2O+Q$.

Adipin kislotasi: $HOOC-(CH_2)_4-COOH$ yoki $C_6H_{10}O_4$

5) $\frac{2*6}{6}C_6H_{2*6-2}O_4+(3*6-5)O_2 \rightarrow (2*6)CO_2+(2*6-2)H_2O$,
$2C_6H_{10}O_4+13O_2 \rightarrow 12CO_2+10H_2O+Q$.

Sebatsin kislotasi: $HOOC-(CH_2)_8-COOH$ yoki $C_{10}H_{18}O_4$

6) $\frac{2*10}{10}C_{10}H_{2*10-2}O_4+(3*10-5)O_2 \rightarrow (2*10)CO_2+(2*10-2)H_2O$,
$2C_{10}H_{18}O_4+25O_2 \rightarrow 20CO_2+18H_2O+Q$.

Yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasini quyidagi ko'rinishda yozib $(2n+m)$, ushbu sinf gomologlari vakillari uchun II variant kimyoviy algoritmini shunday ifodalaymiz:

$$\boxed{2C_nH_{2n-2}O_4+(2n+m)O_2 \rightarrow 2nCO_2+(2n-2)H_2O+Q}$$

(n) va (m) qiymatlari jadvali:

n=2;	m=-3;	n=5;	m=0;	n= 8;	m=3;
n=3;	m=-2;	n=6;	m=1;	n= 9;	m=4;
n=4;	m=-1;	n=7;	m=2;	n=10;	m=5.

Jadvaldan ko'rinib turibdiki, n = 2 bo'lganda, m =- 3 ga yoki n = 5 bo'lganda, m = 0 ga teng bo'ladi. Demak, bu sinf gomologlari vakillarida ham (n) va (m) qiymatlari proporsional ravishda (5) birlikka farq qilib, o'zgarib borishini ko'rish mumkin.

Algoritmik amallarga misollar:

Oksalat kislotasi: $HOOC-COOH$ yoki $C_2H_2O_4$

1) $2C_2H_{2*2-2}O_4+[2*2+(-3)]O_2 \to (2*2)CO_2+(2*2-2)H_2O$,
$2C_2H_2O_4+O_2 \to 4CO_2+2H_2O+Q$.

Malon kislotasi: $HOOC-C\,H_2-COOH$ yoki $C_3H_4O_4$

2) $2C_3H_{2*3-2}O_4+[2*3+(-2)]O_2 \to (2*3)CO_2+(2*3-2)H_2O$,
$2C_3H_4O_4+4O_2 \to 6CO_2+4H_2O$,
$C_3H_4O_4+2O_2 \to 3CO_2+2H_2O+Q$.

Qahrabo kislotasi: $HOOC-(C\,H_2)_2-COOH$ yoki $C_4H_8O_4$

3) $2C_4H_{2*4-2}O_4+[2*4+(-1)]O_2 \to (2*4)CO_2+(2*4-2)H_2O$,
$2C_4H_6O_4+7O_2 \to 8CO_2+6H_2O+Q$.

Glutar kislotasi: $HOOC-(C\,H_2)_3-COOH$ yoki $C_5H_8O_4$

4) $2C_5H_{2*5-2}O_4+(2*5+0)O_2 \to (2*5)CO_2+(2*5-2)H_2O$,
$2C_5H_8O_4+10O_2 \to 10CO_2+8H_2O$,
$C_5H_8O_4+5O_2 \to 5CO_2+4H_2O+Q$.

Adipin kislotasi: $HOOC-(C\,H_2)_4-COOH$ yoki $C_6H_{10}O_4$

5) $2C_6H_{2*6-2}O_4+(2*6+1)O_2 \to (2*6)CO_2+(2*6-2)H_2O$,
$2C_6H_{10}O_4+13O_2 \to 12CO_2+10H_2O+Q$.

Sebatsin kislotasi: $HOOC-(C\,H_2)_8-COOH$ yoki $C_{10}H_{18}O_4$

6) $2C_{10}H_{2*10-2}O_4+(2*10+5)O_2 \to (2*10)CO_2+(2*10-2)H_2O$,
$2C_{10}H_{18}O_4+25O_2 \to 20CO_2+18H_2O+Q$.

Mazkur sinf gomologlari vakillari uchun yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri - suvning H_2O koeffisient qiymati ifodasini $[n+(m+3)]$ shaklida yozib, III variant kimyoviy algoritmini quydagicha ifodalaymiz:

$$\boxed{2C_nH_{2n-2}O_4+(2n+m)O_2 \to 2nCO_2+[n+(m+3)]H_2O+Q}$$

(n) va (m) qiymatlari jadvali:

n=2;	m=-3;	n=5;	m=0;	n=8;	m=3;
n=3;	m=-2;	n=6;	m=1;	n=9;	m=4;
n=4;	m=-1;	n=7;	m=2;	n=10;	m=5.

Algoritmik amallarga misollar:

Oksalat kislotasi: $HOOC-COOH$ yoki $C_2H_2O_4$

1) $2C_2H_{2*2-2}O_4+[2*2+(-3)]O_2 \rightarrow (2*2)CO_2+[2+(-3+3)]H_2O$,

$2C_2H_2O_4+O_2 \rightarrow 4CO_2+2H_2O+Q$.

Malon kislotasi: $HOOC-CH_2-COOH$ yoki $C_3H_4O_4$

2) $2C_3H_{2*3-2}O_4+[2*3+(-2)]O_2 \rightarrow (2*3)CO_2+[3+(-2+3)]H_2O$,

$2C_3H_4O_4+4O_2 \rightarrow 6CO_2+4H_2O$,

$C_3H_4O_4+2O_2 \rightarrow 3CO_2+2H_2O+Q$.

Qahrabo kislotasi: $HOOC-(CH_2)_2-COOH$ yoki $C_4H_6O_4$

3) $2C_4H_{2*4-2}O_4+[2*4+(-1)]O_2 \rightarrow (2*4)CO_2+[4+(-1+3)]H_2O$,

$2C_4H_6O_4+7O_2 \rightarrow 8CO_2+6H_2O+Q$.

Glutar kislotasi: $HOOC-(CH_2)_3-COOH$ yoki $C_5H_8O_4$

4) $2C_5H_{2*5-2}O_4+(2*5+0)O_2 \rightarrow (2*5)CO_2+[5+(0+3)]H_2O$,

$2C_5H_8O_4+10O_2 \rightarrow 10CO_2+8H_2O$,

$C_5H_8O_4+5O_2 \rightarrow 5CO_2+4H_2O+Q$.

Adipin kislotasi: $HOOC-(CH_2)_4-COOH$ yoki $C_6H_{10}O_4$

5) $2C_6H_{2*6-2}O_4+(2*6+1)O_2 \rightarrow (2*6)CO_2+[6+(1+3)]H_2O$,

$2C_6H_{10}O_4+13O_2 \rightarrow 12CO_2+10H_2O+Q$.

Sebatsin kislotasi: $HOOC-(CH_2)_8-COOH$ yoki $C_{10}H_{18}O_4$

6) $2C_{10}H_{2*10-2}O_4+(2*10+5)O_2 \rightarrow (2*10)CO_2+[10+(5+3)]H_2O$,

$2C_{10}H_{18}O_4+25O_2 \rightarrow 20CO_2+18H_2O+Q$.

Asosiy reaksiya mahsulotlaridan biri – karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+5)]$ va IV variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-2}O_4+(2n+m)O_2 \rightarrow [n+(m+5)]CO_2+[n+(m+3)]H_2O+Q}$$

(n) va (m) qiymatlari jadvali:

n=2;	m=-3;	n=5;	m=0;	n=8;	m=3;
n=3;	m=-2;	n=6;	m=1;	n=9;	m=4;
n=4;	m=-1;	n=7;	m=2;	n=10;	m=5.

Algoritmik amallarga misollar:

Oksalat kislotasi: $HOOC-COOH$ yoki $C_2H_2O_4$

1) $2C_2H_{2*2-2}O_4+[2*2+(-3)]O_2\rightarrow[2+(-3+5)]CO_2+[2+(-3+3)]H_2O$,
$2C_2H_2O_4+O_2\rightarrow 4CO_2+2H_2O+Q$.

Malon kislotasi: $HOOC-C\,H_2-COOH$ yoki $C_3H_4O_4$

2) $2C_3H_{2*3-2}O_4+[2*3+(-2)]O_2\rightarrow[3+(-2+5)]CO_2+[3+(-2+3)]H_2O$,
$2C_3H_4O_4+4O_2\rightarrow 6CO_2+4H_2O$,
$C_3H_4O_4+2O_2\rightarrow 3CO_2+2H_2O+Q$.

Qahrabo kislotasi: $HOOC-(C\,H_2)_2-COOH$ yoki $C_4H_6O_4$

3) $2C_4H_{2*4-2}O_4+[2*4+(-1)]O_2\rightarrow[4+(-1+5)]CO_2+[4+(-1+3)]H_2O$,
$2C_4H_6O_4+7O_2\rightarrow 8CO_2+6H_2O+Q$.

Glutar kislotasi: $HOOC-(C\,H_2)_3-COOH$ yoki $C_5H_8O_4$

4) $2C_5H_{2*5-2}O_4+(2*5+0)O_2\rightarrow[5+(0+5)]CO_2+[5+(0+3)]H_2O$,
$2C_5H_8O_4+10O_2\rightarrow 10CO_2+8H_2O$,
$C_5H_8O_4+5O_2\rightarrow 5CO_2+4H_2O+Q$.

Adipin kislotasi: $HOOC-(C\,H_2)_4-COOH$ yoki $C_6H_{10}O_4$

5) $2C_6H_{2*6-2}O_4+(2*6+1)O_2\rightarrow[6+(1+5)]CO_2+[6+(1+3)]H_2O$,
$2C_6H_{10}O_4+13O_2\rightarrow 12CO_2+10H_2O+Q$.

Sebatsin kislotasi: $HOOC-(C\,H_2)_8-COOH$ yoki $C_{10}H_{18}O_4$

6) $2C_{10}H_{2*10-2}O_4+(2*10+5)O_2\rightarrow[10+(5+5)]CO_2+[10+(5+3)]H_2O$,
$2C_{10}H_{18}O_4+25O_2\rightarrow 20CO_2+18H_2O+Q$.

TO'YINMAGAN IKKI ASOSLI KARBON KISLOTALAR

To'yinmagan uglevodorodlar radikallaridagi ikkita vodorod atomi ikkita karboksil guruhiga $-COOH$ almashinishidan hosil bo'lgan birikmalar ikki asosli to'yinmagan (dikarbon) kislotalar deyiladi. Dikarbon kislotalardagi (R) radikallari etilen va asetilen bog'li uglevodordlar qoldig'i bo'lishi mumkin. To'yinmagan ikki asosli karbon kislotalar gomologlari vakillarining umumiy formulasi $C_nH_{2*n-4}O_4$ va yonish reaksiya tenglamalari kimyoviy algoritmi:

$$\frac{2*n}{n}C_nH_{2*n-4}O_4+(3*n-6)O_2\rightarrow 2nCO_2+(2*n-4)H_2O+Q$$

1) $\frac{2*4}{4}C_4H_{2*4-4}O_4+(3*4-6)O_2\rightarrow(2*4)CO_2+(2*4-4)H_2O,$

$2C_4H_4O_4+6O_2\rightarrow 8CO_2+4H_2O,$

$C_4H_4O_4+3O_2\rightarrow 4CO_2+2H_2O+Q.$

2) $\frac{2*5}{5}C_5H_{2*5-4}O_4+(3*5-6)O_2\rightarrow(2*5)CO_2+(2*5-4)H_2O,$

$2C_5H_6O_4+9O_2\rightarrow 10CO_2+6H_2O+Q.$

3) $\frac{2*6}{6}C_6H_{2*6-4}O_4+(3*6-6)O_2\rightarrow(2*6)CO_2+(2*6-4)H_2O,$

$2C_6H_8O_4+12O_2\rightarrow 12CO_2+8H_2O,$

$C_6H_8O_4+6O_2\rightarrow 6CO_2+4H_2O+Q.$

4) $\frac{2*7}{7}C_7H_{2*7-4}O_4+(3*7-6)O_2\rightarrow(2*7)CO_2+(2*7-4)H_2O,$

$2C_7H_{10}O_4+15O_2\rightarrow 14CO_2+10H_2O+Q$

5) $\frac{2*8}{8}C_8H_{2*8-4}O_4+(3*8-6)O_2\rightarrow(2*8)CO_2+(2*8-4)H_2O,$

$2C_8H_{12}O_4+18O_2\rightarrow 16CO_2+12H_2O,$

$C_8H_{12}O_4+9O_2\rightarrow 8CO_2+6H_2O+Q.$

6) $\frac{2*9}{9}C_9H_{2*9-4}O_4+(3*9-6)O_2\rightarrow(2*9)CO_2+(2*9-4)H_2O,$

$2C_9H_{14}O_4+21O_2\rightarrow 18CO_2+14H_2O+Q.$

Yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(2n+m)$ va bu sinf gomologlari vakillarining II variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-4}O_4+(2n+m)O_2\rightarrow 2nCO_2+(2n-4)H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=4; m=-2; n=7; m=1;
n=5; m=-1; n=8; m=2;
n=6; m=0; n=9; m=3 va hokazo.

Jadvaldan ko'rinib turibdiki, n = 4 bo'lganda, m = -2 ga yoki n = 6 bo'lganda, m = 0 ga teng bo'ladi. Demak, (n) va (m) qiymatlari orasidagi farq (6) birlikka o'zgarib boradi.

Algoritmik amallarga misollar:

1) $2C_4H_{2*4-4}O_4+[2*4+(-2)]O_2 \rightarrow (2*4)CO_2+(2*4-4)H_2O$,
$2C_4H_4O_4+6O_2 \rightarrow 8CO_2+4H_2O$,
$C_4H_4O_4+3O_2 \rightarrow 4CO_2+2H_2O+Q$.

2) $2C_5H_{2*5-4}O_4+[2*5+(-1)]O_2 \rightarrow (2*5)CO_2+(2*5-4)H_2O$,
$2C_5H_6O_4+9O_2 \rightarrow 10CO_2+6H_2O+Q$.

3) $2C_6H_{2*6-4}O_4+(2*6+0)O_2 \rightarrow (2*6)CO_2+(2*6-4)H_2O$,
$2C_6H_8O_4+12O_2 \rightarrow 12CO_2+8H_2O$,
$C_6H_8O_4+6O_2 \rightarrow 6CO_2+4H_2O+Q$.

4) $2C_7H_{2*7-4}O_4+(2*7+1)O_2 \rightarrow (2*7)CO_2+(2*7-4)H_2O$,
$2C_7H_{10}O_4+15O_2 \rightarrow 14CO_2+10H_2O+Q$.

5) $2C_8H_{2*8-4}O_4+(2*8+2)O_2 \rightarrow (2*8)CO_2+(2*8-4)H_2O$,
$2C_8H_{12}O_4+18O_2 \rightarrow 16CO_2+12H_2O$,
$C_8H_{12}O_4+9O_2 \rightarrow 8CO_2+6H_2O+Q$.

6) $2C_9H_{2*9-4}O_4+(2*9+3)O_2 \rightarrow (2*9)CO_2+(2*9-4)H_2O$,
$2C_9H_{14}O_4+21O_2 \rightarrow 18CO_2+14H_2O+Q$.

Reaksiyaning asosiy mahsulotlaridan biri – suvning H_2O koeffisient qiymati ifodasi $[n+(m+2)]$ va III variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-4}O_4+(2n+m)O_2 \rightarrow 2nCO_2+[n+(m+2)]H_2O+Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=4; m=-2; n=7; m=1;
n=5; m=-1; n=8; m=2;
n=6; m = 0; n=9; m=3.

Algoritmik amallarga misollar:

1) $2C_4H_{2*4-4}O_4+[2*4+(-2)]O_2 \rightarrow (2*4)CO_2+[4+(-2+2)]H_2O$,
$2C_4H_4O_4+6O_2 \rightarrow 8CO_2+4H_2O$,
$C_4H_4O_4+3O_2 \rightarrow 4CO_2+2H_2O+Q$

2) $2C_5H_{2*5-4}O_4 + [2*5+(-1)]O_2 \to (2*5)CO_2 + [5+(-1+2)]H_2O$,
$2C_5H_6O_4 + 9O_2 \to 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2*6-4}O_4 + (2*6+0)O_2 \to (2*6)CO_2 + [6+(0+2)]H_2O$,
$2C_6H_8O_4 + 12O_2 \to 12CO_2 + 8H_2O$,
$C_6H_8O_4 + 6O_2 \to 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2*7-4}O_4 + (2*7+1)O_2 \to (2*7)CO_2 + [7+(1+2)]H_2O$,
$2C_7H_{10}O_4 + 15O_2 \to 14CO_2 + 10H_2O + Q$.

5) $2C_8H_{2*8-4}O_4 + (2*8+2)O_2 \to (2*8)CO_2 + [8+(2+2)]H_2O$,
$2C_8H_{12}O_4 + 18O_2 \to 16CO_2 + 12H_2O$,
$C_8H_{12}O_4 + 9O_2 \to 8CO_2 + 6H_2O + Q$.

6) $2C_9H_{2*9-4}O_4 + (2*9+3)O_2 \to (2*9)CO_2 + [9+(3+2)]H_2O$,
$2C_9H_{14}O_4 + 21O_2 \to 18CO_2 + 14H_2O + Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+6)]$ va IV variant kimyoviy algoritmi:

$$2C_nH_{2n-4}O_4 + (2n+m)O_2 \to [n+(m+6)]CO_2 + [n+(m+2)]H_2O + Q$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=4; m=-2; n=7; m=1;
n=5; m=-1; n=8; m=2;
n=6; m=0; n=9; m=3.

Algoritmik amallarga misollar:

1) $2C_4H_{2*4-4}O_4 + [2*4+(-2)]O_2 \to [4+(-2+6)]CO_2 + [4+(-2+2)]H_2O$,
$2C_4H_4O_4 + 6O_2 \to 8CO_2 + 4H_2O$,
$C_4H_4O_4 + 3O_2 \to 4CO_2 + 2H_2O + Q$.

2) $2C_5H_{2*5-4}O_4 + [2*5+(-1)]O_2 \to [5+(-1+6)]CO_2 + [5+(-1+2)]H_2O$,
$2C_5H_6O_4 + 9O_2 \to 10CO_2 + 6H_2O + Q$.

3) $2C_6H_{2*6-4}O_4 + (2*6+0)O_2 \to [6+(0+6)]CO_2 + [6+(0+2)]H_2O$,
$2C_6H_8O_4 + 12O_2 \to 12CO_2 + 8H_2O$,
$C_6H_8O_4 + 6O_2 \to 6CO_2 + 4H_2O + Q$.

4) $2C_7H_{2*7-4}O_4 + (2*7+1)O_2 \rightarrow [7+(1+6)]CO_2 + [7+(1+2)]H_2O$,

$2C_7H_{10}O_4 + 15O_2 \rightarrow 14CO_2 + 10H_2O + Q$.

5) $2C_8H_{2*8-4}O_4 + (2*8+2)O_2 \rightarrow [8+(2+6)]CO_2 + [8+(2+2)]H_2O$,

$2C_8H_{12}O_4 + 18O_2 \rightarrow 16CO_2 + 12H_2O$,

$C_8H_{12}O_4 + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

6) $2C_9H_{2*9-4}O_4 + (2*9+3)O_2 \rightarrow [9+(3+6)]CO_2 + [9+(3+2)]H_2O$,

$2C_9H_{14}O_4 + 21O_2 \rightarrow 18CO_2 + 14H_2O + Q$.

MONOKSIKARBON KISLOTALAR

Monoksikarbon kislotalar yoki oksikislotalar molekulasi tarkibida gidroksil$-OH$ va karboksil$-COOH$ guruhlari kiradigan organik birikmalarning muhim sinfi vakillaridan biridir. Demak, bu sinf gomologlari vakillari molekulasi tarkibida ikki xil, ya'ni gidroksil va karboksil funksional guruhlariga ega bo'lgan birikmalardir.

Monoksikarbon kislotalar ham tabiatda keng tarqalgan. Oksisirka kislotasi, sut kislotasi shular jumlasidandir. Ularning umumiy formulasini $C_nH_{2*n}O_3$ ko'rinishda ifodalaydigan bo'lsak, yonish reaksiya tenglamalari kimyoviy algoritmi quydagicha bo'ladi:

$$\frac{2*n}{n}C_nH_{2*n}O_3 + (3*n-3)O_2 \rightarrow 2nCO_2 + (2*n)\ H_2O + Q$$

Algoritmik amallarga misollar:

Oksisirka kislotasi: $C_2H_4O_3$

1) $\frac{2*2}{2}C_2H_{2*2}O_3 + (3*2-3)O_2 \rightarrow (2*2)CO_2 + (2*2)\ H_2O$,

$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

Sut kislotasi: $C_3H_6O_3$

2) $\frac{2*3}{3}C_3H_{2*3}O_3 + (3*3-3)O_2 \rightarrow (2*3)CO_2 + (2*3)\ H_2O$,

$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$,

$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O$.

Oksimoy kislotasi: $C_4H_8O_3$

3) $\frac{2*4}{4}C_4H_{2*4}O_3 + (3*4-3)O_2 \rightarrow (2*4)CO_2 + (2*4)\ H_2O$,

$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

Oksivalerian kislotasi: $C_5H_{10}O_3$

4) $\frac{2*5}{5}C_5H_{2*5}O_3 + (3*5-3)O_2 \rightarrow (2*5)CO_2 + (2*5)\ H_2O$,

$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$,

$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

Oksikapron kislotasi: $C_6H_{12}O_3$

5) $\frac{2*6}{6}C_6H_{2*6}O_3 + (3*6-3)O_2 \rightarrow (2*6)CO_2 + (2*6)\ H_2O$,

$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

Yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorod O_2 uchun koeffisient qiymati ifodasi $(2n+m)$ va II variant kimyoviy algoritmi:

$$2C_nH_{2*n}O_3 + (2n+m)O_2 \rightarrow 2nCO_2 + (2*n)\ H_2O + Q$$

(n) va (m) qiymatlari jadvali:

n=2;	m=-1;	n=5;	m=2;
n=3;	m=0;	n=6;	m=3;
n=4;	m=1;	n=7;	m=4.

Demak, jadvaldan n = 2 bo'lganda, m = -1 ga yoki n = 5 bo'lganda, m = 2 ga tengligini va (n) va (m) qiymatlar orasidagi farq (3) birlikka o'zgarib, ortib borishini ko'rish mumkin.

Algoritmik amallarga misollar:

Oksisirka kislotasi: $C_2H_4O_3$

1) $\frac{2*2}{2}C_2H_{2*2}O_3 + [2*2+(-1)]O_2 \rightarrow (2*2)CO_2 + (2*2)\ H_2O$,

$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

Sut kislotasi: $C_3H_6O_3$

2) $\frac{2*3}{3}C_3H_{2*3}O_3 + (2*3+0)O_2 \rightarrow (2*3)CO_2 + (2*3)\ H_2O$,

$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$,

$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O$.

Oksimoy kislotasi: $C_4H_8O_3$

3) $\frac{2*4}{4}C_4H_{2*4}O_3 + (2*4+1)O_2 \rightarrow (2*4)CO_2 + (2*4)\ H_2O$,

$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

Oksivalerian kislotasi: $C_5H_{10}O_3$

4) $\frac{2*5}{5}C_5H_{2*5}O_3 + (2*5+2)O_2 \rightarrow (2*5)CO_2 + (2*5)\ H_2O$,

$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$,

$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

Oksikapron kislotasi: $C_6H_{12}O_3$

5) $\frac{2*6}{6}C_6H_{2*6}O_3 + (2*6+3)O_2 \rightarrow (2*6)CO_2 + (2*6)\ H_2O$,

$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

Reaksiyaning asosiy mahsulotlaridan biri – suvning H_2O koeffisient qiymati ifodasi $[n+(m+3)]$ va III variant kimyoviy algoritmi:

$$2C_nH_{2*n}O_3 + (2n+m)O_2 \rightarrow 2nCO_2 + [n+(m+3)]\ H_2O + Q$$

(n) va (m) qiymatlari jadvali:

n=2;	m=-1;	n=5;	m=2;
n=3;	m=0;	n=6;	m=3;
n=4;	m=1;	n=7;	m=4.

Algoritmik amallarga misollar:

Oksisirka kislotasi: $C_2H_4O_3$

1) $\frac{2*2}{2}C_2H_{2*2}O_3 + [2*2+(-1)]O_2 \rightarrow (2*2)CO_2 + [2+(-1+3)]\ H_2O$,

$2C_2H_4O_3 + 3O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

Sut kislotasi: $C_3H_6O_3$

2) $\frac{2*3}{3}C_3H_{2*3}O_3+(2*3+0)O_2 \rightarrow (2*3)CO_2+[3+(0+3)]\ H_2O$,

$2C_3H_6O_3+6O_2 \rightarrow 6CO_2+6H_2O$,

$C_3H_6O_3+3O_2 \rightarrow 3CO_2+3H_2O$.

Oksimoy kislotasi: $C_4H_8O_3$

3) $\frac{2*4}{4}C_4H_{2*4}O_3+(2*4+1)O_2 \rightarrow (2*4)CO_2+[4+(1+3)]\ H_2O$,

$2C_4H_8O_3+9O_2 \rightarrow 8CO_2+8H_2O+Q$.

Oksivalerian kislotasi: $C_5H_{10}O_3$

4) $\frac{2*5}{5}C_5H_{2*5}O_3+(2*5+2)O_2 \rightarrow (2*5)CO_2+[5+(2+3)]\ H_2O$,

$2C_5H_{10}O_3+12O_2 \rightarrow 10CO_2+10H_2O$,

$C_5H_{10}O_3+6O_2 \rightarrow 5CO_2+5H_2O+Q$.

Oksikapron kislotasi: $C_6H_{12}O_3$

5) $\frac{2*6}{6}C_6H_{2*6}O_3+(2*6+3)O_2 \rightarrow (2*6)CO_2+[6+(3+3)]\ H_2O$,

$2C_6H_{12}O_3+15O_2 \rightarrow 12CO_2+12H_2O+Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+3)]$ va IV variant kimyoviy algoritmi:

$$2C_nH_{2*n}O_3+(2n+m)O_2 \rightarrow [n+(m+3)]CO_2+[n+(m+3)]\ H_2O+Q$$

(n) va (m) qiymatlari jadvali:

n=2;	m=-1;	n=5;	m=2;
n=3;	m=0;	n=6;	m=3;
n=4;	m=1;	n=7;	m=4.

Algoritmik amallarga misollar:

Oksisirka kislotasi: $C_2H_4O_3$

1) $2C_2H_{2*2}O_3+[2*2+(-1)]O_2 \rightarrow [2+(-1+3)]CO_2+[2+(-1+3)]\ H_2O$,

$2C_2H_4O_3+3O_2 \rightarrow 4CO_2+4H_2O+Q$.

Sut kislotasi: $C_3H_6O_3$

2) $2C_3H_{2*3}O_3 + (2*3+0)O_2 \rightarrow [3+(0+3)]CO_2 + [3+(0+3)]\ H_2O$,

$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$,
$C_3H_6O_3 + 3O_2 \rightarrow 3CO_2 + 3H_2O$.

Oksimoy kislotasi: $C_4H_8O_3$

3) $2C_4H_{2*4}O_3 + (2*4+1)O_2 \rightarrow [4+(1+3)]CO_2 + [4+(1+3)]H_2O$,
$2C_4H_8O_3 + 9O_2 \rightarrow 8CO_2 + 8H_2O + Q$.

Oksivalerian kislotasi: $C_5H_{10}O_3$

4) $2C_5H_{2*5}O_3 + (2*5+2)O_2 \rightarrow [5+(2+3)]CO_2 + [5+(2+3)]H_2O$,
$2C_5H_{10}O_3 + 12O_2 \rightarrow 10CO_2 + 10H_2O$,
$C_5H_{10}O_3 + 6O_2 \rightarrow 5CO_2 + 5H_2O + Q$.

Oksikapron kislotasi: $C_6H_{12}O_3$

5) $2C_6H_{2*6}O_3 + (2*6+3)O_2 \rightarrow [6+(3+3)]CO_2 + [6+(3+3)]H_2O$,
$2C_6H_{12}O_3 + 15O_2 \rightarrow 12CO_2 + 12H_2O + Q$.

TO'YINMAGAN ALDEGIDLAR VA KETONLAR

Molekulasi tarkibida to'yinmagan uglevodorodlar radikalidagi bitta vodorod atomi aldegid guruhi $-CHO$ bilan almashingan organik birikmalar to'yinmagan alьdegidlar sinfini tashkil etadi.

Shuningdek, to'yinmagan aldegidlar va ketonlarning umumiy formulasi $C_nH_{2n-2}O$ bo'lganda, ularning yonish reaksiya tenglamalari kimyoviy algoritmini ushbu ko'rinishda ifodalash mumkin:

$$\boxed{\frac{2n}{n}C_nH_{2n-2}O + (3n-2)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q}$$

Kimyoviy algoritmik amallarga misollar:

1) $\frac{2*3}{3}C_3H_{2*3-2}O + (3*3-2)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4O + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

2) $\frac{2*4}{4}C_4H_{2*4-2}O + (3*4-2)O_2 \rightarrow (2*4)CO_2 + (2*4-2)H_2O$,
$2C_4H_6O + 10O_2 \rightarrow 8CO_2 + 6H_2O$,
$C_4H_6O + 5O_2 \rightarrow 4CO_2 + 3H_2O + Q$.

3) $\frac{2*5}{5}C_5H_{2*5-2}O+(3*5-2)O_2 \rightarrow (2*5)CO_2+(2*5-2)H_2O$,
$2C_5H_8O+13O_2 \rightarrow 10CO_2+8H_2O+Q$.

4) $\frac{2*6}{6}C_6H_{2*6-2}O+(3*6-2)O_2 \rightarrow (2*6)CO_2+(2*6-2)H_2O$,
$2C_6H_{10}O+16O_2 \rightarrow 12CO_2+10H_2O$,
$C_6H_{10}O+8O_2 \rightarrow 6CO_2+5H_2O+Q$.

Mazkur sinf gomologlari vakillari yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislordning O_2 koeffisient qiymati ifodasini ushbu ko'rinishda yozib $(2n+m)$, kimyoviy algoritmining II variantini quydgicha ifodalaymiz:

$$2C_nH_{2n-2}O+(2n+m)O_2 \rightarrow 2nCO_2+(2n-2)H_2O+Q$$

(n) va (m) qiymatlari jadvali:

n=3; m=1; n=6; m=4;
n=4; m=2; n=7; m=5;
n=5; m=3; n=8; m=6.

Jadvaldan ko'rinib turibdiki, (n) va (m) qiymatlari orasidagi farq (2) birlikka o'zgarib borar ekan.

Kimyoviy algoritmik amallarga misollar:

1) $2C_3H_{2*3-2}O+(2*3+1)O_2 \rightarrow (2*3)CO_2+(2*3-2)H_2O$,
$2C_3H_4O+7O_2 \rightarrow 6CO_2+4H_2O+Q$.

2) $2C_4H_{2*4-2}O+(2*4+2)O_2 \rightarrow (2*4)CO_2+(2*4-2)H_2O$,
$2C_4H_6O+10O_2 \rightarrow 8CO_2+6H_2O$,
$C_4H_6O+5O_2 \rightarrow 4CO_2+3H_2O+Q$.

3) $2C_5H_{2*5-2}O+(2*5+3)O_2 \rightarrow (2*5)CO_2+(2*5-2)H_2O$,
$2C_5H_8O+13O_2 \rightarrow 10CO_2+8H_2O+Q$.

4) $2C_6H_{2*6-2}O+(2*6+4)O_2 \rightarrow (2*6)CO_2+(2*6-2)H_2O$,
$2C_6H_{10}O+16O_2 \rightarrow 12CO_2+10H_2O$,
$C_6H_{10}O+8O_2 \rightarrow 6CO_2+5H_2O+Q$.

Organik moddalarning ushbu sinfi gomologlari vakillari yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri - suvning H_2O koeffisient qiymati ifodasini $(n+m)$ shaklida yozganimzda, III variant kimyoviy algoritmi quydagi ko'rinishda bo'ladi:

$$\boxed{2C_nH_{2\cdot n-2}O + (2n+m)O_2 \rightarrow 2nCO_2 + (n+m)H_2O + Q}$$

(n) va (m) qiymatlari jadvali:

n=3; m=1; n=6; m=4;
n=4; m=2; n=7; m=5;
n=5; m=3; n=8; m=6.

Kimyoviy algoritmik amallarga misollar:

1) $2C_3H_{2\cdot 3-2}O + (2*3+1)O_2 \rightarrow (2*3)CO_2 + (3+1)H_2O$,
$2C_3H_4O + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

2) $2C_4H_{2\cdot 4-2}O + (2*4+2)O_2 \rightarrow (2*4)CO_2 + (4+2)H_2O$,
$2C_4H_6O + 10O_2 \rightarrow 8CO_2 + 6H_2O$,
$C_4H_6O + 5O_2 \rightarrow 4CO_2 + 3H_2O + Q$.

3) $2C_5H_{2\cdot 5-2}O + (2*5+3)O_2 \rightarrow (2*5)CO_2 + (5+3)H_2O$,
$2C_5H_8O + 13O_2 \rightarrow 10CO_2 + 8H_2O + Q$.

4) $2C_6H_{2\cdot 6-2}O + (2*6+4)O_2 \rightarrow (2*6)CO_2 + (6+4)H_2O$,
$2C_6H_{10}O + 16O_2 \rightarrow 12CO_2 + 10H_2O$,
$C_6H_{10}O + 8O_2 \rightarrow 6CO_2 + 5H_2O + Q$.

Reaksiyaning asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+2)]$ va IV variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2\cdot n-2}O + (2n+m)O_2 \rightarrow [n+(m+2)]CO_2 + (n+m)H_2O + Q}$$

(n) va (m) qiymatlari jadvali:

n=3; m=1; n=6; m=4;
n=4; m=2; n=7; m=5;
n=5; m=3; n=8; m=6.

Kimyoviy algoritmik amallarga misollar:

1) $2C_3H_{2*3-2}O + (2*3+1)O_2 \rightarrow [3+(1+2)]O_2 + (3+1)H_2O$,
$2C_3H_4O + 7O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

2) $2C_4H_{2*4-2}O + (2*4+2)O_2 \rightarrow [4+(2+2)]CO_2 + (4+2)H_2O$,
$2C_4H_6O + 10O_2 \rightarrow 8CO_2 + 6H_2O$,
$C_4H_6O + 5O_2 \rightarrow 4CO_2 + 3H_2O + Q$.

3) $2C_5H_{2*5-2}O + (2*5+3)O_2 \rightarrow [5+(3+2)]CO_2 + (5+3)H_2O$,
$2C_5H_8O + 13O_2 \rightarrow 10CO_2 + 8H_2O + Q$.

4) $2C_6H_{2*6-2}O + (2*6+4)O_2 \rightarrow [6+(4+2)]CO_2 + (6+4)H_2O$,
$2C_6H_{10}O + 16O_2 \rightarrow 12CO_2 + 10H_2O$,
$C_6H_{10}O + 8O_2 \rightarrow 6CO_2 + 5H_2O + Q$.

ALDEGIDO VA KETONOKISLOTALAR

Molekulasi tarkibida aldegid yoki keton guruhi hamda karboksil guruhi bo'ladigan organik birikmalar aldegido va ketonokislotalar deyiladi. Ularning birinchi vakili glioksil kislotasi pishib yetilmagan ho'l mevalarda uchraydi. Aldegido va ketonokislotalarning umumiy formulasi $C_nH_{2n-2}O_3$ va yonish reaksiya tenglamalari kimyoviy algoritmi:

$$\frac{2n}{n}C_nH_{2n-2}O_3 + (3n-4)O_2 \rightarrow 2nCO_2 + (2n-2)H_2O + Q$$

Algoritmik amallarga misollar:

Glioksil kislotasi: $CHO-COOH$ yoki $C_2H_2O_3$

1) $\frac{2*2}{2}C_2H_{2*2-2}O_3 + (3*2-4)O_2 \rightarrow (2*2)CO_2 + (2*2-2)H_2O$,
$2C_2H_2O_3 + 2O_2 \rightarrow 4CO_2 + 2H_2O$,
$C_2H_2O_3 + O_2 \rightarrow 2CO_2 + H_2O + Q$.

Propanon kislotasi: $C_3H_4O_3$

2) $\frac{2*3}{3}C_3H_{2*3-2}O_3 + (3*3-4)O_2 \rightarrow (2*3)CO_2 + (2*3-2)H_2O$,
$2C_3H_4O_3 + 5O_2 \rightarrow 6CO_2 + 4H_2O + Q$.

Asetosirka kislotasi: $CH_3-CO-CH_2-COOH$ yoki $C_4H_6O_3$

3) $\frac{2*4}{4}C_4H_{2*4-2}O_3+(3*4-4)O_2\rightarrow(2*4)CO_2+(2*4-2)H_2O$,
$2C_4H_6O_3+8O_2\rightarrow 8CO_2+6H_2O$,
$C_4H_6O_3+4O_2\rightarrow 4CO_2+3H_2O+Q$.

Asetosirka efiri: $CH_3-CO-CH_2-COOC_2H_5$ yoki $C_6H_{10}O_3$

4) $\frac{2*6}{6}C_6H_{2*6-2}O_3+(3*6-4)O_2\rightarrow(2*6)CO_2+(2*6-2)H_2O$,
$2C_6H_{10}O_3+14O_2\rightarrow 12CO_2+10H_2O$,
$C_6H_{10}O_3+7O_2\rightarrow 6CO_2+5H_2O+Q$.

Kislorod O_2 uchun koeffisient qiymati ifodasini (2n+m) shaklida yozib, mazkur sinf vakillari yonish reaksiya tenglamalari II varianti kimyoviy algoritmini ushbu ko'rinishda ifodalaymiz:

$$\boxed{2C_nH_{2\cdot n-2}O_3+(2n+m)O_2\rightarrow 2nCO_2+(2n-2)H_2O+Q}$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=2;	m=-2;	n=5;	m=1;
n=3;	m=-1;	n=6;	m=2;
n=4;	m=0;	n=7;	m=3.

Jadvaldan ko'rinib turibdiki, n = 2 ga teng bo'lganda, m = -2 ga teng bo'lib, (n) va (m) qiymatlari (4) birlikka farq qilib o'zgarib boradi.

Algoritmik amallarga misollar:

Glioksil kislotasi: $CHO-COOH$ yoki $C_2H_2O_3$

1) $2C_2H_{2*2-2}O_3+[2*2+(-2)]O_2\rightarrow(2*2)CO_2+(2*2-2)H_2O$,
$2C_2H_2O_3+2O_2\rightarrow 4CO_2+2H_2O$,
$C_2H_2O_3+O_2\rightarrow 2CO_2+H_2O+Q$.

Propanon kislotasi: $C_3H_4O_3$

2) $2C_3H_{2*3-2}-O_3+[2*3+(-1)]O_2\rightarrow(2*3)CO_2+(2*3-2)H_2O$,
$2C_3H_4O_3+5O_2\rightarrow 6CO_2+4H_2O+Q$.

Asetosirka kislotasi: $CH_3-CO-CH_2-COOH$ yoki $C_4H_6O_3$,

3) $2C_4H_{2*4-2}O_3+(2*4+0)O_2 \to (2*4)CO_2+(2*4-2)H_2O$,

$2C_4H_6O_3+8O_2 \to 8CO_2+6H_2O$,

$C_4H_6O_3+4O_2 \to 4CO_2+3H_2O+Q$.

Asetosirka efiri: $CH_3-CO-CH_2-COOC_2H_5$ yoki $C_6H_{10}O_3$

4) $2C_6H_{2*6-2}O_3+(2*6+2)O_2 \to (2*6)CO_2+(2*6-2)H_2O$,

$2C_6H_{10}O_3+14O_2 \to 12CO_2+10H_2O$,

$C_6H_{10}O_3+7O_2 \to 6CO_2+5H_2O+Q$.

Reaksiyaning asosiy mahsulotlaridan biri – suvning H_2O koeffisient qiymati ifodasini quydagicha ifodalab $[n+(m+2)]$, III variant kimyoviy algoritmini ushbu ko'rinishda yozamiz:

$$2C_nH_{2\cdot n-2}O_3+(2n+m)O_2 \to 2nCO_2+[n+(m+2)]H_2O+Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=2;	m=-2;	n=5;	m=1;
n=3;	m=-1;	n=6;	m=2;
n=4;	m=0;	n=7;	m=3.

Algoritmik amallarga misollar:

Glioksil kislotasi: $CHO-COOH$ yoki $C_2H_2O_3$

1) $2C_2H_{2*2-2}O_3+[2*2+(-2)]O_2 \to (2*2)CO_2+[2+(-2+2)]H_2O$,

$2C_2H_2O_3+2O_2 \to 4CO_2+2H_2O$,

$C_2H_2O_3+O_2 \to 2CO_2+H_2O+Q$.

Propanon kislotasi: $C_3H_4O_3$

2) $2C_3H_{2*3-2}O_3+[2*3+(-1)]O_2 \to (2*3)CO_2+[3+(-1+2)]H_2O$,

$2C_3H_4O_3+5O_2 \to 6CO_2+4H_2O+Q$

Asetosirka kislotasi: $CH_3-CO-CH_2-COOH$ yoki $C_4H_6O_3$

3) $2C_4H_{2*4-2}O_3+(2*4+0)O_2 \to (2*4)CO_2+[4+(0+2)]H_2O$,

$2C_4H_6O_3+8O_2 \to 8CO_2+6H_2O$,

$C_4H_6O_3+4O_2 \to 4CO_2+3H_2O+Q$.

Asetosirka efiri: $CH_3-CO-CH_2-COOC_2H_5$ yoki $C_6H_{10}O_3$

4) $2C_6H_{2*6-2}O_3+(2*6+2)O_2 \rightarrow (2*6)CO_2+[6+(2+2)]H_2O$,

$2C_6H_{10}O_3+14O_2 \rightarrow 12CO_2+10H_2O$,

$C_6H_{10}O_3+7O_2 \rightarrow 6CO_2+5H_2O+Q$.

Reaksiyaning asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi quydagicha $[n+(m+4)]$ va IV variant kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$2C_nH_{2\cdot n-2}O_3+(2n+m)O_2 \rightarrow [n+(m+4)]CO_2+[n+(m+2)]H_2O+Q$$

(n) va (m) qiymatlari orasidagi bog'liqlik:

n=2;	m=-2;	n=5;	m=1;
n=3;	m=-1;	n=6;	m=2;
n=4;	m=0;	n=7;	m=3.

Algoritmik amallarga misollar:

Glioksil kislotasi: $CHO-COOH$ yoki $C_2H_2O_3$

1) $2C_2H_{2*2-2}O_3+[2*2+(-2)]O_2 \rightarrow [2+(-2+4)]CO_2+[2+(-2+2)]H_2O$,

$2C_2H_2O_3+2O_2 \rightarrow 4CO_2+2H_2O$,

$C_2H_2O_3+O_2 \rightarrow 2CO_2+H_2O+Q$.

Propanon kislotasi: $C_3H_4O_3$

2) $2C_3H_{2*3-2}O_3+[2*3+(-1)]O_2 \rightarrow [3+(-1+4)]CO_2+[3+(-1+2)]H_2O$,

$2C_3H_4O_3+5O_2 \rightarrow 6CO_2+4H_2O+Q$.

Asetosirka kislotasi: $CH_3-CO-CH_2-COOH$ yoki $C_4H_6O_3$

3) $2C_4H_{2*4-2}O_3+(2*4+0)O_2 \rightarrow [4+(0+4)]CO_2+[4+(0+2)]H_2O$,

$2C_4H_6O_3+8O_2 \rightarrow 8CO_2+6H_2O$,

$C_4H_6O_3+4O_2 \rightarrow 4CO_2+3H_2O+Q$.

Asetosirka efiri: $CH_3-CO-CH_2-COOC_2H_5$ yoki $C_6H_{10}O_3$

4) $2C_6H_{2*6-2}O_3+(2*6+2)O_2 \rightarrow [6+(2+4)]CO_2+[6+(2+2)]H_2O$,

$2C_6H_{10}O_3+14O_2 \rightarrow 12CO_2+10H_2O$,

$C_6H_{10}O_3+7O_2 \rightarrow 6CO_2+5H_2O+Q$.

AROMATIK ALDEGIDLAR VA KETONLAR

Aromatik aldegidlar va ketonlar organik birikmalarning muhim siniflaridan biri bo'lib hisoblanadi. Ularning gomologlari ayrim vakillarining umumiy formulasini ushbu ko'rinishda yozib $C_nH_{2n-8}O$, yonish tenglamalari kimyoviy algoritmini quydagicha ifodalaymiz:

$$\frac{2n}{n} C_nH_{2 \cdot n-8}O + (3n-5)O_2 \rightarrow 2nCO_2 + (2n-8)H_2O + Q$$

Algoritmik amallarga misollar:

1) $\frac{2*7}{7} C_7H_{2*7-8}O + (3*7-5)O_2 \rightarrow (2*7)CO_2 + (2*7-8)H_2O$,

$2C_7H_6O + 16O_2 \rightarrow 14CO_2 + 6H_2O$,

$C_7H_6O + 8O_2 \rightarrow 7CO_2 + 3H_2O + Q$.

2) $\frac{2*8}{8} C_8H_{2*8-8}O + (3*8-5)O_2 \rightarrow (2*8)CO_2 + (2*8-8)H_2O$,

$2C_8H_8O + 19O_2 \rightarrow 16CO_2 + 8H_2O + Q$.

Kislorodning O_2 koeffisient qiymati ifodasi $(2n+m)$ va II variant kimyoviy algoritmi:

$$2C_nH_{2 \cdot n-8}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-8)H_2O + Q$$

(n) va (m) qiymatlari jadvali:

n=7;	m=2;	n=10;	m=5;
n=8;	m=3;	n=11;	m=6;
n=9;	m=4;	n=12;	m=7.

Jadvaldan (n) va (m) qiymatlari orasidagi farq (5) birlikka o'zgarib borishini ko'rish mumkin.

Algoritmik amallarga misollar:

1) $2C_7H_{2*7-8}O + (2*7+2)O_2 \rightarrow (2*7)CO_2 + (2*7-8)H_2O$,

$2C_7H_6O + 16O_2 \rightarrow 14CO_2 + 6H_2O$,

$$C_7H_6O+8O_2 \rightarrow 7CO_2+3H_2O+Q.$$

2) $2C_8H_{2*8-8}O+(2*8+3)O_2 \rightarrow (2*8)CO_2+(2*8-8)H_2O,$

$2C_8H_8O+19O_2 \rightarrow 16CO_2+8H_2O+Q.$

Suvning H_2O koeffisient qiymati ifodasi $[n+(m-3)]$ va III vairant kimyoviy algoritmi:

$$\boxed{2C_nH_{2 \cdot n-8}O+(2n+m)O_2 \rightarrow (2n)CO_2+[n+(m-3)]H_2O+Q}$$

n=7;	m=2;	n=10;	m=5;
n=8;	m=3;	n=11;	m=6;
n=9;	m=4;	n=12;	m=7.

Algoritmik amallarga misollar:

1) $2C_7H_{2*7-8}O+(2*7+2)O_2 \rightarrow (2*7)CO_2+[7+(2-3)]H_2O,$

$2C_7H_6O+16O_2 \rightarrow 14CO_2+6H_2O,$

$C_7H_6O+8O_2 \rightarrow 7CO_2+3H_2O+Q.$

2) $2C_8H_{2*8-8}O+(2*8+3)O_2 \rightarrow (2*8)CO_2+[8+(3-3)]H_2O,$

$2C_8H_8O+19O_2 \rightarrow 16CO_2+8H_2O+Q.$

Karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+5)]$ va IV vairant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-8}O+(2n+m)O_2 \rightarrow [n+(m+5)]CO_2+[n+(m-3)]H_2O+Q}$$

n=7;	m=2;	n=10;	m=5;
n=8;	m=3;	n=11;	m=6;
n=9;	m=4;	n=12;	m=7.

Algoritmik amallarga misollar:

1) $2C_7H_{2*7-8}O+(2*7+2)O_2 \rightarrow [7+(2+5)]CO_2+[7+(2-3)]H_2O,$

$2C_7H_6O+16O_2 \rightarrow 14CO_2+6H_2O,$

$C_7H_6O+8O_2 \rightarrow 7CO_2+3H_2O+Q.$

2) $2C_8H_{2*8-8}O+(2*8+3)O_2 \rightarrow [8+(3+5)]CO_2+[8+(3-3)]H_2O,$

$2C_8H_8O+19O_2 \rightarrow 16CO_2+8H_2O+Q.$

AROMATIK SPIRTLAR

Aromatik spirtlarning ayrim vakillari uchun ushbu umumiy formuladan $C_nH_{2n-6}O$ foydalanib, yonish reaksiya tenglamalari uchun quyidagi kimyoviy algoritm tavsiya qilinadi:

$$\boxed{\frac{2n}{n}C_nH_{2n-6}O + (3*n-4)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q}$$

Algoritmik amallarga misollar:

Benzil spirti: C_7H_8O

1) $\frac{2*7}{7}C_7H_{2*7-6}O + (3*7-4)O_2 \rightarrow (2*7)CO_2 + (2*7-6)H_2O$,

$2C_7H_8O + 17O_2 \rightarrow 14CO_2 + 8H_2O + Q$.

Fenil-etil spirti: $C_8H_{10}O$

2) $\frac{2*8}{8}C_8H_{2*8-6}O + (3*8-4)O_2 \rightarrow (2*8)CO_2 + (2*8-6)H_2O$,

$2C_8H_{10}O + 20O_2 \rightarrow 16CO_2 + 10H_2O$,

$C_8H_{10}O + 10O_2 \rightarrow 8CO_2 + 5H_2O + Q$.

Bu sinf gomologlari vakillari yonish reaksiya tenglamalarining asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(2n+m)$ va II variant kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$\boxed{2C_nH_{2n-6}O + (2n+m)O_2 \rightarrow 2nCO_2 + (2n-6)H_2O + Q}$$

(n) va (m) qiymatlari jadvali:

n=7;	m=3;	n=10;	m=6;
n=8;	m=4;	n=11;	m=7;
n=9;	m=5;	n=12;	m=8.

Jadvaldan ko'rinib turibdiki, (n) va (m) qiymatlari orasidagi farq (4) birlikka o'zgarib boradi.

Algoritmik amallarga misollar:

Benzil spirti: C_7H_8O

1) $2C_7H_{2*7-6}O+(2*7+3)O_2 \to (2*7)CO_2+(2*7-6)H_2O,$

$2C_7H_8O+17O_2 \to 14CO_2+8H_2O+Q.$

Fenil-etil spirti: $C_8H_{10}O$

2) $2C_8H_{2*8-6}O+(2*8+4)O_2 \to (2*8)CO_2+(2*8-6)H_2O,$

$2C_8H_{10}O+20O_2 \to 16CO_2+10H_2O,$

$C_8H_{10}O+10O_2 \to 8CO_2+5H_2O+Q.$

Suvning H_2O koeffisient qiymati ifodasi $[n+(m-2)]$ va III variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-6}O+(2n+m)O_2 \to 2nCO_2+[n+(m-2)]H_2O+Q}$$

(n) va (m) qiymatlari jadvali:

n=7;	m=3;	n=10;	m=6;
n=8;	m=4;	n=11;	m=7;
n=9;	m=5;	n=12;	m=8.

Algoritmik amallarga misollar:

Benzil spirti: C_7H_8O

1) $2C_7H_{2*7-6}O+(2*7+3)O_2 \to (2*7)CO_2+[7+(3-2)]H_2O,$

$2C_7H_8O+17O_2 \to 14CO_2+8H_2O+Q.$

Fenil - etil spirti: $C_8H_{10}O$

2) $2C_8H_{2*8-6}O+(2*8+4)O_2 \to (2*8)CO_2+[8+(4-2)]H_2O,$

$2C_8H_{10}O+20O_2 \to 16CO_2+10H_2O,$

$C_8H_{10}O+10O_2 \to 8CO_2+5H_2O+Q.$

Mazkur sinf vakillari uchun karbonat angidridning CO_2 koeffisient qiymati ifodasi $[n+(m+4)]$ va yonish reaksiya tenglamalarining IV variant kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-6}O+(2n+m)O_2 \to [n+(m+4)]CO_2+[n+(m-2)]H_2O+Q}$$

(n) va (m) qiymatlari jadvali:

n=7;	m=3;	n=10;	m=6;
n=8;	m=4;	n=11;	m=7;
n=9;	m=5;	n=12;	m=8.

Algoritmik amallarga misollar:

Benzil spirti: C_7H_8O

1) $2C_7H_{2*7-6}O + (2*7+3)O_2 \rightarrow [7+(3+4)]CO_2 + [7+(3-2)]H_2O$,

$2C_7H_8O + 17O_2 \rightarrow 14CO_2 + 8H_2O + Q$.

Fenil-etil spirti: $C_8H_{10}O$

2) $2C_8H_{2*8-6}O + (2*8+4)O_2 \rightarrow [8+(4+4)]CO_2 + [8+(4-2)]H_2O$,

$2C_8H_{10}O + 20O_2 \rightarrow 16CO_2 + 10H_2O$,

$C_8H_{10}O + 10O_2 \rightarrow 8CO_2 + 5H_2O + Q$.

BIRLAMCHI, IKKILAMCHI VA UCHLAMChI AMINLAR

Aminlar molekulasida ammiakning bir ikki yoki hamma vodorod atomlarining uglevodorod radikallari bilan almashingan organik birikmalarning hosilalaridir. Bu sinf vakillari tabiatda keng tarqalgan bo'lib, ular birlamchi, ikkilamchi, uchlamchi aminlar guruhlariga bo'linadi. Aminlar sinfi gomologlari vakillarining umumiy formulasini $C_nH_{2*n+3}N$ shaklida ifodalab, yonish reaksiya tenglamalari kimyoviy algoritmini ushbu ko'rinishda yozamiz:

$$\boxed{\frac{4n}{n}C_nH_{2n+3}N + (6n+3)O_2 \rightarrow 4nCO_2 + (4n+6)H_2O + 2N_2 + Q}$$

Algoritmik amallarga misollar:

1) $\frac{4*1}{1}C_1H_{2*1+3}N + (6*1+3)O_2 \rightarrow (4*1)CO_2 + (4*1+6)H_2O + 2N_2 + Q$,

$4C\ H_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$.

2) $\frac{4*2}{2}C_2H_{2*2+3}N + (6*2+3)O_2 \rightarrow (4*2)CO_2 + (4*2+6)H_2O + 2N_2 + Q$,

$4C_2H_7N + 15O_2 \rightarrow 8CO_2 + 14H_2O + 2N_2 + Q$.

3) $\frac{4*3}{3}C_3H_{2*3+3}N + (6*3+3)O_2 \rightarrow (4*3)CO_2 + (4*3+6)H_2O + 2N_2 + Q$,

$4C_3H_9N + 21O_2 \rightarrow 12CO_2 + 18H_2O + 2N_2 + Q$.

Reaksiyaning asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(5n+m)$ bo'lganda, II variant kimyoviy algoritmi quydagicha bo'ladi:

$$\boxed{4C_nH_{2*n+3}N + (5n+m)O_2 \rightarrow 4nCO_2 + (4n+6)H_2O + 2N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1;	m=4;	n=4;	m=7;
n=2;	m=5;	n=5;	m=8;
n=3;	m=6;	n=6;	m=9.

Demak, n = 1 bo'lganda, m = 4 ga yoki n = 3 bo'lganda, m=6 ga. teng bo'lib, (n) va (m) qiymatlari orasidagi farq proporsional ravishda (3) birlikka o'zgarib borishini ko'rish mumkin.

Algoritmik amallarga misollar:

1) $4C_1H_{2*1+3}N + (5*1+4)O_2 \rightarrow (4*1)CO_2 + (4*1+6)H_2O + 2N_2$,
$4CH_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$.

2) $4C_2H_{2*2+3}N + (5*2+5)O_2 \rightarrow (4*2)CO_2 + (4*2+6)H_2O + 2N_2$,
$4C_2H_7N + 15O_2 \rightarrow 8CO_2 + 14H_2O + 2N_2 + Q$.

3) $4C_3H_{2*3+3}N + (5*3+6)O_2 \rightarrow (4*3)CO_2 + (4*3+6)H_2O + 2N_2$,
$4C_3H_9N + 21O_2 \rightarrow 12CO_2 + 18H_2O + 2N_2 + Q$.

Shuningdek, suvning H_2O koeffisient qiymati ifodasi quydagicha $[3n+(m+3)]$ va III variant kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$\boxed{4C_nH_{2\cdot n+3}N + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+3)]H_2O + 2N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1;	m=4;	n=4;	m=7;
n=2;	m=5;	n=5;	m=8;
n=3;	m=6;	n=6;	m=9.

Algoritmik amallarga misollar:

1) $4C_1H_{2*1+3}N + (5*1+4)O_2 \rightarrow (4*1)CO_2 + [3*1+(4+3)]H_2O + 2N_2$,
$4CH_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$.

2) $4C_2H_{2*2+3}N+(5*2+5)O_2 \rightarrow (4*2)CO_2+[3*2+(5+3)]H_2O+2N_2$,
$4C_2H_7N+15O_2 \rightarrow 8CO_2+14H_2O+2N_2+Q$.

3) $4C_3H_{2*3+3}N+(5*3+6)O_2 \rightarrow (4*3)CO_2+[3*3+(6+3)]H_2O+2N_2$,
$4C_3H_9N+21O_2 \rightarrow 12CO_2+18H_2O+2N_2+Q$.

Reaksiya mahsulotlaridan biri karbonat angidridning CO_2 koeffisient qiymati ifodasini $[3n+(m-3)]$ shaklida yozib, IV variant kimyoviy algoritmini shunday ifodalaymiz:

$$\boxed{4C_nH_{2n+3}N+(5n+m)O_2 \rightarrow [3n+(m-3)]CO_2+[3n+(m+3)]H_2O+2N_2+Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1;	m=4;	n=4;	m=7;
n=2;	m=5;	n=5;	m=8;
n=3;	m=6;	n=6;	m=9.

Algoritmik amallarga misollar:

1) $4C_1H_{2*1+3}N+(5*1+4)O_2 \rightarrow [3*1+(4-3)]CO_2+[3*1+(4+3)]H_2O+2N_2$,
$4CH_5N+9O_2 \rightarrow 4CO_2+10H_2O+2N_2+Q$.

2) $4C_2H_{2*2+3}N+(5*2+5)O_2 \rightarrow [3*2+(5-3)]CO_2+[3*2+(5+3)]H_2O+2N_2$,
$4C_2H_7N+15O_2 \rightarrow 8CO_2+14H_2O+2N_2+Q$.

3) $4C_3H_{2*3+3}N+(5*3+6)O_2 \rightarrow [3*3+(6-3)]CO_2+[3*3+(6+3)]H_2O+2N_2$,
$4C_3H_9N+21O_2 \rightarrow 12CO_2+18H_2O+2N_2+Q$.

AMINOKISLOTALAR VA NITROALKANLAR

Aminokislotalar uglevodorod radikallaridagi vodorod atomlarining ham amino guruh $-NH_2$, ham karboksil guruh $-COOH$ bilan almashingan geterofunksionl birikmalaridir. Molekulasi tarkibidagi amino va karboksil guruhlarning soniga hamda uglevodorod radikallariga bog'liq holda ular monoaminokarbon kislotalar, diaminokarbon kislotalar, aminodikarbon, aromatik va geterosiklik birikmalarga bo'linadi. Shuningdek, monoaminokarbon kislotalar bilan nitroalkanlarning umumiy formulasini $C_nH_{2*n+1}NO_2$ shaklida ifodalab, bu sinf gomologlari vakillarining yonish reaksiya tenglamalari kimyoviy algoritmini quydagicha yozamiz:

$$\frac{4n}{n} C_nH_{2n+1}N\,O_2 + (6n-3)O_2 \rightarrow 4nCO_2 + (4n+2)H_2O + 2N_2 + Q$$

Algoritmik amallarga misollar keltiramiz:

1) $\frac{4*1}{1} C_1H_{2*1+1}N\,O_2 + (6*1-3)O_2 \rightarrow (4*1)CO_2 + (4*1+2)H_2O + 2N_2 + Q$,

$4C\,H_3N\,O_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$.

2) $\frac{4*2}{2} C_2H_{2*2+1}N\,O_2 + (6*2-3)O_2 \rightarrow (4*2)CO_2 + (4*2+2)H_2O + 2N_2 + Q$,

$4C_2H_5N\,O_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$.

3) $\frac{4*3}{3} C_3H_{2*3+1}N\,O_2 + (6*3-3)O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2 + Q$,

$4C_3H_7N\,O_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

Agar aminokislotalar vakillarining formulalarini ushbu shakllarda yozadigan bo'lsak:

α -aminosirka kislotasi: H_2N-CH_2-COOH yoki $C_2H_5NO_2$

β- aminopropion kislotasi: $H_2N-(CH_2)_2-COOH$ yoki $C_3H_7NO_2$

γ - aminomoy kislotasi: $H_2N-(CH_2)_3-COOH$ yoki $C_4H_9NO_2$

demak, nitroalkanlarning yonish reaksiya tenglamalari uchun keltirilgan kimyoviy algoritmlardan "aminokislotalar" sinfi gomologlari vakillari uchun ham foydalanish mumkin.

Mazkur sinflar gomologlari vakillari uchun reaksiyaning asosiy ishtirokchisi kislorodning O_2 koeffisient qiymati ifodasi $(5n+m)$ bo'lganda, II variant kimyoviy algoritmi quydagicha bo'ladi:

$$4C_nH_{2\cdot n+1}NO_2 + (5n+m)O_2 \rightarrow 4nCO_2 + [4n+2]H_2O + 2N_2 + Q$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1;	m=-2;	n=5;	m=2;
n=2;	m=-1;	n=6;	m=3;
n=3;	m= 0;	n=7;	m=4;
n=4	m= 1;	n=8;	m=5.

Jadvaldan ko'rinib turibdiki, n = 1 bo'lganda, m = -2 ga yoki n = 4 bo'lganda, m = 1 ga teng bo'lib, (n) va (m) qiymatlari o'rtasidagi farq (3) birlikka proporsional ravishda o'zgarib borishini kuzatish mumkin.

Misollar keltirilgan:

1) $4C_1H_{2*1+1}NO_2 + [5*1+(-2)]O_2 \rightarrow (4*1)CO_2 + (4*1+2)H_2O + 2N_2$,
$4CH_3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$.

2) $4C_2H_{2*2+1}NO_2 + [5*2+(-1)]O_2 \rightarrow (4*2)CO_2 + (4*2+2)H_2O + 2N_2$,
$4C_2H_5NO_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$.

3) $4C_3H_{2*3+1}NO_2 + [5*3+0)]O_2 \rightarrow (4*3)CO_2 + (4*3+2)H_2O + 2N_2$,
$4C_3H_7NO_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

4) $4C_4H_{2*4+1}NO_2 + (5*4+1)O_2 \rightarrow (4*4)CO_2 + (4*4+2)H_2O + 2N_2$,
$4C_4H_9NO_2 + 21O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$.

Reaksiyaning asosiy mahsulotlaridan biri - suvning H_2O koeffisient qiymati ifodasini $[3n+(m+5)]$ shaklida yozsak, mazkur sinflar gomologlari vakillarining III variant kimyoviy algoritmi ushbu ko'rinishga ega bo'ladi:

$$\boxed{4C_nH_{2n+1}NO_2 + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+5)]H_2O + 2N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1;	m=-2;	n=5;	m=2;
n=2;	m=-1;	n=6;	m=3;
n=3;	m= 0;	n=7;	m=4;
n=4	m= 1;	n=8;	m=5.

Misollar keltirilgan:

1) $4C_1H_{2*1+1}NO_2 + [5*1+(-2)]O_2 \rightarrow (4*1)CO_2 + [3*1+(-2+5)]H_2O + 2N_2$,
$4CH_3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$

2) $4C_2H_{2*2+1}NO_2 + [5*2+(-1)]O_2 \rightarrow (4*2)CO_2 + [3*2+(-1+5)]H_2O + 2N_2$,
$4C_2H_5NO_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$.

3) $4C_3H_{2*3+1}NO_2 + [5*3+0]O_2 \rightarrow (4*3)CO_2 + [3*3+(0+5)]H_2O + 2N_2$,
$4C_3H_7NO_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

4) $4C_4H_{2*4+1}NO_2+(5*4+1)O_2 \to (4*4)CO_2+[3*4+(1+5)]H_2O+2N_2$,
$4C_4H_9NO_2+21O_2 \to 16CO_2+18H_2O+2N_2+Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasi $[3n+(m+3)]$ va IV variant kimyoviy algoritmi:

$$\boxed{4C_nH_{2\cdot n+1}NO_2+(5n+m)O_2 \to [3n+(m+3)]CO_2+[3n+(m+5)]H_2O+2N_2+Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=1;	m=-2;	n=5;	m=2;
n=2;	m=-1;	n=6;	m=3;
n=3;	m= 0;	n=7;	m=4;
n=4	m= 1;	n=8;	m=5.

Misollar keltirilgan:

1) $4C_1H_{2*1+1}NO_2+[5*1+(-2)]O_2 \to [3*1+(-2+3)]CO_2+[3*1+(-2+5)]H_2O+2N_2$,
$4CH_3NO_2+3O_2 \to 4CO_2+6H_2O+2N_2+Q$.

2) $4C_2H_{2*2+1}NO_2+[5*2+(-1)]O_2 \to [3*2+(-1+3)]CO_2+[3*2+(-1+5)]H_2O+2N_2$,
$4C_2H_5NO_2+9O_2 \to 8CO_2+10H_2O+2N_2+Q$.

3) $4C_3H_{2*3+1}NO_2+[5*3+0]O_2 \to [3*3+(0+3)]CO_2+[3*3+(0+5)]H_2O+2N_2$,
$4C_3H_7NO_2+15O_2 \to 12CO_2+14H_2O+2N_2+Q$.

4) $4C_4H_{2*4+1}NO_2+(5*4+1)O_2 \to [3*4+(1+3)]CO_2+[3*4+(1+5)]H_2O+2N_2$,
$4C_4H_9NO_2+21O_2 \to 16CO_2+18H_2O+2N_2+Q$.

KISLOTA AMIDLARI

Kislota amidlari ham eng muhim azotli organik birikmalar sinflaridan biri bo'lib hisoblanadi. Bu sinf vakillarining umumiy formulasini ushbu $C_nH_{2n+1}NO$ ko'rinishda yozib, yonish reaksiya tenglamalari kimyoviy algoritmini shunday ifodalaymiz:

$$\boxed{\frac{4n}{n}C_nH_{2n+1}NO+(6n-1)O_2 \to 4nCO_2+(4n+2)H_2O+2N_2+Q}$$

Misollar keltirilgan:

Formamid: $H-CO-NH_2$ yoki CH_3NO

1) $\frac{4*1}{1}C_1H_{2*1+1}N\ O\ +(6*1-1)O_2 \to (4*1)CO_2+(4*1+2)H_2O+2N_2$,

$4C\ H_3N\ O\ +5O_2 \to 4CO_2+6H_2O+2N_2+Q$.

Asetamid: $CH_3-CO-NH_2$ yoki C_2H_5NO

2) $\frac{4*2}{2}C_2H_{2*2+1}N\ O\ +(6*2-1)O_2 \to (4*2)CO_2+(4*2+2)H_2O+2N_2$,

$4C_2H_5N\ O\ +11O_2 \to 8CO_2+10H_2O+2N_2+Q$.

Propioamid $CH_3-CH_2-CO-NH_2$ yoki C_3H_7NO

3) $\frac{4*3}{3}C_3H_{2*3+1}N\ O\ +(6*3-1)O_2 \to (4*3)CO_2+(4*3+2)H_2O+2N_2$,

$4C_3H_7N\ O\ +17O_2 \to 12CO_2+14H_2O+2N_2+Q$.

Reaksiyaning asosiy ishtirokchilaridan biri - kislorodning O_2 koeffisient qiymati ifodasi $(5n+m)$ va ushbu sinf gomologlari vakillarining yonish reaksiya tenglamalari kimyoviy algoritmining II varianti quydagicha bo'ladi:

$$4C_nH_{2\cdot n+1}NO+(5n+m)O_2 \to 4nCO_2+(4n+2)H_2O+2N_2+Q$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=1;	m=0;	n=4;	m=3 ;
n=2;	m=1;	n=5;	m=4;
n=3;	m=2;	n=6;	m=5.

Bundan (n) va (m) qiymatlari (1) birlikka farq qilib, proporsional ravishda o'zgarib borishini ko'rish mumkin.

Misollar keltirilgan:

1) $4C_1H_{2*1+1}NO+(5*1+0)O_2 \to (4*1)CO_2+(4*1+2)H_2O+2N_2$,

$4CH_3NO+5O_2 \to 4CO_2+6H_2O+2N_2+Q$.

2) $4C_2H_{2*2+1}NO+(5*2+1)O_2 \to (4*2)CO_2+(4*2+2)H_2O+2N_2$,

$4C_2H_5NO+11O_2 \to 8CO_2+10H_2O+2N_2+Q$.

3) $4C_3H_{2*3+1}NO+(5*3+2)O_2 \rightarrow (4*3)CO_2+(4*3+2)H_2O+2N_2$,
$4C_3H_7NO+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$.

Suvning H_2O koeffisient qiymati ifodasini $[3n+(m+3)]$ shaklida yozib, III variant kimyoviy algoritmini quyidagicha ifodalimiz:

$$4C_nH_{2\cdot n+1}NO+(5n+m)O_2 \rightarrow 4nCO_2+[3n+(m+3)]H_2O+2N_2+Q$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=1; m=0; n=4; m=3 ;
n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5.

Misollar keltirilgan:

1) $4C_1H_{2\cdot *1+1}NO+(5*1+0)O_2 \rightarrow (4*1)CO_2+[3*1+(0+3)]H_2O+2N_2$,
$4CH_3NO+5O_2 \rightarrow 4CO_2+6H_2O+2N_2+Q$.

2) $4C_2H_{2\cdot *2+1}NO+(5*2+1)O_2 \rightarrow (4*2)CO_2+[3*2+(1+3)]H_2O+2N_2$,
$4C_2H_5NO+11O_2 \rightarrow 8CO_2+10H_2O+2N_2+Q$.

3) $4C_3H_{2\cdot *3+1}NO+(5*3+2)O_2 \rightarrow (4*3)CO_2+[3*3+(2+3)]H_2O+2N_2$,
$4C_3H_7NO+17O_2 \rightarrow 12CO_2+14H_2O+2N_2+Q$.

Karbonat angidridning CO_2 koeffisient qiymati ifodasi $[3n+(m+1)$ va IV variant kimyoviy algoritmi:

$$4C_nH_{2n+1}NO+(5n+m)O_2 \rightarrow [3n+(m+1)CO_2+[3n+(m+3)]H_2O+2N_2+Q$$

(n) va (m) qiymatlari orasidagi ketma - ketlikdagi bog'liqlik:

n=1; m=0; n=4; m=3 ;
n=2; m=1; n=5; m=4;
n=3; m=2; n=6; m=5.

Misollar keltirilgan:

1) $4C_1H_{2*1+1}NO+(5*1+0)O_2 \rightarrow [3*1+(0+1)]CO_2+[3*1+(0+3)]H_2O+2N_2$,
$4CH_3-NO+5O_2 \rightarrow 4CO_2+6H_2O+2N_2+Q$.

2) $4C_2H_{2*2+1}NO + (5*2+1)O_2 \rightarrow [3*2+(1+1)]CO_2 + [3*2+(1+3)]H_2O + 2N_2$,
$4C_2H_5NO + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$.

3) $4C_3H_{2*3+1}NO + (5*3+2)O_2 \rightarrow [3*3+(2+1)]CO_2 + [3*3+(2+3)]H_2O + 2N_2$,
$4C_3H_7NO + 17O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

DIAMINOKARBON KISLOTALAR

Diaminokarbon kislotalar ham oqsillarning tarkibida uchraydigan organik birikmalarning muhim sinfi vakillaridir. Diaminokarbon kislotalar gomologlari vakillarining umumiy formulasi $C_nH_{2n+2}N_2O_2$ va ular uchun yonish reaksiya tenglamalari kimyoviy algoritmi:

$$\frac{4n}{n}C_nH_{2*n+2}N_2O_2 + (6n-2)O_2 \rightarrow 4nCO_2 + (4n+4)H_2O + 4N_2 + Q$$

Tipik vakili lizinning yonish reaksiya tenglamasi: $C_6H_{14}N_2O_2$

1) $\frac{4*6}{6}C_6H_{2*6+2}N_2O_2 + (6*6-2)O_2 \rightarrow (4*6)CO_2 + (4*6+4)H_2O + 4N_2$,
$4C_6H_{14}N_2O_2 + 34O_2 \rightarrow 24CO_2 + 28H_2O + 4N_2$,
$2C_6H_{14}N_2O_2 + 17O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

Boshqa misollar ham keltirilgan:

2) $\frac{4*4}{4}C_4H_{2*4+2}N_2O_2 + (6*4-2)O_2 \rightarrow (4*4)CO_2 + (4*4+4)H_2O + 4N_2$,
$4C_4H_{10}N_2O_2 + 22O_2 \rightarrow 16CO_2 + 20H_2O + 4N_2$,
$2C_4H_{10}N_2O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$.

3) $\frac{4*7}{7}C_7H_{2*7+2}N_2O_2 + (6*7-2)O_2 \rightarrow (4*7)CO_2 + (4*7+4)H_2O + 4N_2$,
$4C_7H_{16}N_2O_2 + 40O_2 \rightarrow 28CO_2 + 32H_2O + 4N_2$,
$2C_7H_{16}N_2O_2 + 20O_2 \rightarrow 14CO_2 + 16H_2O + 2N_2 + Q$.

Reaksiyaning asosiy ishtirokchisi - kislorod O_2 uchun koeffisient qiymati ifodasi $(5n+m)$ bo'lganda, II variant kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$4C_nH_{2n+2}N_2O_2 + (5n+m)O_2 \rightarrow 4nCO_2 + (4n+4)H_2O + 4N_2 + Q$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=2;	m=0;	n=5;	m=3;
n=3;	m=1;	n=6;	m=4;
n=4;	m=2;	n=7;	m=5.

Jadvaldan ko'rinib turibdiki, n = 2 ga teng bo'lganda, m = 0 ga yoki n = 4 ga teng bo'lganda, m = 2 ga teng bo'lib, (n) va (m) qiymatlari orasidagi farq ham shunday tartibda o'zgarib borishi mumkin.

Algoritmik amallarga misollar:

1) $4C_6H_{2*6+2}N_2O_2 + (5*6+4)O_2 \to (4*6)CO_2 + (4*6+4)H_2O + 4N_2$,
$4C_6H_{14}N_2O_2 + 34O_2 \to 24CO_2 + 28H_2O + 4N_2$,
$2\,C_6H_{14}N_2O_2 + 17O_2 \to 12CO_2 + 14H_2O + 2N_2 + Q$.

2) $4C_4H_{2*4+2}N_2O_2 + (5*4+2)O_2 \to (4*4)CO_2 + (4*4+4)H_2O + 4N_2$,
$4C_4H_{10}N_2O_2 + 22O_2 \to 16CO_2 + 20H_2O + 4N_2$,
$2C_4H_{10}N_2O_2 + 11O_2 \to 8CO_2 + 10H_2O + 2N_2 +$ Q.

3) $4C_7H_{2*7+2}N_2O_2 + (5*7+5)O_2 \to (4*7)CO_2 + (4*7+4)H_2O + 4N_2$,
$4C_7H_{16}N_2O_2 + 40O_2 \to 28CO_2 + 32H_2O + 4N_2$,
$2C_7H_{16}N_2O_2 + 20O_2 \to 14CO_2 + 16H_2O + 2N_2 +$ Q.

Reaksiyaning asosiy mahsulotlaridan biri - suvning H_2O koeffisient qiymati ifodasi $[3n+(m+6)]$ bo'lganda, III variant kimyoviy algoritmi quydagi ko'rinishga ega bo'ladi:

$$\boxed{2C_nH_{2n+2}N_2O_2 + (5n+m)O_2 \to 4nCO_2 + [3n+(m+6)]H_2O + 4N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=2;	m=0;	n=5;	m=3;
n=3;	m=1;	n=6;	m=4;
n=4;	m=2;	n=7;	m=5.

Misollar keltirilgan:

1) $4C_6H_{2*6+2}N_2O_2 + (5*6+4)O_2 \rightarrow (4*6)CO_2 + [3*6+(4+6)]H_2O + 4N_2,$

$4C_6H_{14}N_2O_2 + 34O_2 \rightarrow 24CO_2 + 28H_2O + 4N_2,$

$2C_6H_{14}N_2O_2 + 17O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q.$

2) $4C_4H_{2*4+2}N_2O_2 + (5*4+2)O_2 \rightarrow (4*4)CO_2 + [3*4+(2+6)]H_2O + 4N_2,$

$4C_4H_{10}N_2O_2 + 22O_2 \rightarrow 16CO_2 + 20H_2O + 4N_2,$

$2C_4H_{10}N_2O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2$ + Q.

3) $4C_7H_{2*7+2}N_2O_2 + (5*7+5)O_2 \rightarrow (4*7)CO_2 + [3*7+(5+6)]H_2O + 4N_2,$

$4C_7H_{16}N_2O_2 + 40O_2 \rightarrow 28CO_2 + 32H_2O + 4N_2,$

$2C_7H_{16}N_2O_2 + 20O_2 \rightarrow 14CO_2 + 16H_2O + 2N_2$ + Q.

Reaksiyaning asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi $[3n+(m+2)]$ va IV variant kimyoviy algoritmi:

$$2C_nH_{2*n+2}N_2O_2 + (5n+m)O_2 \rightarrow [3n+(m+2)]CO_2 + [3n+(m+6)]H_2O + 4N_2 + Q$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=2;	m=0;	n=5;	m=3;
n=3;	m=1;	n=6;	m=4;
n=4;	m=2;	n=7;	m=5.

Misollar keltirilgan:

1) $4C_6H_{2*6+2}N_2O_2 + (5*6+4)O_2 \rightarrow [3*6+(4+2)]CO_2 + [3*6+(4+6)]H_2O + 4N_2,$

$4C_6H_{14}N_2O_2 + 34O_2 \rightarrow 24CO_2 + 28H_2O + 4N_2,$

$2C_6H_{14}N_2O_2 + 17O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q.$

2) $4C_4H_{2*4+2}N_2O_2 + (5*4+2)O_2 \rightarrow [3*4+(2+2)]CO_2 + [3*4+(2+6)]H_2O + 4N_2,$

$4C_4H_{10}N_2O_2 + 22O_2 \rightarrow 16CO_2 + 20H_2O + 4N_2,$

$2C_4H_{10}N_2O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2$ + Q.

3) $4C_7H_{2*7+2}N_2O_2 + (5*7+5)O_2 \rightarrow [3*7+(5+2)]CO_2 + [3*7+(5+6)]H_2O + 4N_2,$

$4C_7H_{16}N_2O_2 + 40O_2 \rightarrow 28CO_2 + 32H_2O + 4N_2,$

$2C_7H_{16}N_2O_2 + 20O_2 \rightarrow 14CO_2 + 16H_2O + 2N_2$ + Q.

AMINODIKARBON KISLOTALAR

Organik moddalarning ushbu vakillari ham oqsillar tarkibida uchraydigan aminokislotalarning muhim sinfi gomologlari vakillari hisoblangan aminodikarbon kislotalar bo'lib, ularning umumiy formulasini $C_nH_{2n-1}N\,O_4$ shaklida ifodalaydigan bo'lsak, yonish reaksiya tenglamalari kimyoviy algoritmi quydagi ko'rinishda bo'ladi:

$$\boxed{\frac{4n}{n}C_nH_{2n-1}N\,O_4 + (6n-9)O_2 \rightarrow 4nCO_2 + (4n-2)H_2O + 2N_2 + Q}$$

Glutamin kislotaning yonish reaksiya tenglamasi: $C_5H_9N\,O_4$

1) $\frac{4*5}{5}C_5H_{2*5-1}N\,O_4 + (6*5-9)O_2 \rightarrow (4*5)CO_2 + (4*5-2)H_2O + 2N_2$,
$4C_5H_9N\,O_4 + 21O_2 \rightarrow 20CO_2 + 18H_2O + 2N_2 + Q$

Boshqa misollar keltirilgan:

2) $\frac{4*3}{3}C_3H_{2*3-1}N\,O_4 + (6*3-9)O_2 \rightarrow (4*3)CO_2 + (4*3-2)H_2O + 2N_2$,
$4C_3H_5N\,O_4 + 9O_2 \rightarrow 12CO_2 + 10H_2O + 2N_2 + Q$.

3) $\frac{4*4}{4}C_4H_{2*4-1}N\,O_4 + (6*4-9)O_2 \rightarrow (4*4)CO_2 + (4*4-2)H_2O + 2N_2$,
$4C_4H_7N\,O_4 + 15O_2 \rightarrow 16CO_2 + 14H_2O + 2N_2 + Q$.

4) $\frac{4*6}{6}C_6H_{2*6-1}N\,O_4 + (6*6-9)O_2 \rightarrow (4*6)CO_2 + (4*6-2)H_2O + 2N_2$,
$4C_6H_{11}N\,O_4 + 27O_2 \rightarrow 24CO_2 + 22H_2O + 2N_2 + Q$.

Aminodikarbon kislotalar gomologlari vakillari yonish reaksiya tenglamalarining asosiy ishtirokchilaridan biri - kislorodning O_2 koeffisient qiymati ifodasi $(5n+m)$ va III varianti kimyoviy algoritmi:

$$\boxed{4C_nH_{2n-1}NO_4 + (5n+m)O_2 \rightarrow 4nCO_2 + (4n-2)H_2O + 2N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=3;	m=-6;	n= 7;	m=-2;
n=4;	m=-5;	n= 8;	m=-1;
n=5;	m=-4;	n= 9;	m= 0;
n=6;	m=-3;	n=10;	m= 1.

Jadvaldan ko'rinib turibdiki, n = 3 bo'lganda, m = -6 ga n = 7 bo'lganda, m = -2 ga yoki n = 9 bo'lganda, m = 0 ga teng bo'lib, (n) va (m) qiymatlari proporsional ravishda (9) birlikka farq qilib, shunday tartibda o'zgarib boradi.

Misollar keltirilgan:

1) $4C_5H_{2*5-1}NO_4 + [5*5+(-4)]O_2 \rightarrow (4*5)CO_2 + (4*5-2)H_2O + 2N_2$,
$4C_5H_9NO_4 + 21O_2 \rightarrow 20CO_2 + 18H_2O + 2N_2 + Q$.

2) $4C_3H_{2*3-1}NO_4 + [5*3+(-6)]O_2 \rightarrow (4*3)CO_2 + (4*3-2)H_2O + 2N_2$,
$4C_3H_5NO_4 + 9O_2 \rightarrow 12CO_2 + 10H_2O + 2N_2 + Q$.

3) $4C_4H_{2*4-1}NO_4 + [5*4+(-5)]O_2 \rightarrow (4*4)CO_2 + (4*4-2)H_2O + 2N_2$,
$4C_4H_7NO_4 + 15O_2 \rightarrow 16CO_2 + 14H_2O + 2N_2 + Q$.

4) $4C_6H_{2*6-1}NO_4 + [5*6+(-3)]O_2 \rightarrow (4*6)CO_2 + (4*6-2)H_2O + 2N_2$,
$4C_6H_{11}NO_4 + 27O_2 \rightarrow 24CO_2 + 22H_2O + 2N_2$.

Yonish reaksiya tenglamalarining asosiy mahsulotlaridan biri - suvning H_2O koeffisient qiymati ifodasi $[3n+(m+7)]$ va III variant kimyoviy algoritmi:

$$\boxed{4C_nH_{2n-1}NO_4 + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+7)]H_2O + 2N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=3;	m=-6;	n= 7;	m=-2;
n=4;	m=-5;	n= 8;	m=-1;
n=5;	m=-4;	n= 9;	m= 0;
n=6;	m=-3;	n=10;	m= 1.

Misollar keltirilgan:

1) $4C_5H_{2*5-1}NO_4 + [5*5+(-4)]O_2 \rightarrow (4*5)CO_2 + [3*5+(-4+7)]H_2O + 2N_2$,
$4C_5H_9NO_4 + 21O_2 \rightarrow 20CO_2 + 18H_2O + 2N_2 + Q$.

2) $4C_3H_{2*3-1}NO_4 + [5*3+(-6)]O_2 \rightarrow (4*3)CO_2 + [3*3+(-6+7)]H_2O + 2N_2$,
$4C_3H_5NO_4 + 9O_2 \rightarrow 12CO_2 + 10H_2O + 2N_2 + Q$.

3) $4C_4H_{2*4-1}NO_4+[5*4+(-5)]O_2 \rightarrow (4*4)CO_2+[3*4+(-5+7)]H_2O+2N_2$,
$4C_4H_7NO_4+15O_2 \rightarrow 16CO_2+14H_2O+2N_2+Q$.

4) $4C_6H_{2*6-1}NO_4+[5*6+(-3)]O_2 \rightarrow (4*6)CO_2+[3*6+(-3+7)]H_2O+2N_2$,
$4C_6H_{11}NO_4+27O_2 \rightarrow 24CO_2+22H_2O+2N_2$.

Reaksiyaning asosiy mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasi $[3n+(m+9)]$ va IV variant kimyoviy algoritmi:

$$4C_nH_{2n-1}NO_4+(5n+m)O_2 \rightarrow [3n+(m+9)]CO_2+[3n+(m+7)]H_2O+2N_2+Q$$

(n) va (m) qiymatlari orasidagi ketma-ketlikdagi bog'liqlik:

n=3;	m=-6;	n= 7;	m=-2;
n=4;	m=-5;	n= 8;	m=-1;
n=5;	m=-4;	n= 9;	m= 0;
n=6;	m=-3;	n=10;	m= 1.

Misollar keltirilgan:

1) $4C_5H_{2*5-1}NO_4+[5*5+(-4)]O_2 \rightarrow [3*5+(-4+9)]CO_2+[3*5+(-4+7)]H_2O+2N_2$,
$4C_5H_9NO_4+21O_2 \rightarrow 20CO_2+18H_2O+2N_2+Q$.

2) $4C_3H_{2*3-1}NO_4+[5*3+(-6)]O_2 \rightarrow [3*3+(-6+9)]CO_2+[3*3+(-6+7)]H_2O+2N_2$,
$4C_3H_5NO_4+9O_2 \rightarrow 12CO_2+10H_2O+2N_2+Q$.

3) $4C_4H_{2*4-1}NO_4+[5*4+(-5)]O_2 \rightarrow [3*4+(-5+9)]CO_2+[3*4+(-5+7)]H_2O+2N_2$,
$4C_4H_7NO_4+15O_2 \rightarrow 16CO_2+14H_2O+2N_2+Q$.

4) $4C_6H_{2*6-1}NO_4+[5*6+(-3)]O_2 \rightarrow [3*6+(-3+9)]CO_2+[3*6+(-3+7)]H_2O+2N_2$,
$4C_6H_{11}NO_4+27O_2 \rightarrow 24CO_2+22H_2O+2N_2$ + Q.

OKSIAMINOKISLOTALAR

Oksiaminokislotalar gomologlari vakillari ham azotli organik birikmalarning muhim siniflaridan biridir. Mazkur sinfga kiruvchi organik moddalarning umumiy formulasini $C_nH_{2n+1}N\,O_3$ shaklida ifodalab, yonish reaksiya tenglamalari kimyoviy algoritmini quydagi ko'rinishda yozamiz:

$$\frac{4n}{n}C_nH_{2*n+1}N\,O_3+(6n-5)O_2 \rightarrow 4nCO_2+(4n+2)H_2O+2N_2+Q$$

Tipik vakili treoninning yonish reaksiya tenglamasi: $C_4H_9N\ O_3$

1) $\frac{4*4}{4}C_4H_{2*4+1}N\ O_3+(6*4-5)O_2\rightarrow(4*4)CO_2+(4*4+2)H_2O+2N_2$,
$4C_4H_9N\ O_3+19O_2\rightarrow16CO_2+18H_2O+2N_2+Q$.

Boshqa misollar keltirilgan:

2) $\frac{4*3}{3}C_3H_{2*3+1}N\ O_3+(6*3-5)O_2\rightarrow(4*3)CO_2+(4*3+2)H_2O+2N_2$,
$4C_3H_7N\ O_3+13O_2\rightarrow12CO_2+14H_2O+2N_2+Q$.

3) $\frac{4*6}{6}C_6H_{2*6+1}N\ O_3+(6*6-5)O_2\rightarrow(4*6)CO_2+(4*6+2)H_2O+2N_2$,
$4C_6H_{13}N\ O_3+31O_2\rightarrow24CO_2+26H_2O+2N_2+Q$.

Reaksiyaning asosiy ishtirokchisi - kislorodning O_2 koeffisient qiymati ifodasi $(5n+m)$ bo'lganda, II variant kimyoviy algoritmi quydagicha bo'ladi:

$$4C_nH_{2\cdot n+1}NO_3+(5n+m)O_2\rightarrow4nCO_2+(4n+2)H_2O+2N_2+Q$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=3;	m=-2;	n= 7;	m=2;
n=4;	m=-1;	n= 8;	m=3;
n=5;	m= 0;	n= 9;	m=4;
n=6;	m= 1;	n=10;	m=5.

Bunda (n) va (m) qiymatlari (5) birlikka farq qiladi, ya'ni n = 3 bo'lganda, m = -2 ga yoki n = 6 bo'lganda, m = 1 ga teng bo'ladi. Demak, (n) va (m) qiymatlarining o'zaro nisbatlari ana shunday tartibda o'zgarib boradi.

Misollar keltirilgan:

1) $4C_4H_{2*4+1}NO_3+[5*4+(-1)]O_2\rightarrow(4*4)CO_2+(4*4+2)H_2O+2N_2$,
$4C_4H_9NO_3+19O_2\rightarrow16CO_2+18H_2O+2N_2+Q$.

2) $4C_3H_{2*3+1}NO_3+[5*3+(-2)]O_2\rightarrow(4*3)CO_2+(4*3+2)H_2O+2N_2$,
$4C_3H_7NO_3+13O_2\rightarrow12CO_2+14H_2O+2N_2+Q$.

3) $4C_6H_{2*6+1}NO_3+(5*6+1)O_2\rightarrow(4*6)CO_2+(4*6+2)H_2O+2N_2$,
$4C_6H_{13}NO_3+31O_2\rightarrow24CO_2+26H_2O+2N_2+Q$.

Reaksiya mahsulotlaridan biri - suvning H_2O koeffisient qiymati ifodasini $[3n+(m+7)]$ shaklida yozib, III variant kimyoviy algoritmini shunday ifodalaymiz:

$$\boxed{4C_nH_{2n+1}NO_3 + (5n+m)O_2 \rightarrow 4nCO_2 + [3n+(m+7)]H_2O + Q}$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=3;	m=-2;	n= 7;	m=2;
n=4;	m=-1;	n= 8;	m=3;
n=5;	m= 0;	n= 9;	m=4;
n=6;	m= 1;	n=10;	m=5.

Misollar keltirilgan:

1) $4C_4H_{2*4+1}NO_3 + [5*4+(-1)]O_2 \rightarrow (4*4)CO_2 + [3*4+(-1+7)]H_2O + 2N_2,$
$4C_4H_9NO_3 + 19O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q.$

2) $4C_3H_{2*3+1}NO_3 + [5*3+(-2)]O_2 \rightarrow (4*3)CO_2 + [3*3+(-2+7)]H_2O + 2N_2,$
$4C_3H_7NO_3 + 13O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q.$

3) $4C_6H_{2*6+1}NO_3 + (5*6+1)O_2 \rightarrow (4*6)CO_2 + [3*6+(1+7)]H_2O + 2N_2,$
$4C_6H_{13}NO_3 + 31O_2 \rightarrow 24CO_2 + 26H_2O + 2N_2 + Q.$

Shuningdek, reaksiya mahsulotlaridan biri - karbonat angidridning CO_2 koeffisient qiymati ifodasini $[3n+(m+5)]$ shaklida yozib, IV variant kimyoviy algoritmini shunday ifodalaymiz:

$$\boxed{4C_nH_{2n+1}NO_3 + (5n+m)O_2 \rightarrow [3n+(m+5)]CO_2 + [3n+(m+7)]H_2O + 2N_2 + Q}$$

(n) va (m) qiymatlari orasidagi ketma- ketlikdagi bog'liqlik:

n=3;	m=-2;	n= 7;	m=2;
n=4;	m=-1;	n= 8;	m=3;
n=5;	m= 0;	n= 9;	m=4;
n=6;	m= 1;	n=10;	m=5.

Misollar keltirilgan:

1) $4C_4H_{2*4+1}NO_3 + [5*4+(-1)]O_2 \rightarrow [3*4+(-1+5)]CO_2 + [3*4+(-1+7)]H_2O + 2N_2,$
$4C_4H_9NO_3 + 19O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q.$

2) $4C_3H_{2*3+1}NO_3 + [5*3+(-2)]O_2 \rightarrow [3*3+(-2+5)]CO_2 + [3*3+(-2+7)]H_2O + 2N_2$,

$4C_3H_7NO_3 + 13O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

3) $4C_6H_{2*6+1}NO_3 + (5*6+1)O_2 \rightarrow [3*6+(1+5)]CO_2 + [3*6+(1+7)]H_2O + 2N_2$,

$4C_6H_{13}NO_3 + 31O_2 \rightarrow 24CO_2 + 26H_2O + 2N_2 + Q$.

FUNKSIONAL GURUHLI ORGANIK BIRIKMALARNING KIMYOVIY ALGORITMLARI

Yonish reaksiyalari tenglamalari qatorida $-CHO$, $-COOH$ yoki boshqa funksional guruhlar bilan bog'langan organik birikmalarda kimyoviy algoritmlarning ayrim qonuniyatlari namoyon bo'ladi. Chunonchi, chumoli aldegidi $H-CHO$ yoki ushbu $H-COOH$ formula bilan ifodalanadigan chumoli kislotasida $-CHO$ va $-COOH$ funksional guruhlari faqat vodorod atomlari bilan bog'langan, ya'ni ularda $(C\ H_2)$ radikalining qiymati (0) ga teng. Mazkur organik moddalarda $(C\ H_2)$ radikalining (0) ga tengligini aynan ushbu turdagi kimyoviy algoritmlar tasdiqlydi. Quyida shunday algoritmlarga misollar keltirilgan. Masalan, aldegidlarning umumiy formulasi $C_nH_{2n+1}-CHO$ bo'lganda, yonish tenglamalari kimyoviy algoritmi ushbu ko'rinishda bo'ladi:

$$\boxed{2C_nH_{2n+1}CHO + (3n+2)O_2 \rightarrow (2n+2)CO_2 + (2n+2)H_2O + Q}$$

Misollar keltirilgan:

1) $2C_0H_{2*0+1}CHO + (3*0+2)O_2 \rightarrow (2*0+2)CO_2 + (2*0+2)H_2O$,

$2HCHO + 2O_2 \rightarrow 2CO_2 + 2H_2O$,

$HCHO + O_2 \rightarrow CO_2 + H_2O + Q$.

2) $2C_1H_{2*1+1}CHO + (3*1+2)O_2 \rightarrow (2*1+2)CO_2 + (2*1+2)H_2O$,

$2CH_3-CHO + 5O_2 \rightarrow 4CO_2 + 4H_2O + Q$.

3) $2C_2H_{2*2+1}CHO + (3*2+2)O_2 \rightarrow (2*2+2)CO_2 + (2*2+2)H_2O$,

$2C_2H_5CHO + 8O_2 \rightarrow 6CO_2 + 6H_2O$,

$C_2H_5CHO + 4O_2 \rightarrow 3CO_2 + 3H_2O + Q$.

Bir asosli karbon kislotalarning umumiy formulasi $C_nH_{2n+1}COOH$ va yonish tenglamalari kimyoviy algoritmi:

$$\boxed{2C_nH_{2n+1}COOH + (3n+1)O_2 \rightarrow (2n+2)CO_2 + (2n+2)H_2O + Q}$$

1) $2C_0H_{2*0+1}COOH + (3*0+1)O_2 \rightarrow (2*0+2)CO_2 + (2*0+2)H_2O$,

$2HCOOH + O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

2) $2C_1H_{2*1+1}COOH + (3*1+1)O_2 \rightarrow (2*1+2)CO_2 + (2*1+2)H_2O$,
$2CH_3COOH + 4O_2 \rightarrow 4CO_2 + 4H_2O$,
$CH_3COOH + 2O_2 \rightarrow 2CO_2 + 2H_2O + Q$.

3) $2C_2H_{2*2+1}COOH + (3*2+1)O_2 \rightarrow (2*2+2)CO_2 + (2*2+2)H_2O$,
$2C_2H_5COOH + 7O_2 \rightarrow 6CO_2 + 6H_2O + Q$.

Bir asosli to'yinmagan karbon kislotalarning umumiy formulasi $C_nH_{2n-1}COOH$ va kimyoviy algoritmining umumiy ko'rinishi:

$$\boxed{2C_nH_{2n-1}COOH + 3nO_2 \rightarrow (2n+2)CO_2 + 2nH_2O + Q}$$

1) $2C_3H_{2*3-1}COOH + (3*3)O_2 \rightarrow (2*3+2)CO_2 + (2*3)H_2O$,
$2C_3H_5COOH + 9O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

2) $2C_4H_{2*4-1}COOH + (3*4)O_2 \rightarrow (2*4+2)CO_2 + (2*4)H_2O$,
$2C_4H_7COOH + 12O_2 \rightarrow 10CO_2 + 8H_2O$,
$C_4H_7COOH + 6O_2 \rightarrow 5CO_2 + 4H_2O + Q$.

3) $2C_{17}H_{2*17-1}COOH + (3*17)O_2 \rightarrow (2*17+2)CO_2 + (2*17)H_2O$,
$2C_{17}H_{33}COOH + 51O_2 \rightarrow 36CO_2 + 34H_2O$.

Ikki asosli karbon kislotalarning umumiy formulasi $HOOCC_nH_{2n}COOH$ va yonish reaksiya tenglamalari kimyoviy algoritmi:

$$\boxed{2HOOCC_nH_{2n}COOH + (3n+1)O_2 \rightarrow (2n+4)CO_2 + (2n+2)H_2O + Q}$$

1) $2HOOCC_1H_{2*1}COOH + (3*1+1)O_2 \rightarrow (2*1+4)CO_2 + (2*1+2)H_2O$,
$2HOOCCH_2COOH + 4O_2 \rightarrow 6CO_2 + 4H_2O$,
$HOOCCH_2COOH + 2O_2 \rightarrow 3CO_2 + 2H_2O + Q$.

2) $2HOOCC_2H_{2*2}COOH + (3*2+1)O_2 \rightarrow (2*2+4)CO_2 + (2*2+2)H_2O$,
$2HOOCC_2H_4COOH + 7O_2 \rightarrow 8CO_2 + 6H_2O + Q$.

3) $2HOOCC_5H_{2*5}COOH + (3*5+1)O_2 \rightarrow (2*5+4)CO_2 + (2*5+2)H_2O$,
$2HOOCC_5H_{10}COOH + 16O_2 \rightarrow 14CO_2 + 12H_2O$,
$HOOCC_5H_{10}COOH + 8O_2 \rightarrow 7CO_2 + 6H_2O + Q$.

Ko'proq to'yinmagan karbon kislotalarning umumiy formulasi $C_nH_{2n-3}COOH$ va yonish reaksiya tenglamalari kimyoviy algoritmi:

$$\boxed{2C_nH_{2n-3}COOH + (3n-1)O_2 \rightarrow (2n+2)CO_2 + (2n-2)H_2O + Q}$$

1) $2C_3H_{2*3-3}COOH + (3*3-1)O_2 \to (2*3+2)CO_2 + (2*3-2)H_2O + Q$,

$2C_3H_3COOH + 8O_2 \to 8CO_2 + 4H_2O$,

$C_3H_3COOH + 4O_2 \to 4CO_2 + 2H_2O + Q$.

2) $2C_4H_{2*4-3}COOH + (3*4-1)O_2 \to (2*4+2)CO_2 + (2*4-2)H_2O$,

$2C_4H_5COOH + 11O_2 \to 10CO_2 + 6H_2O + Q$.

3) $2C_5H_{2*5-3}COOH + (3*5-1)O_2 \to (2*5+2)CO_2 + (2*5-2)H_2O$,

$2C_5H_7COOH + 14O_2 \to 12CO_2 + 8H_2O$,

$C_5H_7COOH + 7O_2 \to 6CO_2 + 4H_2O + Q$.

KIMYOVIY ALGORITMLARNING MATEMATIK TAHLILLARI

Tahlillar shuni ko'rsatadiki, kimyo fanining reaksiyaga kirishgan moddalarning massasi reaksiya natijasida hosil bo'lgan moddalarning massasiga tengligiga doir klassik qonuni yonish reaksiya tenglamalari qatorida ma'lum bir izchillikda takrorlanishini quydagi xulosalar yana bir bor tasdiqlaydi.

Yonish reaksiyalari tenglamalari qatorida molekulasi tarkibida uglerod, vodorod yoki uglerod, vodorod va kislorod tutgan hamda izchillik koeffisienti 2n/n bo'lgan birikmalarda dastlabki organik moddaning massasi 28.a.m.b. ga, reaksiyaning asosiy ishtirokchisi – kislorodning O_2 massasi 96.a.m.b. ga va reaksiyaning asosiy mahsulotlari - karbonat angidridning CO_2 massasi 88.a.m.b. ga hamda suvning H_2O massasi esa 36.a.m.b. qiymatiga proporsional ravishda ortib yoki kamayib boradi.

Alkanlar misolida:

1) $2CH_4 + 4O_2 \to 2CO_2 + 4H_2O + Q$.

2*16=32 + 4*32=128 = 2*44=88 + 4*18=72

2) $2C_2H_6 + 7O_2 \to 4CO_2 + 6H_2O + Q$.

2*30=60 + 7*32=224 = 4*44=176 + 6*18=108

3) $2C_3H_8 + 10O_2 \to 6CO_2 + 8H_2O + Q$.

2*44=88 + 10*32=320 = 6*44=264 + 8*18=144

4) $2C_4H_{10} + 13O_2 \to 8CO_2 + 10H_2O + Q$.

2*58=116 + 13*32=416 = 8*44=352 + 10*18=180

Aldegidlar misolida:

1) $2CH_2O + 2O_2 \to 2CO_2 + 2H_2O + Q$.

2*30=60 + 2*32=64 = 2*44=88 + 2*18=36

2) $2C_2H_4O + 5O_2 \to 4CO_2 + 4H_2O + Q$.

2*44=88 + 5*32=160 = 4*44=176 + 4*18=72

3) $2C_3H_6O + 8O_2 \rightarrow 6CO_2 + 6H_2O$ + Q.

2*58=116 + 8*32=256 = 6*44=264 + 6*18=108

4) $2C_4H_8O + 11O_2 \rightarrow 8CO_2 + 8H_2O$ + Q.

2*72=144 + 11*32=352 = 8*44=352 + 8*18=144

Yonish reaksiyalari tenglamalari qatorida molekulasi tarkibida uglerod, vodorod, azot yoki uglerod, vodorod, azot va kislorod tutgan hamda izchillik koeffisienti 4n/n bo'lgan birikmalarda dastlabki organik moddaning massasi 56 a.m.b. ga, reaksiyaning asosiy ishtirokchisi -kislorodning O_2 massasi 192 a.m.b. ga va reaksiyaning asosiy mahsulotlari -karbonat angidridning CO_2 massasi 176 m.u.b. ga hamda suvning H_2O massasi esa 72 a.m.b. qiymatiga prporsional ravishda ortib yoki kamayib boradi.

Aminlar misolida:

1) $4CH_5N + 9O_2 \rightarrow 4CO_2 + 10H_2O + 2N_2 + Q$

4*31=124 + 9*32=288 = 4*44=176 + 10*18=180 + 2*28=56

2) $4C_2H_7N + 15O_2 \rightarrow 8CO_2 + 14H_2O + 2N_2 + Q$

4*45=180 + 15*32=480 = 8*44=352 + 14*18=252 + 2*28=56

3) $4C_3H_9N + 21O_2 \rightarrow 12CO_2 + 18H_2O + 2N_2 + Q$

4*59=236 + 21*32=672 = 12*44=528 + 18*18=324 + 2*28=56

Nitroalkanlar misolida:

1) $4CH_3NO_2 + 3O_2 \rightarrow 4CO_2 + 6H_2O + 2N_2 + Q$.

4*61=244 + 3*32=96 = 4*44=176 + 6*18=108 + 2*28=56

2) $4C_2H_5NO_2 + 9O_2 \rightarrow 8CO_2 + 10H_2O + 2N_2 + Q$.

4*75=300 + 9*32=288 = 8*44=352 + 10*18=180 + 2*28=56

3) $4C_3H_7NO_2 + 15O_2 \rightarrow 12CO_2 + 14H_2O + 2N_2 + Q$.

4*89=356 + 15*32=480 = 12*44=528 + 14*18=252 + 2*28=56

4) $4C_4H_9NO_2 + 21O_2 \rightarrow 16CO_2 + 18H_2O + 2N_2 + Q$.

4*103=412 + 21*32=672 = 16*44=704 + 18*18=324 + 2*28=56

Kimyoviy reaksiya tenglamalarida, reaksiyaga kirishayotgan moddalar massalarining miqdorlarini, hosil bo'lgan moddalarning massalari miqdorlariga taqqoslaganda gomologik qatorlarda ularning miqdori ma'lum izchillikda o'zgarishini ko'rish mumkin. Shuningdek, yuqori molekulyar tuzilishga ega moddalardan (oqsillar, yog'lar, uglevodlar va boshqalar) quyi molekulyar tuzilishga ega bo'lgan (aminokislotalar, yuqori molekulyar karbon kislotalar, glyukoza, karbonat angidrid, suv va boshqalar) moddalarning hosil bo'lish jarayoni ham ana shunday qonuniyatga amal qiladi.

Demak, ushbu natijalarni **"reaksiyaga kirishgan moddalarning massasi reaksiya natijasida hosil bo'lgan moddalarning massasiga tengligiga"** doir kimyo fani klassik qonunining mantiqiy davomi sifatida **"kimyoviy reaksiyalarda moddalar massalari miqdorlarining ma'lum bir izchillikda o'zgarib, ortib yoki kamayib borishi"** qonunini quydagicha ifodalash maqsadga muvofiqdir:

Yonish reaksiyalari tenglamalari qatorida reaksiyaga kirishgan va hosil bo'lgan moddalar massalarining miqdorlari ma'lum bir izchillikda o'zgarib, ortib yoki kamayib boradi.

Ushbu natijalar kimyoviy reaksiyalarni matematik jihatdan algoritmlash va modellashtirish mumkinligini yana bir bor tasdiqlaydi. Aytish mumkinki, jonsiz va jonli tabiatda sodir bo'ladigan kimyoviy jarayonlar, mazkur kimyoviy jarayonlarda ishtirok etadigan moddalar massalari miqdorlarining ma'lum bir izchillikda o'zgarib, ortib yoki kamayib borishi asosida ro'y beradi. Demak, har qanday kimyoviy jarayon qandaydir matematik qonuniyatga bo'ysunadi.

1-ilova.

Kimyoviy algoritmlarning O_2, CO_2 va H_2O uchun koeffisient qiymati ifodalari jadvali

Organik moddalarning asosiy sinflari	O_2 ning koeffi-sient qiymati ifodasi	CO_2 ning koeffisient qiymati ifodasi	H_2O ning koeffisient qiymati ifodasi
1.To'yingan uglevodorodlar	2n + m	[n + (m – 1)]	[n + (m + 1)]
2.Sikloparafinlar va etilen qatori uglevodorodlar	2n + m	(n + m)	(n + m)
3.Dien va asetilen qatori uglevodorodlar	2n + m	[n + (m + 1)]	[n + (m – 1)]
4.Aromatik uglevodorodlar	2n + m	[n + (m + 3)]	[n + (m – 3)]
5.Bir atomli spirtlar va oddiy efirlar	2n + m	n + m	[n + (m + 2)]
6.Ikki atomli spirtlar	2n + m	[n + (m + 1)]	[n + (m + 3)]
7.Aldegidlar ketonlar va to'yinmagan spirtlar	2n + m	[n + (m + 1)]	[n + (m + 1)]
8. Bir asosli karbon kislotalar va murakkab efirlar	2n + m	[n + (m + 2)]	[n + (m + 2)]
9.To'yinmagan bir asosli karbon kislotalar, dialdegidlar va diketonlar	2n + m	[n + (m + 3)]	[n + (m +1)]
10.Ko'proq to'yinmagan karbon kislotalar	2n + m	[n + (m + 4)]	n + m
11.Ikki asosli karbon kislotalar	2n + m	[n + (m + 5)]	[n + (m + 3)]
12.To'yinmagan ikki asosli karbon kislotalar	2n + m	[n + (m + 6)]	[n + (m +2)]
13. Monoksikarbon kislotalar	2n + m	[n + (m + 3)]	[n + (m + 3)]
14.To'yinmagan aldegidlar va ketonlar	2n + m	[n + (m + 2)]	n + m
15.Aldegido va ketonokislotalar	2n + m	[n + (m + 4)]	[n + (m + 2)]
16.Aromatik aldegidlar va ketonlar	2n + m	[n + (m + 5)]	[n + (m – 3)]
17.Aromatik spirtlar	2n + m	[n + (m + 4)]	[n + (m – 2)]
18.Aminlar	5n + m	[3n + (m – 3)]	[3n + (m + 3)]
19.Aminokislotalar va nitroalkanlar	5n + m	[3n + (m + 3)]	[3n + (m + 5)]
20.Kislota amidlari	5n + m	[3n + (m + 1)]	[3n + (m + 3)]
21. Diaminokarbon kislotalar	5n + m	[3n + (m + 2)]	[3n + (m + 6)]
22.Aminodikarbon kislotalar	5n + m	[3n + (m + 9)]	[3n + (m + 7)]
23.Oksiaminokarbon kislotalar	5n + m	[3n + (m + 5)]	[3n + (m + 7)]

2-ilova.

“Kimyoviy algoritm”larning organik moddalar asosiy sinflari gomologlari birinchi vakili uchun (n) va (m) qiymatlari jadvali

Organik moddalarning asosiy sinflari	Umumiy formulasi	Gomologlarining dastlabki vakili	(n) va (m) sonlarining qiymatlari
1.To’yingan uglevodorodlar	C_nH_{2n+2}	CH_4	n = 1 m = 2
2.Sikloparafinlar va etilen qatori uglevodorodlar	C_nH_{2n}	C_2H_4	n = 2 m = 2
3.Dien va asetilen qatori uglevodorodlar	C_nH_{2n-2}	C_2H_2	n = 2 m = 1
4.Aromatik uglevodorodlar	C_nH_{2n-6}	C_6H_6	n = 6 m = 3
5.Bir atomli spirtlar va oddiy efirlar	$C_nH_{2n+2}O$	CH_4O	n = 1 m = 1
6.Ikki atomli spirtlar	$C_nH_{2n+2}O_2$	$C_2H_6O_2$	n = 2 m = 1
7.Aldegidlar ketonlar va to’yinmagan spirtlar	$C_nH_{2n}O$	CH_2O	n = 1 m = 0
8. Bir asosli karbon kislotalar va murakkab efirlar	$C_nH_{2n}O_2$	CH_2O_2	n = 1 m = -1
9.To’yinmagan bir asosli karbon kislotalar, dialdegidlar va diketonlar	$C_nH_{2n-2}O_2$	$C_3H_4O_2$	n = 3 m = 0
10. Ko’proq to’yinmagan karbon kislotalar	$C_nH_{2n-4}O_2$	$C_4H_4O_2$	n = 4 m = 0
11.Ikki asosli karbon kislotalar	$C_nH_{2n-2}O_4$	$C_2H_2O_4$	n = 2 m = -3
12.To’yinmagan ikki asosli karbon kislotalar	$C_nH_{2n-4}O_4$	$C_4H_4O_4$	n = 4 m = -2
13. Monoksikarbon kislotalar	$C_nH_{2n}O_3$	$C_3H_4O_3$	n = 2 m = -1
14.To’yinmagan aldegidlar va ketonlar	$C_nH_{2n-2}O$	C_3H_4O	n = 3 m = 1
15.Aldegido va ketonokislotalar	$C_nH_{2n-2}O_3$	$C_2H_2O_3$	n = 2 m = -2
16.Aromatik aldegidlar va ketonlar	$C_nH_{2n-8}O$	C_7H_6O	n = 7 m = 2
17.Aromatik spirtlar	$C_nH_{2n-6}O$	C_7H_8O	n = 7 m = 3
18.Aminlar	$C_nH_{2n+3}N$	CH_3N	n = 1 m = 4
19.Aminokislotalar va nitroalkanlar	$C_nH_{2n+1}NO_2$	CH_3NO_2	n = 1 m = -2
20.Kislota amidlari	$C_nH_{2n+1}NO$	CH_3NO	n = 1 m = 0
21. Diaminokarbon kislotalar	$C_nH_{2n+2}N_2O_2$	$C_2H_6N_2O_2$	n = 2 m = 0
22.Aminodikarbon kislotalar	$C_nH_{2n-1}NO_4$	$C_3H_5NO_4$	n = 3 m = -6
23.Oksiaminokarbon kislotalar	$C_nH_{2n+1}NO_3$	$C_3H_7NO_3$	n = 3 m = -2

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MUNDARIJA

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KIMYOVIY ALGORITMLARNING NAZARIY ASOSLARI

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