USE OF VINYL ETERS AGAINST INSECTS "*EURYGASTER INTEGRICEPS PUT.*"

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Annotation

This article provides information about the biological activity of terpenoids, the possibilities of their use as biologically active substances. In addition, the experimental results of the use of vinyl esters of menthol, thymol, 3-hydroxymethyl-chamazulene in the fight against harmful turtle (lat. Eurygaster integriceps) living in wheat crops are described.

Key words: thymol, menthol, 3-hydroxymethyl-chamazulene, vinyl esters, pesticide.
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Today, the demand for fine organic synthesis products is growing in the world. These substances include mainly biologically active compounds, including in medicine: chemical-therapeutic and pharmacological agents, vitamins, hormones, food additives; in agriculture: widely used as an insecticide, fungicide, herbicide, defoliant, plant and animal biostimulant. In addition, the specificity of their practical use lies in the fact that even when used in relatively small quantities, they determine the quality of products in many industries. One of the requirements for them is that such funds should not harm a person and his environment. It is important to isolate them from plant materials, as well as to obtain and modify environmentally friendly biologically active compounds based on derivatives of natural compounds.

In the world, scientific research is being carried out to obtain biologically active substances based on raw materials of higher plants, the creation of preparations with pesticide properties and their use in agriculture. It should be noted that chemical studies of the azulene system were often carried out on the substance azulene or on the substance guaiazulene (1,4-dimethyl-7-isopropylazulene), which is much cheaper and sufficient, but less biologically active. Almost nothing has been written about the synthesis of chamazulene derivatives, except for the highly efficient synthesis of its sulfides. According to the results of some studies, the sulfide derivatives of chamazulene have the lowest oxidation potential value compared to pure chamazulene. These data indicate that chamazulene derivatives have effective bioantioxidant properties and once again confirm the need for its chemical modification. Also, vinyl ethers are widely used in the field of organic synthesis due to their chemical activity and versatile reactivity.

In recent years, special attention has been paid to the chemical industry in our country. Industrial enterprises are being reconstructed and additional workshops are being created, where acetylene production processes are used with high efficiency using new technology. The tasks of "modernization, technical and technological re-equipment of chemical industry enterprises" are defined in the Action Strategy for the further development of the Republic of Uzbekistan. In this regard, scientific research aimed at creating methods for obtaining organic synthesis products based on local raw materials of acetylene and improving the structure, physicochemical, technological and operational properties of the products obtained are of great importance.

It is known from the studied literature that most of the oxygen derivatives of mentane

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hydrocarbons exhibit some biological activity: piperitone is more active as an insect repellant; thymol - antiseptic and anthelmintic agent; 1,8-cineol has an antiseptic, mucolytic effect, and ascaridol is an effective anthelmintic agent, but toxic - LD50=0.2 g/kg.

Some plants, which are natural sources of compounds of the azulene series, have found application in folk and modern medicine. This indicates that azulene hydrocarbons have a wide spectrum of biological activity. [48; 79-90-b., 52; 837-845-b.].

Chamazulene and its precursors in plant organisms have antibacterial activity. Chamazulene, contained in the essential oil of yarrow, exhibits strong activity against pathogenic microorganisms (Staphylococus aureus, Candida albicans) [52; S. 837-845]. Along with chamazulene and guaiazulene isolated from the plant Calicogorgia granulosa, isolated derivatives of guaiazulene - 2,2-diguazulenmethane and 2,2-diguazulenes have antifungal and antitumor, antibacterial and cytotoxic properties. All starting substances and their derivatives selected for research have biological activity and are used in various fields. Vinyl esters of menthol, thymol, 3-hydroxymethyl-chamazulene were synthesized from these substances in the research work and it is supposed to use the obtained products as new biologically active drugs [121; pp. 31-33, 122; pp. 61-63, 126; S. 14-18]. Currently, many different vinyl ethers are effectively used in medicine, industry, and agriculture [127; pp. 28-32, 130; pp. 43-45, 132; S. 48-49].

As part of the research work, 3 new organic substances were synthesized - thymol, menthol, vinyl esters of 3-hydroxymethyl-chamazulene, and these drugs were used in the experimental fields of the Namangan Scientific Experimental Station of the Namangan Research Institute of Cereals and legumes in the conditions of the Namangan region were tested on wheat for 3 years in 2019-2021 Experimental work was carried out to combat the grain pest Eurygaster integriceps Put. and was carried out in the developmental phase of budding and earing of wheat crops, as well as during the laying of eggs and larvae of Eurygaster integriceps Put.

In the first year of testing, in April-May 2019, preliminary experiments were carried out to determine the effectiveness of the drugs. At the same time, solutions of various concentrations of thymolvinyl ether (TVE), mentholvinyl ether (MVE) and 3-vinyloxymethyl-chamazulene (VHA) were prepared and the area sown with Asr winter wheat was sprayed every 0.15 ha. For comparison and control, the drug "Dalate" was taken. The results obtained are presented in Table 1 below.

From this Table 1 it can be seen that the efficiency was low at low concentrations (0.001%). At a working solution concentration of 0.005% and 0.01%, the efficiency was positive and similar results were obtained. It can be concluded that the optimal concentration of drugs used in the fight against harmful insects is 0.005%.

Table 1.

The effectiveness of preparations of various concentrations against insects Eurygaster integriceps Put.

№	Name of the chemical	Solution concentration, %	Spread of insects, pcs/m^2	Efficiency, piece/m^2	
				10 days	10 days
1	Thymol Vinyl Ether (TVE)	0,001	2-3	1,5-2	0-0,5
		0,005	2-3	1-2	0
		0,01	2-3	1-2	0
2	Menthol Vinyl Ether (MVE)	0,001	2-3	2-3	1,5-2
		0,005	2-3	2	1
		0,01	2-3	1,5-2	0,5-1

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3	3-Vinyloxymethyl-chamazulene (VCA)	0,001	2-3	2-2,5	1
		0,005	2-3	2	0,5-1
		0,01	2-3	1,5	0,5-1
4	Control (Dalate)	0,005	2-3	1-1,5	0

In the second year of testing, i.e. in April-May 2020, on small experimental plots sown with "Asr" winter wheat, the substances listed above were applied: the TVE preparation - 0.15 hectares, the MVE preparation - 0.15 hectares and the VCA preparation - 0.20 hectares, working solutions of 0.005% in the form of an emulsion, crops were sprayed with a manual motor sprayer equipped with a 10-liter tank, on a total area of 0.5 ha. Field processing was carried out in the afternoon under favorable weather conditions. When observing the sown area 10 days after treatment, it was noted that the spread of adults of harmful weeds decreased by 50-55%. After this control, the sowing field was treated with preparations by the above method for the second time. 10 days after the second treatment, when observing the field, no harmful insects were observed in the field.

For the 3rd year of testing, i.e. in April-May 2021, these drugs were tested again on a larger area: TVE - 0.5 hectares, MVE - 0.5 hectares, VHA - 0.5 hectares, 1.5 hectares in total. As a result, up to 100% destruction of harmful insects in the fields of grain crops was achieved (Table 2).

Table 2.

The effectiveness of drugs against Eurygaster integriceps Put.

№	Name of the chemical	Spread of insects, pcs/m^2	Efficiency, piece/m^2	
			10 days	10 days
1	Thymol Vinyl Ether (TVE)	2-3	1-2	0
2	Menthol Vinyl Ether (MVE)	2-3	2	1
3	3-Vinyloxymethyl-chamazulene (VCA)	2-3	2	0,5-1
4	Control (Dalate)	2-3	1-1,5	0

The use of new drugs submitted for testing showed a positive effect in the fight against the pest of crops, the harmful turtle (Eurygaster integriceps Put.). The highest efficiency was determined for HVE - thymol vinyl ether.

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