

Environmental Levels (Air and Soil) of Other Organohalogenes and Dioxins P302

HYGIENIC ASPECTS OF 2,4-D EMPLOYMENT IN UKRAINE.

M.G.Prodanchuk, R.Yu.Sova, E.I.Daviduk, S.V.Snoz
Medved's Institute of Ecohygiene and Toxicology, Kyiv, Ukraine.

It was determined that permanent using of 2,4-D group herbicides on the cereals crop rotation fields (0.8-1.5 kg per hectare) in the forest-steppe zone of Ukraine result in prolonged keeping of 2,4-D remains and products its degradation - 2,4-dichlorophenole (2,4-DCP) in environmental objects.

2,4-D degradation in environmental relates with biodegradation in agrobiocenose objects (plants and soil organisms). These organism absorb, metabolize and excrete 2,4-D and 2,4-DCP remains in the soil and pollute its active layer (to 0.0002 and 0.02 mg/kg, correspondingly). Increasing of the loading on the soil lead to slowing of 2,4-D degradation and in result itself purification ability decreasing. The accumulation 2,4-D and its high-toxic metabolite in the organism's tissues (worms, rodent, etc.) is accompanied with the decreasing of organisms total amounts and lead to ecosystem balance disruption.

2,4-D and 2,4-DCP remains migration from the agrobiocenose to environmental and pollute the agricultural production become the reason of these compounds entrance to the rural citizens organism. The main source of 2,4-D entrance was foods (0.006 mg/day). Considerable contribution during the harvest campaign in the fields carry in the air (0.001 mg/day). The entrance with drinking water was unimportant (0.0001 mg/day). The summary daily entrance of 2,4-D to the human organism during harvest campaign was more 10 fold and 2,4-DCP - 100 fold than permissible daily dose (0.00001 mg/kg b.w. daily).

2,4-D and 2,4-DCP levels in the blood and urine of agricultural workers during the harvest campaign are in the table 1.

Table 1.
2,4-D and 2,4-DCP levels in the blood and urine of agricultural workers.

Substance	Level, mg/L			
	Women		Men	
	Blood	Urine	Blood	Urine
2,4-D	0.0031±0.0007	0.0009±0.0006	0.0036±0.0010	0.0007±0.0002
2,4-DCP	0.0252±0.0075	0.0029±0.0003	0.0504±0.0012	0.0037±0.0005

After the harvest campaign the pesticides loading on the agricultural workers organism decreased and processes of metabolism and excretion of 2,4-D reduced.

The 2,4-D and 2,4-DCP levels are determined in the human milk too(table 2).

Table 2.

Environmental Levels (Air and Soil) of Other Organohalogenes and Dioxins P302

2,4-D and 2,4-DCP levels in the human milk and its daily entrance to the children's organism.

Substance	Level in the human milk, mg/L	Daily entrance, mg/kg b.w.
2,4-D	0.0006±0.0001	0.0003
2,4-DCP	0.0033±0.0009	0.0020

The results of table 2 demonstrate that 2,4-D and 2,4-DCP daily entrance with mother's milk to rural child was more few fold than permissible normative (FAO/WHO) [1].

2,4-D and 2,4-DCP levels in the bioliquids of rural citizens indicate to possibility of risk rise for adult and children's rural population health, especially during harvest campaign.

Our results good conform with WHO results. For example, in USA districts of regular 2,4-D using the 2,4-D remains in the soil kept prolonged time and it had been determined in the level less than 1 mg/kg in the more than 10 per cent probes. 2,4-D level in the drinking water was from less than 0.0001 to 0.0039 mg/L. In the 40 per cent of air probes the 2,4-D contain on the level - 0.00001 -0.0001 mg/m³. In the case of 973 human urine probes (workers, which working on the fields and parks) the 2,4-D amount was in the range: less than 0.001 mg/L (735 probes), less than 0.1 mg/L (211 probes) and more than 1.0 mg/L (27 probes) [1].

The scientists of the Institute of rural hygiene (Saratov, Russia) defined the considerable contribution in the human organism 2,4-D accumulation carry in: "long-term" component of 2,4-D excretion from organism (about 1 per cent entrancing 2,4-D is excrete into the human organism with halfexcretion period 240-280 days) and "pick" 2,4-D remains in the foods [2]. These results conform with our investigations, too.

References.

1. Hygienic criteria of environmental state. 29. 2,4-Dichlorophenoxyacetic acid (2,4-D). Geneva. WHO, 1987. P.132.
2. Gerstein E.G. The transport kinetic and statistical model of accumulation of 2,4-D group herbicides in the mammals organism/ Thesis for seeking of scientific degree of candidate of biological sciences. Kyiv,1990. P.23.