



INFLUENCE OF ABIOTIC FACTORS ON ORGANS AND TISSUES

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Abstract. *The purpose of this article is to study the mechanism by which environmental factors influence living organisms. A comparative analysis was used for the study. This method revealed that various insecticides used in the environment have a specific effect on the protective barrier of living organisms. Simultaneously, it was discovered that a weakened immune system is unable to respond to attacks from abiotic factors. This led to the development of respiratory diseases. Based on the analysis, it can be concluded that virtually all abiotic factors have a toxicological effect. The study's results emphasized the need to protect against the harmful effects of environmental factors. To this end, regular sanitary and hygienic inspections are recommended, with the practical application of uniform, standardized reference values.*

Keywords: *Ecology, toxicology, abiotic factors, insecticide, pesticide, heavy metals, function, adaptive, protection, immune system, sanitation, hygiene, phosalone, zinc, cobalt, allergy.*

Аннотация. *Цель данной статьи – изучение механизма влияния факторов окружающей среды на живые организмы. Для исследования был использован метод сравнительного анализа. С помощью этого метода было установлено, что различные инсектициды, используемые в окружающей среде, оказывают специфическое воздействие на защитный барьер живого организма. Одновременно было обнаружено, что ослабленная иммунная система не может реагировать на атаки абиотических факторов. В результате было выявлено развитие респираторных заболеваний. На основании проведенных анализов можно сказать, что практически все абиотические факторы оказывают токсикологическое воздействие. По*



результатам исследования была подчеркнута необходимость защиты от вредного воздействия факторов окружающей среды. Для этого рекомендуется регулярно проводить санитарно-гигиенические проверки с практическим применением единых стандартизированных нормативных значений.

Ключевые слова: Экология, токсикология, абиотические факторы, инсектицид, пестицид, тяжёлые металлы, функция, адаптив, защита, иммунная система, санитария, гигиена, фозалон, цинк, кобальт, аллергия.

Annotastiya. Mazkur maqolaning maqsadi, atrof muhitda tarqalayotgan ekologik omillarning, tirik organizmga ta'sir mexanizmini tadbiq etish. Mazkur tadqiqot ishlari uchun qiyosiy taxlil usuli qo'llanildi. Ushbu usul yordamida, atrof muhitda maqsadli ishlatiladigan turli insektisidlar tirik organizmning himoya to'siqiga o'ziga xos ta'sir qilishi aniqlandi. Shu bilan birga, zaiflashgan immun tizimi abiotik omillarning xujumlariga javob bera olmasligi ma'lum bo'ldi. Natijasida nafas yo'llari bog'liq kasalliklarning rivojlanishi aniqlandi. Taxlillar asosida aytish mumkin, deyarli barcha abiotik omillar toksikologik ta'sirga ega. Tadqiqot natijalariga ko'ra, ekoomillarning zararli tasilaridan himoyalaniş kerakligi yoritildi. Buning uchun, yagona standartlashtirilgan me'yoriy qiymatlarni amalda qo'llash bo'yicha, sanitariya gigiena tekshiruvlarni muntazam yo'lga qo'yish tavsiya etiladi.

Kalit so'zlar: Ekologiya, toksikologiya, abiotik omillar, insektisid, pestisid, oq'ir metallar, funktsiya, adaptiv, himoya, immun tizimi, sanitariya, gigiena, fozalon, sink, kobalt, allergiya.

In developing countries around the world, the use of insecticides, pesticides, and heavy metals is widespread. Excessive exposure to these environmental factors primarily affects the respiratory tract, leading to the development of various respiratory diseases.

The sources describe in detail the effects of insecticides under various names on the immune system in various ways. Examples include Mavrik, Sanolen,



Phosalone, Cadmium, Zinc, and others. Along with the effects of some of these, the course of the disease is also determined. For example, the immune function of affected organs and tissues was restored within a month, and in some cases, within two months, thanks to various antibodies.

Environmental factors, as well as various microorganisms, act as stress factors that suppress the natural protective functions of the innate and adaptive immune systems, which is the basis for the development of various diseases in a living organism.

The degree of influence of abiotic factors on the immune system is also determined by chemical compounds. In this case, attacks on the immune system's defenses can also trigger the development of infectious processes. This indicates a connection between the immune system and pathogens.

There is currently an increasing incidence of secondary immunodeficiency diseases caused by various environmental factors. In some cases, they are considered a syndrome of abiotic factors and infectious diseases.

Xenobiotics are chemical substances, and dynamic monitoring of the immune system of people exposed to them revealed the following results: laboratory tests showed elevated immunoglobulin levels above normal; decreases and increases in all immunoglobulins above normal were observed; clinical manifestations were absent at all stages of elevated immunoglobulin levels; and lymphocyte counts decreased. Allergic diseases were regularly observed in people exposed to Fosalon and similar substances.

Pesticides can cause various immune-related diseases by affecting oxidative stress, mitochondrial changes, membrane permeability, and other parameters in organs and tissues. This is explained by the toxicological effects of all environmental factors.

The literature widely reports that pesticides such as phosphorus, atrazine, organophosphorus compounds, carbamates, and pyrethroids inhibit apoptosis or cellular functions. This, in turn, can suppress the survival and growth of leukocytes,



affecting the specific immunological functions of immune cells. Based on the above, it can be concluded that pesticides exhibit immunotoxicity towards specific immune cells. To confirm this, it is necessary to demonstrate the toxic effects of all types of abiotic factors on the organism as a whole. This requires collecting and carefully analyzing data.

As is well known, the immune system is a collection of white blood cells, lymphocytes in the blood, lymph nodes, bone marrow, and spleen that protect the body from microbial attacks and abiotic factors. Literature has shown that most diseases associated with immune system function occur in the respiratory and digestive tracts. A disruption in the immune system's protective function increases the sensitivity of living organs and tissues to various environmental factors. This negatively impacts the body's functioning, leading to a number of external influences. Furthermore, as the body weakens, the likelihood of pathogens entering the body also increases.

To enable a living organism to respond to environmental stress caused by environmental factors, measures must be taken to strengthen the immune system. This requires a redistribution of energy resources. Developed programs for the proper use of various insecticides must be followed. Sanitary and hygienic inspections should be conducted regularly and, if necessary, intensified. Since abiotic factors such as pesticides are chemical poisons, health professionals are concerned about their negative impact on health.

Based on the above, as well as information from literature and online resources, it can be concluded that environmental factors play a significant role in the development of diseases associated with impaired immune function. They are known to cause cancer, respiratory diseases, systemic failure, nervous system diseases, and asthma. Urinary incontinence and other pathological conditions have been observed in some patients with kidney disease.

To protect a living organism from diseases caused by abiotic factors, acclimatization is necessary. Ecological acclimatization is a mechanism that restores



the protective functions of the body's immune system. This mechanism serves to strengthen the immune system for the body's survival and to combat factors that have a harmful effect on organ tissue. This strengthens the immune system and activates its natural defense mechanisms. For example, by regulating the immune system, it reduces the sensitivity of organs and tissues to various factors.

The immune system responds to direct attacks from environmental factors that cause disease in living organisms. It stimulates their functional state and seeks protective measures. It regulates immunity in the presence of inflammatory and tumor cells. In this case, lymphocytes and antibodies participate in reducing the concentration of foreign pathogens foreign to the body.

Currently, the science of immunotoxicology is engaged in a broader study of the direct impact of environmental factors on the organs and tissues of a living organism.

In response to the above, it can be concluded that the immunotoxicity of factors used or prohibited for use, as well as their impact on various immune cells and leukocytes, such as macrophages, must be considered. After all, immune cells perform the most unique functions in the innate and adaptive immune systems, supporting and protecting organs and tissues, and ensuring their defense.

LIST OF REFERENCES

1. Abdurashid, O., Gulrukh, I., Gulbaxor, U., Nafisa, G., Gullola, K., Malokhat, J., ... & Dilshod, D. (2025). CD19-Targeted Lipid Nanoparticles for Delivering Venetoclax and BCL2 siRNA in B-Cell Acute Lymphoblastic Leukemia. *Journal of Nanostructures*, 15(2), 587-595.
2. Bacheler, N. M., Paramore, L. M., Buckel, J. A., & Hightower, J. E. (2009). Abiotic and biotic factors influence the habitat use of an estuarine fish. *Marine Ecology Progress Series*, 377, 263-277.
3. Komiljonovich, P. M., Islamovich, A. M., Urunboevna, U. G., & Alibekovna, E. K. (2015). Protective effect of salvifolin on liver mitochondrial function in rats with experimental diabetes. *European science review*, (7-8), 3-7.



4. Pangesti K. et al. *Molecular epidemiology of respiratory syncytial virus. Rev Med Virol* 28:e1968. (2018).
5. Razak, S. A., Griffin, M. J., Mischke, C. C., Bosworth, B. G., Waldbieser, G. C., Wise, D. J., ... & Scribner, K. T. (2019). Biotic and abiotic factors influencing channel catfish egg and gut microbiome dynamics during early life stages. *Aquaculture*, 498, 556-567.
6. Saijo, Y., & Loo, E. P. I. (2020). Plant immunity in signal integration between biotic and abiotic stress responses. *New Phytologist*, 225(1), 87-104.
7. Trawicki M.B. *Deterministic seirs epidemic model for modeling vital dynamics, vaccinations, and temporary immunity. Mathematics. 2017 doi: 10.3390/math5010007. [DOI] [Google Scholar]*
8. Urmanova, G. (2025). USE OF PHYSICAL FACTORS IN MEDICINE. *Journal of analytical synergy and scientific horizon*, 1(1.3 (C series)), 4-10.
9. Urmanova, G. U., Karshiev, D. A., & Islamov, Y. N. (2021). FUNCTIONAL STATUS OF SMALL INTESTINE AFTER APPLICATION OF GUANETIDIDE SULFATE. *Новый день в медицине*, (1), 29-33.
10. Urmanova, G., & Yo'ldosheva, D. (2023). TIBBIYOTNING RIVOJLANISHIGA HISSA QO'SHAYOTGAN AYRIM NOYOB USULLARNING KELIB CHIQISH TARIXI. *Talqin va tadqiqotlar*, 1(8).
11. Urmanova, G., & Yoldosheva, D. (2024). PHYSICAL CHARACTERISTICS OF PULSE OXIMETRY. *Theoretical aspects in the formation of pedagogical sciences*, 3(5), 46-48.
12. Yodgorovna, B. S. (2025). ECOPATHOGENS AND IMMUNOSUPPRESSION. *Modern education and development*, 38(4), 348-353.
13. Бахранова, М., & Урманова, Г. (2021). Изучение физических характеристик ультразвука. *Перспективы развития медицины*, 1(1), 173-173.



14. Исломов, Ю., Каршиев, Д., Урманова, Г., & Исломов, А. (2023). Биологик актив бирикмаларни нурланишга таъсири. *Актуальные вопросы детской хирургии, 1(1)*, 11-12.
15. Рудченко, В. А., & Разоренова, Ю. В. (2015). Экопроблемы питания. использование сои в продуктах. In Молодая наука-2014 (pp. 221-222).
16. ТАЪСИРИ, С. (2006). ФОЗАЛОН ИНСЕКТИЦИДИ ВА КАДМИЙ ИОНЛАРИНИНГ ЖИГАР МИТОХОНДРИЯЛАРИ МЕМБРАНАСИ ЎТКАЗУВЧАНЛИГИГА. *Доклады Академии наук Республики Узбекистан, (6)*, 81.
17. Тоштемирова, М. Ж., Урманова, Г. У., & Асраров, М. И. (2002). Изучение действия инсектицида фозалона на функции митохондрий печени крыс в опытах in vivo. *Известия вузов. Химико-биологические науки, (4)*, 28-31.
18. Урманова, Г. У., Каршиев, Д. А., & Исламов, Ю. Н. (2022). Аллергические изменения поджелудочной железы циррозах печени у детей. *Воронцовские чтения®. Санкт-петербург-2022*, 114.
19. Ханюков, Д. А. (2023). Экологические проблемы в индустрии гостеприимства. In Новая экономика, бизнес и общество (pp. 541-544).
20. Шадиметов, Ю. Ш., & Айрапетов, Д. А. (2022). Экологическая дипломатия в центральной Азии. *Экономика и социум, (9 (100))*, 770-777.
21. <https://cordis.europa.eu/article/id/442184-scientists-uncover-impact-of-infections-on-immune-system>. Scientists uncover impact of infections on immune system.2020.
22. <https://gemotest.ru/info/spravochnik/zabolevaniya/infektsionnye-zabolevaniya/> Инфекционные заболевания 2023.
23. <https://www.iloencyclopaedia.org/ru/>. Иммунотоксикология 2011.