

Hygienic Evaluation Of Oxiacetamide, Triazinone And Bipyrilidiums Herbicides Behavior In Soil, Prediction Of Ground Water Contamination Risk And Its Danger For Human Health

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Abstract

Pesticides pose serious threats to both human health and the environment. Ability of pesticides accumulate in the soil may lead to contamination of the environment (agricultural crops, ground and surface water).

Purpose of work was a comparative risk evaluation of the soil and groundwater contamination of Ukraine and other European countries with herbicides, as well as risk assessment of the adverse effects of these substances on human health while contaminated groundwater consumption.

We have studied the most widely used in agriculture perspective representatives of herbicides chemical classes: oxiacetamide (flufenacet), triazinone (metribuzin), bipyrilidiums (diquat).

Field hygienic experiments with studied active ingredients (a.i.) of pesticides were carrying out according to in different soil and climatic conditions of Ukraine which corresponds to different soil and climatic zones of Europe: Polissia (Kiev region or West and North Europe), Forest-steppe (Vinnitsa, Kyiv, Poltava region or Central and East Europe) and Steppe (Odessa, Kherson region or South Europe).

Prediction of possibility of pesticides migration into groundwater was carried out by: Groundwater ubiquity score (GUS) and Leaching potential index (LEACH).

For determination of potential risk to the environment and human health by drinking water containing the pesticide screening model of maximum concentration of a pesticide in groundwater determination SCI-GROW, developed by the Agency for Environmental Protection (EPA) USA, was used. For the evaluation of the parameters SCI-GROW - a method of comprehensive assessment including establishing of the maximum possible daily intake of pesticide with water and subsequently compared with acceptable daily intake of pesticide with water was used.

The results of field studies and evaluation of GUS index showed that risk of leaching into groundwater of herbicides based on metribuzin during application in soil and climatic conditions of Ukraine is a high (probably leached), flufenacet - medium and diquat – low.

SCI-GROW value for metribuzin 7.58×10^{-01} μ /day, flufenacet – 1.94×10^{-01} μ /day, diquat – 9.00×10^{-03} μ /day and daily intake with 3 L of water: 2.274 μ /day, 0.5820 μ /day, 0.0270 μ /day, respectively.

It was proved that the maximum possible concentration of studied classes herbicides in groundwater SCI-GROW significantly lower than allowable, which is associated primarily with low application rates and indicates the relative safety for human health when consuming water, which could be contaminated with test compounds.

Key words: groundwater, herbicides, risk, forecasting, health.