

## Some aspects of pesticides utilisation in Byelorussia

Sergey V. Soroka, Aloiz F. Skuriat, Piotr M. Kislushko

Byelorussia Scientific-Research Institute of Plant Protection

223011, p. Priluki, Minsk region, the Republic of Belarus

Phone /Fax: +375 172 5992 339, Email: weeds@belizr.belpak.minsk.by

More than 65 noxious pestspecies, 100 types of plant diseases, and 40 weed species can damage agricultural crops, under Byelorussian conditions with a damp and lukewarm climate dominance. The potential yield losses, when the effective protection is absent, amount to 25-30%. Therefore in order to avoid yield losses and the decrease of its quality against the harmful objects, alongside with agrotechnical methods, from the sixties onwards, chemical agents for plant protection are widely used. Predominantly, preparations from the chloroorganic group (DDT, HCH, aldrin, dieldrin, polychlorpinen, polychlorcamphen and others) have been used for more than twenty years.

After their restriction and prohibition, large sets of preparations were utilised by the only one feasible option at that time - disposal in landfills. There are 7 such landfills on the territory of Byelorussia located in 5 areas besides the Minsk oblast. The total quantity of landfilled pesticide waste for the period of 1971-1988 is 4,108.3 tonnes of obsolete pesticides. The landfill locations and their volumes are presented in Figure 1.



Figure 1. Places of landfilling and volumes of obsolete pesticides in the Republic of Belarus

Among the landfilled pesticide wastes, some human carcinogens are found which are persistent and highly accumulative in the environmental compartments. Therefore, during 1988, the dumping of obsolete pesticides in landfills was prohibited in Byelorussia.

The evidence of the presence of carcinogenic types of pesticides can be found in the list of pesticides disposed in one of the landfills in 1974 in the Slonim region of the Grodno area (Table 1).

During 1990, the Ministry of Natural Resources and Environmental Protection organised a partial inspection of landfills storing pesticides in Belarus. It was noticed that the landfills storing pesticides, in the course of time due to possible partial leakage, started to create a certain hazardous environmental impact especially to the upper groundwater aquifer. Moreover, the remediation activities have not been carried out in any of these landfills.

After dumping of obsolete pesticides in the landfills had stopped in 1988, the accumulation of obsolete preparations continued in agricultural crops. Therefore, under the assistance and financial support of the Danish Environmental Protection Agency as part of the DANCEE Programme (Danish Cooperation for Environment in Eastern Europe), the inspection and inventory of the amount and assortment of the stored obsolete pesticides in the landfills was made during the period 1997 - 1998. The inventory was made together with the experts of the interested ministries and departments of Byelorussia.

It was also determined that alongside with the 410 tonnes of pesticides disposed in landfills, 1,220.3 tonnes of obsolete plant protection agents were accumulated in agricultural warehouses and trading enterprises.

In this context the question of today is their utilisation by the most economic and ecological safe method. Based on the analysis and critical assessment of possible ways of utilisation (landfilling, incineration in cement kiln, incineration in glass kiln or in plasma reactor), the method of incineration in a cement kiln at one of Byelorussia Grondo area plants was suggested and selected. This involved three Danish consulting companies: Danish Technological Institute, the companies of COWI and DANCEM and Byelorussia Scientific-Research Institute of Plant Protection. It is planned to carry out the incineration as a pilot project for a limited amount of 49 tonnes of obsolete pesticides with the controlled measurements of gaseous emissions to air and of the cement quality.

In case of safe application and the absence of negative consequences for the quality of cement parameters during the incineration process, the technology of pesticide wastes incineration in cement kilns, which is also considered the most acceptable, could be adopted to solve the problem of pesticides utilisation in the territory of Byelorussia.

No	Pesticide product	Quantity in tonnes	No	Pesticide product	Quantity in tonnes
1	2,4-D am salt	10.4	24	Entobacterin	0.1
2	2,4-D butyl ester	2.9	25	Estersulfonat	14.7
3	2,4-D sodium salt	9.3	26	Fozalon	0.1
4	AB preparation	1.7	27	HGH, 12% dust	1.8
5	Azotox	10.0	28	Granozan	0.9
6	Carbofos	0.1	29	Imported seed protectant	5.5
7	Carbolineum	0.5	30	Keltan	27.8
8	Cineb	1.0	31	Metafos	0.6
9	Ciram	6.3	32	Methylnitrofos	0.8
10	Copper chloride oxide	0.9	33	Mixture	3.6
11	Copper sulphate	1.0	34	Nitrofen	2.1
12	Copperas	0.8	35	Polichlorpinen	1.2
13	Dalapon	0.2	36	Preparation No.30	0.2
14	DDT 5,5% P	278.6	37	Prometrin	0.3
15	DDT 50% LP	27.8	38	Schweinfurth green	0.8
16	DDT 70% LP	77.1	39	Simazine	1.2
17	DDT EC	1.6	40	Sodium rodane Cu salt	16.3
18	DDT technical	0.9	41	Sodium sulphate	7.8
19	DDT, 30% WP	61.2	42	THAN	2.6
20	DHM	1.3	43	TMTD	18.8
21	Dicotex 80%	4.5	44	Tur	5.4
22	Dicotex 70%	5.5	45	Tvofos	0.2
23	Dicotex 40%	3.5	46	Zinc phosphide	0.7
<b>Total</b>					<b>620.6</b>

Table 1. Obsolete pesticides landfilled in 1974 in the Slonim region of the Grodno area.