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**ECOTOXICOLOGICAL EVALUATION OF THE APPLICATION OF PESTICIDES UNDER KHERSON REGION**

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*Done ecotoxicological evaluation of pesticides in terms of the Kherson region, taking into account the type and extent of its pesticide hazards.*

**Key words:** ecotoxicological evaluation of pesticides, the gravity of pesticide, plant protection.

**Introduction.** The use of plant protection products to control pests is an integral part of modern technology of growing crops.

**Problem.** Kherson region is a major supplier of agricultural products to all regions of Ukraine. Difficult climatic and soil conditions require the use of modern means of plant protection for high and stable yields of grain as well as technical and vegetable crops. Unfortunately part of pesticides is a large number of substances harmful to plants, so you need to consider their toxicological effects.

**Analysis of recent research and publications.** The issues involved in plant protection scientists and Manfred Heinrich Dieter Herht (2001) in his writings [1]. Scientists Vasiliev, P. Dimitrenko, B. and L. tailor Bagel suggested empirical equations to calculate the danger range of pesticides during load planning plant protection measures, defined ahroekotoksykolohichnym index (AETI) [2].

**The purpose of research.** The study is an analysis of the current state of pesticides in the soils of the Kherson region and their ecotoxicological assessment.

**Results.** To preserve the favorable ecological situation in the local and regional scale, it is necessary to normalize the number and range of pesticides at levels corresponding to the intensity of self-purification agricultural landscapes. The best option of chemical plant protection measures set based on an analysis of three options: the properties of the drug, the quantitative load of the territory and the intensity of the schedule to the specific soil and climatic conditions. Properties range indicator used pesticides is their average degree of risk (PRS), which is calculated by the formula [2]:

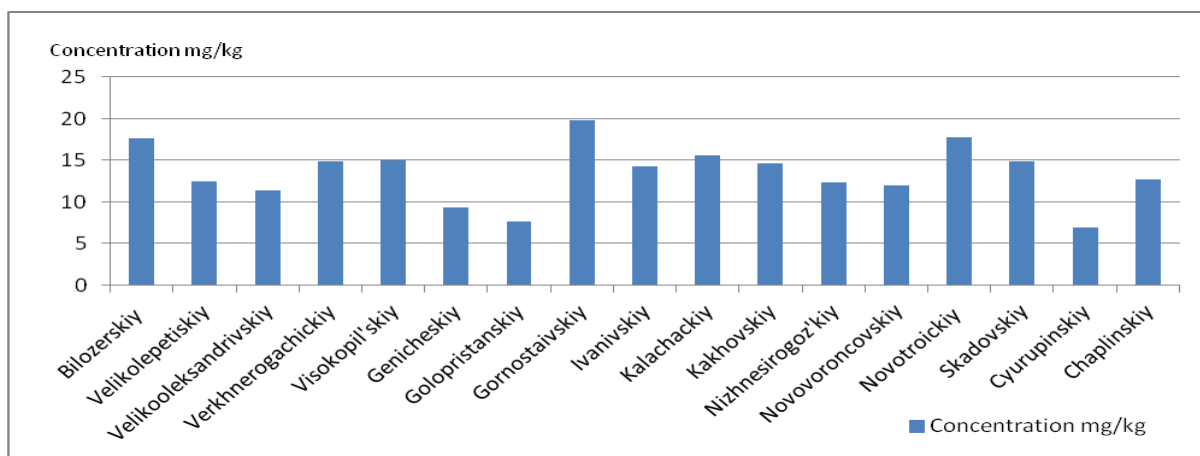
$$C_{CH} = \frac{C_{CH1}m_1 + C_{CH1}m_2 + \dots + C_{CHn}m_n}{M} \quad (1)$$

where  $C_{CH}$  - the gravity of that pesticide;  $m$  - scheduled or used the number one pesticide;  $M$  - the total amount of all pesticides  $C_{CH}$  - Integrated the gravity of the drug. Loading pesticides on the farm, the area measured ecotoxicological dose

(Dekt):

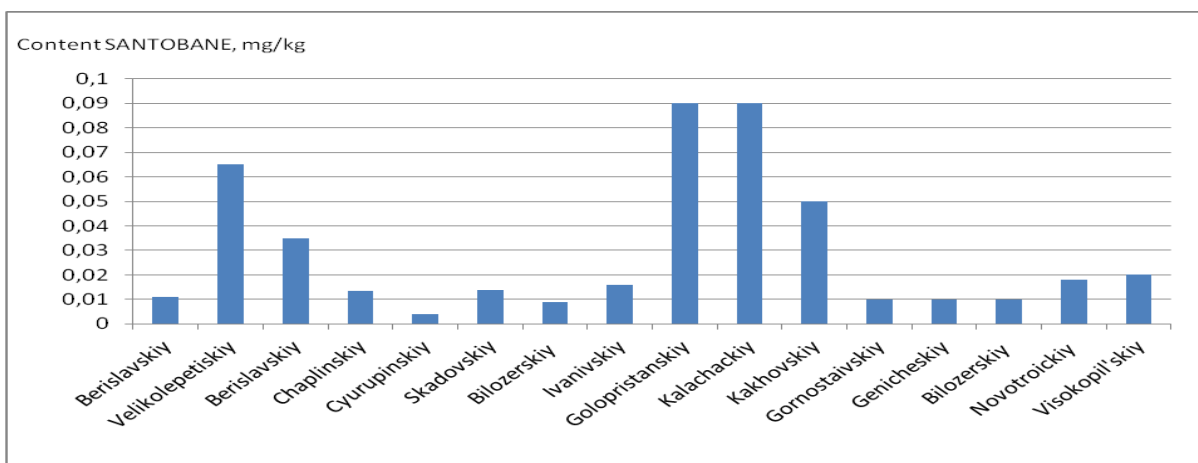
$$D_{ект} = \frac{M_c}{S} \quad (2)$$

where  $M_c$  - seasonal total consumption of pesticides, kg, liters;  $S$  - total arable area, ha. To assess the current state of pesticide in the soil of Kherson region has been used about the concentrations of pesticides in 2010, which is presented in Figure 1.



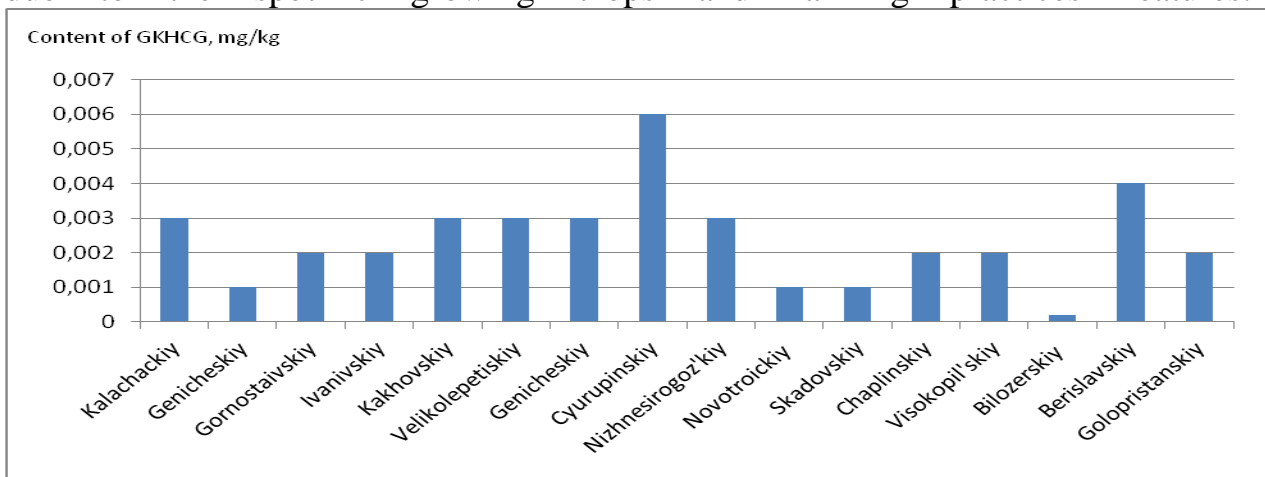
**Fig. 1.** Dynamics of pesticides listed in 2010.

The graph shows that the use of pesticides in 2010 in a district of Kherson region is uneven. Number of listed pesticides in different areas every year, is to increase the total mass used pesticides such breaks, and karbofos Hematoks that when used properly, provide high yields at relatively low cost and have a lasting effect. Mainly used pesticides that are characterized by contact and spectrum insecticides. However, not only continuous introduction of pesticides affect the quality of soils and their productivity. Pesticides that have been used in agriculture, such as DDT is still in the soils of the Kherson region in amounts that are high in some places, but not exceeding the MCL. In addition, DDT has toxic effects on living organisms at different levels of the food chain, which in some cases will inevitably suppress or gives effect to vital functions or entail the death of a living organism. Such effects on the environment may cause a change in the species composition of flora and fauna up to complete distortion of the food chain, which in turn can cause general crisis and cause irreversible ecosystem degradation of the earth. Since DDT was discovered in Antarctica, thousands of kilometers from the nearest place of use of this chemical. Analysis of soil farm field was conducted on the contents of persistent organochlorine pesticides (DDT, HCH) and 2,4-D, which are major pollutants of soil Kherson region. Analyzing the content of residual amounts of DDT (sum of metabolites) should note that 100% of the analyzed samples were contaminated by 45%. The maximum content was 0.046 mg / kg at maximum concentration limit of 0.1 mg / kg. For HCH (sum of isomers) exceeded MPC is detected, with 100% of the analyzed samples were contaminated by 48%. Discovered maximum content - 0,009 mg / kg at maximum concentration limit of 0.1 mg / kg. The level of contamination of the sample preparation of 2,4-D is 14.9 percent. The analysis of pesticide residues (HSC) in soils of the Kherson region showed that the drug HCH in the last 5 years of sharp changes in identifying the isomers is not observed. For the preparation of DDT remains a general tendency to reduce contamination of soils and reduce the amount exceeding the maximum allowable amounts. The content of the drug 2,4-D (amine salt) in soils in recent years dramatically reduced, due to the survey in previous years had contaminated areas. Determination of pesticide residues in soils in the Kherson region from 2009 to 2014 are shown in Fig. 2. This graph shows



**Fig. 2.** Content pesticide DDT by region Kherson region

that in areas of Kherson region in the determination of pesticide residues in soils of agricultural lands not exceeded the maximum allowable concentrations of DDT in soils and gardens in the Kherson region in some cases. Analyzing the chart given to the following conclusions. Maximum values of the pesticide DDT observed in the northern areas, the lowest in the western areas. The most common drugs found in soils DDT and its metabolites simazine, semeron, HCH and its isomers, STCA, atrazine. Also in the soils of the Kherson region accumulated a large number of HCH and its derivatives. Figure 3 shows the pesticides HCH by region, Kherson region. The graph shows that soil contamination is different in the Kherson region. Analyzing the chart given to the following conclusions. Maximum values of pesticide HCH observed in the western area of the region (Tsyuryupynsk), the least in most western regions. This uneven distribution seems due to the specific growing crops and farming practices features.



**Fig. 3.** Content of pesticide of GKHCg for to the districts of the Kherson area  
**Conclusions.** Kherson region is among the most loaded terms of growing crops. To obtain high and stable yields should use crop protection chemicals, and recommended the use of irrigation. Made ecotoxicological assessment leads to the conclusion of the minor soil contamination by pesticides Kherson region, which suggests the possible use of the area for the purpose of growing crops.

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## **ЭКОТОКСИКОЛОГИЧЕСКАЯ ОЦЕНКА ПРИМЕНЕНИЯ ПЕСТИЦИДОВ В УСЛОВИЯХ ХЕРСОНСКОЙ ОБЛАСТИ**

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**Ключевые слова:** экотоксикологическая оценка, пестициды, степень опасности пестицида, средства защиты растений.

Резюме

*Выполнена экотоксикологическая оценка применения пестицидов в условиях Херсонской области с учетом вида пестицида и ступенью его опасности.*

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Summary

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