

## DEVELOPMENT OF INSECTICIDE PREPARATION "ENTOVANT"

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**Abstract:** *The article presents the results of the development of the insecticidal preparation Entovant 15% c.s. by mixing the active substance with surfactants and other components.*

**Key words:** *indoxacarb, S-isomer, active substance, powder, melting point, solubility, mixture, component, dispersion, grinding, insecticide, larvae.*

In the world of varieties of insect pests, there are several thousand species. The main harm to agricultural crops is caused by both insects and their larvae. In favorable conditions, insects actively reproduce, for which global warming of the world contributes. An important factor in this is that insects can give at least two to three generations per year. Scientists have estimated the loss of world agriculture from insect pests, the activity of which will increase due to global warming. Annual loss of wheat harvest reaches 59 million metric tons with the current production volume of 749.4 million metric tons. Together with rice and corn, the losses will amount to about 213 million metric tons. To combat pests of agricultural crops, chemicals are widely used - insecticides.

Insecticides are divided into the following main groups for penetration and insect damage:

- a) contact - the insect dies upon contact with a certain part of the body;
- b) intestinal - the insect enters the body with food and poisons the intestines;
- c) systemic - spreads through the vascular system of the plant and is poisoned when eaten by insects.

Fumigants - insects enter the body through the respiratory tract. Some insecticides often have physical effects, causing insect suffocation and death by blocking the respiratory tract. Mineral oils and crushed silica gels have this effect.

Fungicides generally fall into two main groups: fungicides for growing plants and fungicides for seed treatments. Before sowing seeds, they are treated to prevent various diseases.

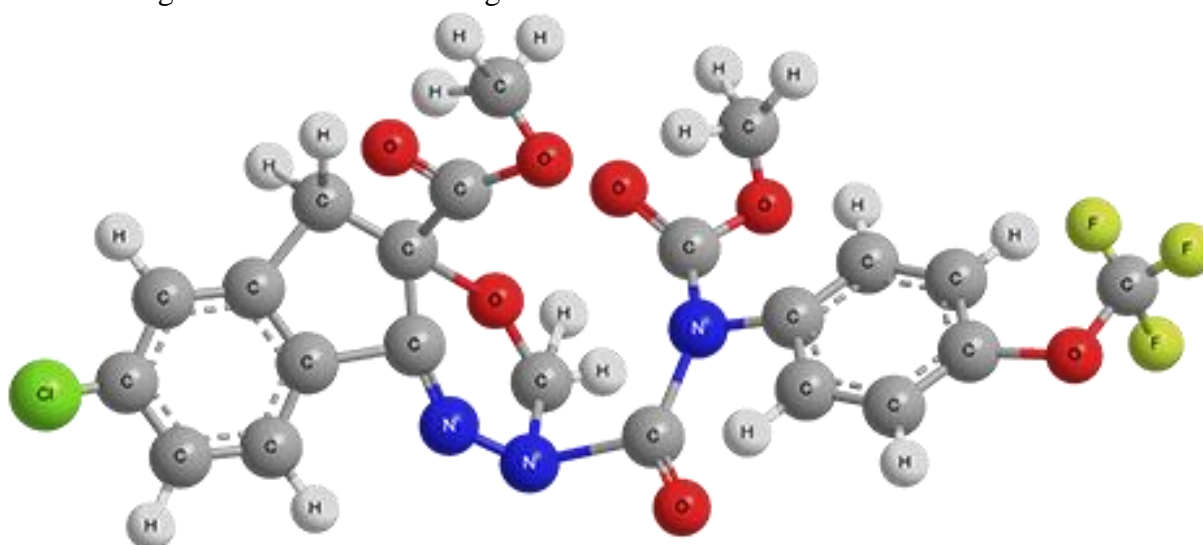
More than 1000 types of pesticides are used in the world, and only more than 300 of them are widely used in practice. It is believed that for the effective use of pesticides in agriculture in some industries and in the health care system, in addition to a strong physiological effect on various pests, they must have certain sets of properties, that is, their use should not have a negative effect on cultivated plants. Plant protection products against parasites must not adversely affect the plant, and products used against parasites in domestic animals must not adversely affect domestic animals. When used, chemicals should not have a negative effect on humans and household organisms.

When choosing pesticides and determining the rational way of their use, it is necessary to evaluate all the ways they enter the human body. Highly toxic substances (LD<sub>50</sub> 50 mg/kg) can enter the human body through the skin and inhalation and can be highly toxic. Industrial products and materials should be treated with relatively stable pesticides. They prevent pests from decaying over a long period of time. Other requirements for pesticides: maximum biological effectiveness against pests, low corrosion of equipment and low cost.

One of the promising insecticides is indoxacarb, a chemical active ingredient of pesticides from the oxydiazine class, used in agriculture and personal subsidiary plots to combat harmful insects, the empirical formula of which is C<sub>22</sub>H<sub>17</sub>ClF<sub>3</sub>N<sub>3</sub>O<sub>7</sub>.

Indoxacarb - [Methyl (R, S) - 7 - chloro - 2, 3, 4a, 5 - tetrahydro - 2 - [methoxycarbonyl (4-trifluoromethoxyphenyl) carbamoyl] indeno [1,2-e] [1,3,4] oxadiazine - 4a (3H) - carboxylate.

Consists of mixtures of S:R-isomers in a ratio of 3:1 or 1:1, the S-isomer is active. The S-isomer of the active ingredient is a white powder with a melting point of 140-141 ° C. Solubility in water <0.5 mg / l. The substance belongs to the chemical class oxadiazine.



**Spatial structure of indoxacarb**

Indoxacarb exhibits contact and gastric toxicity and is effective for larvae of all ages. The insect stops feeding within 0-4 hours, followed by paralysis.

Indoxacarb blocks the sodium channels of nerve fibers. Pest insects stop feeding. Their coordination is disturbed, then paralysis and death occur.

The drug based on indoxacarb has an ovicidal effect on some Lepidoptera. Studies have shown high oviciform activity in relation to the codling moth. Insect larvae do not hatch or die during hatching. The main factor for the manifestation of the ovicidal effect is moisture.

The insecticidal mechanism of indoxacarb is unique in that there is no cross-resistance to other insecticides. Indoxacarb is naturally toxic to mammals, livestock, fish and birds. It has a low residue in cultures and can be harvested on the second day after administration. This is especially true for crops such as vegetables or herbs, which will be harvested several times. Indoxacarb can be used for integrated pest management. The preparation based on indoxacarb is a highly toxic insecticide against harmful entomofauna.

However, the drug has clearly pronounced selective properties in relation to a certain group of phytophages, which necessitates a differentiated approach to its use. The duration of action of the

drug is 10-15 days. "Ifoda agro kimyo himoya" LLC (Uzbekistan) has developed an indoxacarb containing an insecticidal preparation - Entovant 15% k.s.

The drug will help effectively control various pests on crops such as grain, cotton, fruits and vegetables. The drug, the active ingredient of which is indoxacarb, is not phytotoxic for the treated crops. Has a high rain resistance. The drug "Entovant 15% c.w." are used against pests of apple (leaf rollers, codling moth), grapes (leaf rollers), rapeseed (rape flower beetle, cruciferous fleas), open field tomatoes (cotton scoop), onions (gnawing scoops). When used in personal subsidiary plots, Entovant 15% c.s. is very useful against pests of apple (leaf rollers, codling moth), grapes (leaf rollers), onions (gnawing scoops), open field tomatoes (cotton scoops).

The half-life of the active ingredient "Entovant 15% c.w." in the soil is 4-5 days. The drug "Entovant 15% c.w." has a positive temperature coefficient, an increase in ambient temperature increases activity. Oral LD50 for rats > 5000 mg / kg; LD50 cutaneous > 2000mg / kg. Does not irritate the skin and mucous membranes of the eyes of rabbits. The drug "Entovant 15% c.w." Harmful by inhalation and if swallowed.

Skin contact may cause sensitization. Acute poisoning is characterized by intoxication, impaired coordination of movement, tremor, hypothermia, irritating effect on the mucous membranes of the eyes and nose. The drug "Entovant 15% c.w." belong to the 3rd class of danger to humans and the 1st and 2nd classes of danger to bees.

Technological process for obtaining the drug "Entovant 15% c.w." consists in mixing the active substance indoxacarb with surfactants and other components in accordance with the recipe developed by "Ifoda agro kimyo himoya" LLC (Uzbekistan). The mixture of components is dispersed and crushed at a temperature not exceeding 40 ° C.

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