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HYGIENIC ANALYSIS OF SOIL COMPOSITION

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Abstract: This article provides information about the hygienic composition of the soil and the diseases that occur in it.

Key words: soil composition, neutralization, hygienic importance, ecological, organic matter, sanitary bacteriological, sanitary helminthological, hygienic feature.

Hygienic importance of soil. If a person is connected with the soil through the climate, food chain, air and water through his life activities from an ecological point of view, the hygienic value of the soil is determined by:
1) determining the factors determining its impact on human life;
2) the need to assess the level of this effect on health;
3) development of preventive measures to protect the soil from both anthropogenic influences and people from diseases caused by this pollution.

The main soil factors that have a great impact on human health and are of great hygienic importance:

A) by shaping the climate of the region - affects the thermal regime of the region, the composition of the air and vegetation cover, thereby forming the adaptive ecological type of a person. Healthy places are high, dry, sunny; unhealthy - low-lying, cold, flooded, wet, often foggy;

B) constitutes an important link of the food chain - "external environment - man": 1) as a producer of food (B, F, U, vitamins, minerals, trace elements) - impact on a person through nutrition does and 2) as a supplier. all chemicals to the body through food, physical and biological anthropogenic pollutants that fall into the soil and are not neutralized;

C) soil is a natural environment for eliminating waste through self-cleaning. The soil is a huge laboratory, in which the synthesis and destruction of organic substances, photochemical processes, the formation of new organic substances, the death of many bacteria, viruses, helminth eggs and insects are constantly taking place. Soil is used to treat and neutralize wastewater, sewage and garbage;

D) the factor that determines the nosology of geoendemic diseases, both as a result of soil naturally characteristic of a certain area (fluorosis, goiter) and as a result of its anthropogenic contamination (for example, heavy metals); contaminated soil is a source of chemical, physical and biological pollution of the environment (air, water, plants);

E) soil is a factor in the spread of a number of infectious diseases (wounds, botulism), epidemic diseases (intestinal group, anthrax) and helminthosis (ascariasis).

Hygienic requirements for soil quality. For hygienists, the surface layer of the soil is

important - 25 cm (arable). It is there that plants grow, it is often polluted, and pollution from it enters the air, water bodies and plants. It is this layer that meets hygienic requirements. Based on the fact that the soil consists of solid particles - grains and empty spaces between them - pores filled with air, the hygienic properties of the soil are determined by its porosity, air permeability, moisture capacity, hygroscopicity and capillarity.

- Porosity - the percentage of pores in the soil (sandy - 40%, peat - 82%).
- Air permeability - the ability to pass air.
- Water permeability - the ability to pass water (its ability to filter).
- Moisture capacity - how much water the soil can hold (its adsorption capacity).
- Capillarity is the ability of the soil to move water up from the lower layers.

These properties depend on the mechanical and chemical composition of the soil. Therefore, before choosing a place for construction, a hygienic assessment of the state of the area is carried out: sanitary-topographic examination, physical-mechanical analysis, radiological, sanitary-toxicological, sanitary-bacteriological, entomological and helminthological studies.

Soils are distinguished by their mechanical composition - sandy, loamy, loamy and loamy soils. The structure of these soils is determined by the mechanical elements that make them up - grains and their diameter: up to 0.01 mm - it is called clay; more than 0.01 mm - sand; Up to 1 mm - fine soil, more than 1 mm - soil skeleton.

According to their chemical composition, soils are divided into calcareous (Ca and CaO compounds), aluminum oxide (aluminum compounds - Al_2O_3) and sandy (silicon compounds - SiO_2).

Coarse-grained soils are sandy soils: they have large pores that allow air to pass well (good aeration); Such soils are dry and do not flood.

Fine-grained soils - clayey and swampy soils, high water capacity, hygroscopicity, capillarity help to retain moisture and easy waterlogging.

Healthy soil should be coarse and dry, which ensures air permeability: more oxygen means better oxidation of organic matter and thus better cleaning of the soil from them. For utilities, coarse-grained soils are better, which do not raise groundwater from below to the foundation of the building and allow it to pass well from above. We should not forget about the important hygienic property of the soil - its thermal properties. The surface layer of the soil, which is heated by solar radiation during the day, emits heat in the evening and warms the air, which is taken into account when laying water pipes and house foundations. The composition of the soil air also depends on the soil: in polluted soils, the amount of carbon dioxide decreases to 15%, and oxygen decreases to 5%. Enzymatic processes of decomposition of organic matter prevail in such soils, rather than rotting due to lack of oxygen. Methane, ammonia, hydrogen sulphide formed as a result of fermentation processes from soil air enter the basements of houses, spread further through underground structures (water pipes, sewers) and poison the inhabitants living there.

Hygienic cleanliness of the soil is assessed by the results of sanitary-bacteriological, sanitary-helminthological, sanitary-entomological and sanitary-chemical studies.

During the sanitary-bacteriological examination, the following are determined: 1) the total number of microorganisms in 1 g of soil; 2) the number of thermophiles in 1 g of soil (microorganisms that produce temperatures up to 60-70°C in composts; 3) coli titer (an indicator of organic pollution); 4) titer-perfringens (an indicator of the level of human presence in general pollution) and 5) the presence of pathogenic microorganisms, which are usually very difficult

to detect. A sanitary-helminthological study reveals the presence of helminth eggs in the soil, which is an indicator of contamination with fresh feces.

The results of the study are evaluated as a whole. Thus, an increase in organic nitrogen and carbon in the soil without an increase in ammonia with a low titer of coli and a large number of helminth eggs indicates a new pollution of feces, as well as the absence of mineralization processes of organic matter (soil). does not "digest" pollution well). The simultaneous presence of organic nitrogen and chlorides indicates long-term soil pollution and intensive use of organic matter (soil "digests" pollution well). A good humus formation process is also indicated by the Khlebnikov number, which approaches 1. The detection of nitrates + chlorides + low-titer perfringens indicates long-term contamination of the soil without new inputs.

The soil is a breeding ground for 27 species of mosquitoes (in the middle zone), one of which is the "house mosquito" important for the spread of epidemic intestinal diseases - dysentery and typhoid fever. A white worm turns into a fly in infected feces, carries up to 20 thousand dysentery germs on its legs, flies into a person's house and falls on unopened food - milk, cheese, sausage. And then the temperature and time help bacteria multiply (their number doubles every 20 minutes at 20°C). Dysentery and typhoid fever can be transmitted in this way.

Thus, the epidemic importance of soil is as follows:
1) contaminated soil can serve as a factor of epidemic diseases directly and through contamination of water supply and mosquitoes;
2) mosquitoes multiply and get sick in contaminated soil;
3) consumption of contaminated vegetables (onions, radishes) and berries (strawberries) causes people to become infected with worm eggs.

Therefore, in the prevention of soil-borne infectious diseases and helminthiasis, sanitary protection of the soil and sanitary cleaning of waste from the areas are of great importance.

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