THE EFFECT OF INSECTOACARICIDES ON THE IMMUNE SYSTEM

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Abstract: *The purpose of this article is to study the properties of insecticides and acaricides and their negative impact on the immune system. Statistical research and comparative analysis were used to study the properties of these chemicals. These methods helped define the properties of insectoacaricides and identify their advantages and disadvantages. This also provided the basis for understanding their unique properties for protecting human health and property. It was also established that the use of large quantities of insectoacaricides can lead to pathological conditions associated with the immune system.*

Keywords: *Insecticide, pesticide, acaricides, chemicals, pesticide, natural defense system, cell.*

INTRODUCTION

Sources report that insecticides, under various names, are causing an increase in birth defects. Although this may pose the greatest threat to healthy living, the problems associated with their use remain unresolved. For unknown reasons, little attention has been paid to the dysfunction of the immune system in humans and animals. This article will examine the immune system's response to chemicals used for various purposes. It will also present data on methods for mitigating their negative impacts.

Chemicals used for their intended purpose are considered hazardous to human health. It is advisable to conduct experimental and epidemiological studies to confirm the effects of insecticides, widely used worldwide, on the immune system and their negative health impacts. According to recent statistics, the risks associated with toxic chemicals are particularly high in countries where their use is widespread. The reason for disseminating such reliable information is the known increase in immunodeficiency-related diseases in these developing countries.

This indicates that current environmental health and safety measures are insufficient. If the chemicals used to enhance efficacy are damaging the immune system, then their use policies must be radically altered.

The purpose of this article is to introduce the properties of insectoacaricides and their impact on the human immune system. Insectoacaricides are chemicals that protect people, plants, and pets from various pests. Insectoacaricides, or insecticides and acaricides, have the following characteristics:

- insecticides are used to kill insects that harm living organisms, such as disease-carrying mosquitoes. They inhibit insect reproduction and growth.

They are available as sprays and powders.

- acaricides are chemicals used to protect all biological organisms, from humans to agricultural crops, livestock, and pets, from pests. They are widely used in medicine, agriculture, and veterinary science;
- pesticides have properties that destroy weeds, fungi, rodents, and bacteria. They are also classified as chemical or biological agents used to protect healthy lifestyles and property.

LITERATURE REVIEW.

Changes in the atmosphere lead to an increase in the number of pathogenic microorganisms in the environment, including various infections and targeted insecticides.

Excessive use of abiotic substances initially negatively impacts the functional state of young organisms. This leads to the development of immunodeficiency. Overall, this can lead to a weakening of the immune system and even death. This is because the functional state of the protective memory is altered due to the weakening of the child's natural physiological properties. In such cases, the natural defense system is unable to respond to foreign elements.

According to accumulated data, pesticides can cause respiratory diseases associated with impaired immune system function. According to a number of online sources, they can cause respiratory diseases, including asthma, allergies, as well as cancer, immunodeficiency, and other diseases.

Insecticides and acaricides are known to have toxicological effects that can cause oxidative stress, mitochondrial dysfunction and endoplasmic reticulum stress in living organisms.

Pesticides such as atrazine, organophosphates, carbamates, and pyrethroids have been reported to induce apoptosis, or cell cycle arrest. They have also been shown to affect specific immunological functions of immune cells, inhibiting the survival and growth of leukocytes.

Thus, based on the above data, it is an urgent issue to consider the immunotoxicity of currently used or banned insecticides, acaricides and pesticides, as they affect the adaptation and survival of various cells that stimulate the immune system.

METHODOLOGY.

These studies were conducted using the following methods: the properties of insectoacaricides presented in the scientific literature and online sources were analyzed; their positive and negative effects on biological organisms were statistically studied; a comprehensive, systematic approach was applied to the study of the synergistic effect of various types of insecticides, and their complex interactions were analyzed; along with a study of the impact of insectoacaricides on the immune system, an assessment of the functional state of the organism was conducted; along with a study of the beneficial properties of insectoacaricides, recommendations were provided to reduce their harmful effects.

RESULTS AND DISCUSSION

Based on the study's results, it can be concluded that certain chemicals are harmful to all biological systems in the environment and primarily affect the human immune system. This can damage the body's natural defenses.

The synergistic effect of insecticides, acaricides and pesticides on the body leads to disruption of cellular energy metabolism.

Figures 1 and 2 show the chemical formulas of the insectoacaricides studied.

The insectoacaricide mavrik (Fig. 1) has a long-lasting effect and destroys pests on trees and agricultural crops by sucking them out with mucus.

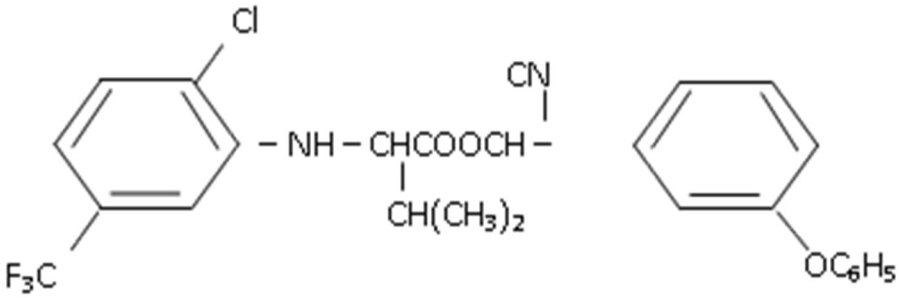

Fig. 1. Mavrik: (R)-3-methyl-2-(4-trifluoromethyl chlorpheniramine)butanoic acid (R,S)-3-phenoxy α-cyanobenzyl ester.

Phosalone (Fig. 2) is capable of paralyzing and killing pests.

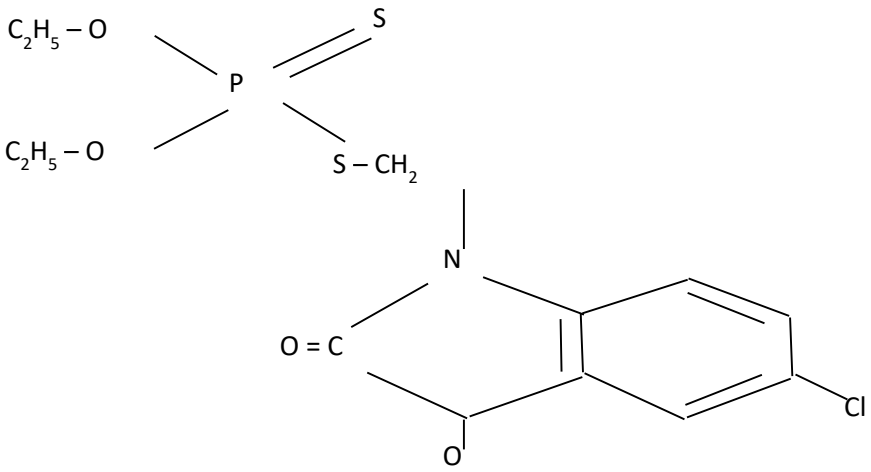

Fig. 2. Fosalon: (S-{(6-[chloro-2-oxo-3]-(2H)-benzoxazolyl) methyl} 0,0-diethyl dithiophosphate.

Phosalone, used to kill pests, belongs to a group of organophosphorus compounds. However, excessive use of both chemicals increases stress on living organisms, weakening the immune system

The immune system is known to perform unique functions for human survival in the environment. However, the negative effects of certain insectoacaricides can interfere with the following functions:

- white blood cells fail to recognize emerging problems. They are unable to fight foreign microorganisms. As a result, communication with other cells is disrupted;
- cytokines act as signaling molecules, warning of danger. They fail to tell immune cells where to go and what to do. As a result, their function is impaired, and tissues become susceptible to inflammation;
- lymph nodes, which have the ability to cleanse the body, perform unique functions in the body. When exposed to insectoacaricides, they fail to filter waste products from tissues and cells. As a result, the system for storing beneficial nutrients is disrupted;
- when insectoacaricides affect the complement system, the protective function of tissues is impaired. In this case, damage-fighting cells hinder the healing of wounds or infections;
- chemicals affect the tonsils and adenoids, causing respiratory diseases;
- the spleen cannot store white blood cells. As a result, it impairs blood filtration and is unable to renew old and damaged cells;
- thymus cells cannot help the body become independent and fight external factors on its own. This hinders the body's maturation;
- due to the destruction of the skin's protective barrier, it cannot produce fats. At the same time, it cannot regulate the system's defense cells;
- the mucous membrane, damaged by insecticides, cannot retain foreign elements entering the body. This negatively impacts the body's filtration system;
- bone marrow, which is essential for blood cells, cannot produce white blood cells that stimulate the immune system.

The combined effects of insectoacaricides on the body also lead to disruption of cellular energy metabolism. As a result, nutrients are not delivered to organs and tissues.

Insectoacaricides also negatively affect the function of the cyclosporine A-sensitive pore in mitochondrial membranes. In this case, low concentrations act as pore-blocking agents, while high concentrations act as inhibitors.

Thus, although insectoacaricides protect biological organisms from poisoning, their excessive presence in the environ[ment is considered extremely dangerous for the human immune system.

CONCLUSION.

In conclusion, it can be said that a healthy lifestyle is essential for protection against insecticide exposure. A healthy diet helps strengthen the immune system. Standardized environmental use of insecticides should be established, with specific

targets in mind. It is recommended to develop guidelines for their use, which should support a healthy lifestyle.

REFERENCES:

[1]. Cestonaro, L. V., Macedo, S. M. D., Piton, Y. V., Garcia, S. C., & Arbo, M. D. (2022). Toxic effects of pesticides on cellular and humoral immunity: an overview. *Immunopharmacology and Immunotoxicology*, *44*(6), 816-831.
[2]. Lee, G. H., & Choi, K. C. (2020). Adverse effects of pesticides on the functions of immune system. *Comparative Biochemistry and Physiology Part C: 235*, 108789.
[3]. Lee, G. H., & Choi, K. C. (2020). Adverse effects of pesticides on the functions of immune system. *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*, *235*, 108789.
[4]. Mohammed, R. J., & Al Sammaraa, I. A. (2025). Investigate the Effect of Pesticides on the Immune System Function. *Al-Anbar Journal of Veterinary Sciences*, *18*(2), 37-42.
[5]. Rodríguez-Hidalgo, R., Pérez-Otáñez, X., & León, R. (2025). Introduction to Ticks and Their Resistance to Acaricides. Singapore: Springer Nature p. (1-21).
[6]. Rojas-Cabeza, J. F. et all. (2024). A review of acaricides and their resistance mechanisms in hard ticks and control alternatives with synergistic agents. *Acta Tropica*, 107519.
[7]. Urmanova, G. (2025). Use of physical factors in medicine. *Journal of analytical synergy and scientific horizon*, *1*(1.3 (C series)), 4-10.
[8]. Urmanova, G. U. (2024). Use of ultrasound properties in medicine. *Web of Medicine: Journal of Medicine, Practice and Nursing*, *2*(12), 345-349.
[9]. Urmanova, G., & Yoldosheva, D. (2024). PHYSICAL CHARACTERISTICS OF PULSE OXIMETRY. *Theoretical aspects in the formation of pedagogical sciences*, *3*(5), 46-48.
[10]. Vechia, J.F.D. et all. (2019). Effects of insecticide and acaricide mixtures on Diaphorina citri control. *Revista Brasileira de Fruticultura*, *41*, e-076.
[11]. Бахранова, М., & Урманова, Г. (2021). Изучение физических характеристик ультразвука. *Перспективы развития медицины*, *1*(1), 173-173.
[12]. Исломов, Ю., Каршиев, Д., Урманова, Г., & Исломов, А. (2023). Биологик актив бирикмаларни нурланишга таъсири. *Актуальные вопросы детской хирургии*, *1*(1), 11-12.
[13]. ТАЪСИРИ, С. (2006). ФОЗАЛОН ИНСЕКТИЦИДИ ВА КАДМИЙ ИОНЛАРИНИНГ ЖИГАР МИТОХОНДРИЯЛАРИ МЕМБРАНАСИ ЎТКАЗУВЧАНЛИГИГА. *Доклады Академии наук Республики Узбекистан*, (6), 81.
[14]. Урманова, Г. У., Каршиев, Д. А., & Исламов, Ю. Н. (2022). АЛЛЕРГИЧЕСКИЕ ИЗМЕНЕНИЯ ПОДЖЕЛУДОЧНОЙ ЖЕЛЕЗЫ ЦИРРОЗАХ ПЕЧЕНИ У ДЕТЕЙ. *ВОРОНЦОВСКИЕ ЧТЕНИЯ®. САНКТ-ПЕТЕРБУРГ-2022*, 114.