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HYGIENIC ASPECTS OF ATMOSPHERIC AIR ENVIRONMENT

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Abstract
In this article, atmospheric layers, factors that characterize the physical properties of the atmosphere include air temperature, humidity and movement, atmospheric pressure, solar radiation entering the atmosphere, atmospheric air and the composition of air when a person exhales, breathing when the oxygen supply of the human body is disturbed, the central nervous system, about serious changes in the cardiovascular system and other systems, indicators of meteorological factors, partial pressure, causes of "mountain sickness", atmospheric pressure, carbon (IV)-oxide, hygienic importance of air held.

Keywords: atmospheric layers, physical properties of the atmosphere, air temperature, humidity and movement, atmospheric pressure, solar radiation entering the atmosphere, atmospheric air, oxygen, breath, central nervous system, cardiovascular system, meteorological factors, atmospheric pressure, carbon(IV)-oxide.

Introduction

Human life takes place in the atmosphere surrounding him. In general, the air environment ensures the normal physiological processes observed in the body. Sometimes, as a result of air pollution, changes in physiological processes are noted, as a result of which pathological symptoms may occur in organs. For this reason, studying the effects of air pollution on the body is important from a hygienic point of view. The lowest layer of the atmosphere, which is dense and close to the ground, is distinguished by its physical properties and chemical stability. Today, due to the development of aviation and the conquest of space, the interest in studying the upper parts of the atmosphere is growing more and more. 3 parts of atmosphere can be given importance. They are:

1. Troposphere - the part 10-12 km above the earth's surface, characterized by decreasing air temperature and humidity;
2. Stratosphere - a part that is distinguished by an increase in temperature, a decrease in humidity, the absence of clouds, ultraviolet rays, and an increase in the amount of ozone, approximately 100 km above the troposphere;
3. The ionosphere is a part characterized by an increase in temperature to 700 degrees and more, high electrical conductivity and an increase in the ionized nature of the air, as well as an abundance of ultraviolet rays.

Since the human body is in direct contact with the air environment, it is affected not only by its composition, but also by meteorological factors. Factors that characterize the physical state of the atmosphere include air temperature, humidity and movement, atmospheric pressure, solar radiation entering the atmosphere, etc. The sum of these factors determines the weather and climate in different places. It differs in that the indicator of meteorological factors is not constant. Air temperature, humidity, movement and light power have a great influence on heat

exchange, which is one of the most important functions of the human body. Physiological importance of solar radiation is also huge. Individual meteorological factors, as well as the study of the effects of weather and climate on the human body, using the positive effects of this factor on health (sunbaths, spa treatments, climate treatment, etc.) , also allows to develop suggestions for prevention of overheating, sunstroke, frostbite, frostbite, colds and diseases.

Composition of air and its hygienic importance.

Atmospheric air consists of a physical mixture of oxygen, carbon (IV)-oxide, nitrogen, argon and other gases. The composition of the air changes little even when it rises to a height of several kilometers. However, as the air becomes rarer as the air rises, the amount of each gas per unit volume decreases (PB), and the partial pressure1 decreases. The chemical composition of inhaled and exhaled air is presented in the table. In atmospheric air, there are gases that are not part of its composition, including hydrocarbon, hydrocarbon acid, hydrogen sulfide, sulfide gas, phenol, chlorine, and fluorine compounds, which are released into the atmosphere as industrial waste.

Atmospheric air and the composition of air when a person exhales

Gas	Atmospheric air (% by volume)	Exhaled air (% by volume)
Oxygen	20,94	15.4 to 16.0
Carbon (IV)-oxide	0,04	3.4 to 4.7
Nitrogen	78,08	78,26
Argon, other inert gases and mixtures	0,94	0,94

The most important component of atmospheric air is oxygen. Oxygen (O2) is 20.94%, PO2 has a partial pressure of 213 hPa near 160 mm of mercury.

It is known that oxygen in atmospheric air is extremely necessary for a living organism. It is the most important element of the atmosphere, a very common gas in nature. Oxygen itself does not burn, but it helps to burn and oxidize many minerals and organic substances. Oxygen enters the body through the respiratory tract and directly participates in the oxidation process in the human body. It passes through the lungs into the blood and combines with red blood cells. These cells carry oxygen to tissues and cells during blood circulation. Depending on the partial pressure of oxygen in the air, we can observe the saturation of blood with oxygen. Very complex biochemical processes take place in a living organism with the help of oxygen. Processing, oxidation of food substances in human organs and the release of energy from these processes cannot take place without oxygen. Oxygen ensures the maintenance of body temperature in a living organism, in warm-blooded animals.

It should be said that if the oxygen supply of the human body is disturbed, serious changes may occur in the activity of breathing, central nervous system, cardiovascular system and other systems. Usually, the transfer of oxygen to the blood and tissue fluid in the alveoli of the lungs takes place under the influence of the partial pressure difference. When the partial pressure drops, oxygen cannot pass into the blood, oxygen deficiency occurs in tissues and cells, which leads to hypoxia. When the amount of oxygen drops to 16-17% at different altitudes (when the partial pressure of PO2 is equal to gPa or 120 mm of mercury column), physiological changes are observed; if the oxygen content is 11-13%, and the partial pressure PO2 is 120 hPa equal to

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90 mm of the mercury column, oxygen deficiency is expressed, which leads to a sharp decrease in work capacity. As you rise above sea level, the partial pressure of oxygen in the air decreases, and this situation can cause "altitude sickness". In order to prevent such a situation, it is important to gradually adapt to the thin atmospheric conditions (acclimatization) (information about this is covered in detail in the "Atmospheric pressure" section of this book). The effect of high-concentration oxygen is of great interest in medicine. Breathing air enriched with 40-60% oxygen (partial pressure PO2 equal to 430-640 g Pa or 320-M80 mm Hg) is used to treat oxygen deficiency. If the pressure in the barochamber is increased to 3 atmospheres, PO2 will rise to 640 hPa, and the mercury column will rise to 480 mm (160X3). When a person is in a state of hypoxia under such conditions, the oxygen content in the tissues improves and his vital activity normalizes. This treatment method is called hyperbaric oxygenation method.

Carbon (IV)-oxide (CO2) is a colorless, odorless gas. It does not affect the mucous membranes, and even when it is in large quantities in the air, a person does not feel it, which can cause poisoning. Carbon (IV)-oxide is 1.5 times heavier than air and therefore can accumulate at the bottom of closed spaces. Carbon (IV)-oxide found in atmospheric air or in the air of houses and public buildings has no significant effect. Nevertheless, the accumulation of more than 0.1-0.15% CO2 in the air of these buildings indicates air pollution, insufficient ventilation, that is, carbon (IV)-oxide is an indirect sanitary indicator of air cleanliness. The transfer of carbon (IV)-oxide from the tissues to the liquid between the tissues, from it to the vein, and then to the air in the alveoli occurs by diffusion due to the difference in its partial pressure.

The partial pressure of CO2 formed as a result of oxidation is high in tissues. Such a high pressure ensures that it passes into the fluid between the tissues and then into the blood. The partial pressure of CO2 in the venous blood is 7 mm Hg higher than the air in the alveoli, which ensures that it diffuses into the air of the alveoli, from it into the bronchi, and then into the exhaled air and released into the atmosphere. The presence of SO2 in the air ensures the breathing process. Its partial pressure increases its ability to bind with hemoglobin, and when it decreases, it decreases.

The presence of CO2 in the blood affects the respiratory center either directly or by changing the pH of the blood. When the amount of CO2 in the air reaches 1%, metabolic disorders (acidosis) begin to occur in the human body, but the ability to work does not change. When the amount of CO2 is more (1.5-3%), some people show signs of poisoning: shortness of breath, headache, etc., and work capacity decreases. When the amount of CO2 is 10-12%, cases of fainting and death are observed quickly. There is a permissible amount of CO2 in the air of different buildings. For example, CO2 should not exceed 0.5-1% in spaceships, submarines, and 2% in areas intended for bomb and gas protection and similar points.

Nitrogen (N) is the heaviest part of atmospheric air. It makes up about 4/5 of the volume of air. The hygienic value of nitrogen is that it, together with all groups of inert gases, dilutes oxygen to the level necessary for human breathing, because without it, life in pure oxygen is difficult. In nature, nitrogen constantly circulates, as a result, nitrogen in the atmospheric air turns into organic compounds, organic compounds decompose and return nitrogen to the atmospheric air. An increase in nitrogen in the air reduces the partial pressure of oxygen and causes hypoxia and asphyxia. However, nitrogen does not change its amount naturally.

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It dissolves well in the blood, and at low pressure, it leaves the blood and causes Casson's disease. Ozone (O s) gas is always present in the atmosphere. The ozone molecule consisting of three atoms of oxygen was discovered 205 years ago by the Dutch physicist Van Marum. Ozone solidifies and melts at very low temperatures, decomposes easily, and smells like chlorine.

Ozone increases in summer and decreases in autumn. At an altitude of 20-25 kilometers, it creates a layer that protects the food from ultraviolet rays. Ozone is formed in small amounts in the lower layers of the atmosphere during thunderstorms and under the influence of the sun's ultraviolet rays, as well as when a lot of water and resinous substances evaporate (on sea and ocean coasts, in mountains and forests). The presence of ozone in atmospheric air at m level indicates its purity. If the ozone gas reaches 0.02 mg/m3 in the air, it will have a negative effect on the human body.

Ozone protects humans and animals from becoming blind. The fact is that ozone traps a part of ultraviolet light in the atmospheric air, including a small wave that has the property of protein denaturation. Ultraviolet light has a bad effect on the retina. Usually, if there are a lot of remaining ultraviolet rays, then the eye function is disturbed. Due to this, the ozone, which is only ten millimeters thick on the earth's surface, traps a part of ultraviolet rays and protects the eyes. If ozone in the air exceeds the norm, a person will feel weak, tired, and have a headache. If the concentration of ozone exceeds the norm, it can cause nausea, nosebleeds, eye inflammation, serious changes in the heart muscles, and even death.

Ozone concentrations can be found in medical facilities, including physiotherapy and X-ray rooms. When the concentration of ozone increases to 0.005 mg/l, tickling of the mucous membrane of the upper respiratory organs, dizziness and a number of vegetative changes are observed. Currently, ozone is used to disinfect water and air, to bleach gas, to produce mineral oils, and as an oxidant in chemical reactions. Transient photochemical reactions under the influence of solar radiation also destroy ozone. But the main component of ozone is freon, chlorinated gases, fluorocarbons and polyfluorocarbon liquids. They contain ozone-depleting chlorine and bromine atoms. These substances have the property of rising towards the stratosphere and are distinguished from many compounds by their extraordinary stability.

Unfortunately, today the total amount of these on earth is one million hundred thousand tons. I.S. According to Shklovsky, if the use of these gases is not regulated in the coming years, after a few decades the ozone layer in the atmosphere may begin to decrease significantly. It has become known that the inappropriate interference of mankind in the work of nature, which has been doing its job for millions of years, will lead to bad consequences. Relying on various technologies, humanity is losing out from getting along with nature (according to Q. Akhmedov).

Hygienic importance:

1. Safety for health: Clean and harmless air is important for human health. Polluted air can cause various diseases, including diseases of the respiratory system.
2. Oxidation process: Since oxygen is present in the air, organisms can carry out the necessary oxidation processes to produce energy.

3. Protection of the atmosphere: Air layers protect the earth's surface from ultraviolet rays and keep the climate in balance.
4. Ecological balance: The balance between the gases in the air is important for the ecosystem. For example, the balance between carbon dioxide and oxygen ensures the photosynthesis process of plants.

In conclusion, the purity and composition of the air is also of particular importance in densely populated areas and in places associated with industrial production. It is necessary to take a number of measures to maintain clean air here.

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