

Universal Method of Checking Pesticides Safety Found in Russia

An accurate and fast method for analyzing the suitability of commercial pesticides for agriculture was created by SibFU scientists together with colleagues from the Institute of Biophysics SB RAS. According to them, the development allows analyzing the toxicity of a commercial pesticide as a whole, and not just its active substance. The results are published in the International Journal of Molecular Sciences.



Pesticides are now widely used in agriculture to increase harvest and control pests. According to the scientists, in recent decades there has been an active search for new substances of this type that would be safer for humans and wildlife.

However, as experts explained, the testing of new formulations for toxicity is carried out without taking into account additional compounds that supplement the active substance in the commercial formula of a particular pesticide. Such additives can dramatically increase the biological activity and the danger of the pesticide to living organisms, the scientists stressed.

A team of researchers from Siberian Federal University has developed a new method for assessing the toxicity of commercial pesticides, which allows to quickly determine the level of suitability of chemicals for use in agriculture. According to the scientists, the methodology they developed fully takes into account the effect of additives on the properties of the pesticide and will be extremely useful in the work of state regulatory authorities.

“Due to the complexity and diversity of molecular processes in living organisms, different pesticide formulas can affect enzyme systems, physiological processes or the balance of basic biomolecules in the organisms. They are able to launch a cascade of effects that lead to serious damage to health,” explained **Elena Yesimbekova** one of the authors of the work, assistant professor, SibFU.



The new technique is based on the analysis of enzyme reactions to pesticides. Enzymes are the most important molecules in living organisms that accelerate all biochemical reactions and have a high sensitivity to toxins.

“Enzymes react to any changes in their environment, the presence of suppressive factors immediately disrupts their work. A wide variety of enzymes with different properties and the ability to reproduce enzymatic reactions in the laboratory makes them an excellent material for the development of test systems in ecotoxicological analysis,” said **Dr Yesimbekova**.

According to the creators, the proposed technique is complex, as it allows for a comprehensive analysis of the pesticide during one procedure. The developed test system can be used in the future to assess the safety of any chemical compositions used in everyday life and industry, the scientists noted.

The study was carried out jointly with colleagues from the Institute of Biophysics of the Krasnoyarsk Scientific Center SB RAS with the support of RFBR grant No. 20-44-242001 and the Krasnoyarsk Regional

Fund for Support of Scientific and Scientific-Technical Activities.

[SibFU Press Office](#), 16 may 2023

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