

LEVELS IN THE ENVIRONMENT

EXPERIENCE OF USAGE DDT IN SOVIET UNION AFTER ITS "BAN"

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Introduction

"Soviet period" of DDT began in 1946-1947 years, when its manufacture was adjusted in Moscow and Vurnary (Russia, Chuvash Republic). During 1950-1970 DDT was intensively used in amount more than 20 thousand tons in a year. It has resulted in the serious pollution of large areas, dangerous levels of contamination of the food and biological tissues of the inhabitants, especially of children.

Since 1969-1970, according to the recommendations of international organizations, DDT was excluded from the official "List of chemical and biological means of pest control, recommended in an agriculture in the USSR".

However after 1970 situation in USSR with DDT contamination of soil and food in USSR was not improved, but became worse. It can be shown, for instance, by consideration of residual amounts of pesticides in soils and in food.

Some authors explain such deterioration of a situation with DDT by its global atmospheric circulation. As a reference they used calculated data¹⁾ about annual fall about 500 metric tons DDT on the territory of USSR. However these tons DDT hardly have solely atmospheric, and furthermore foreign origin. Local jumps of DDT level in 1980-th were too large in different regions of USSR.

There was another reason.

Situation after 1970

After "ban-1970" the DDT production and usage were not stopped in Soviet Union, but proceeded in the confidential mode. The scales of DDT production not only were kept, but also were extended at the plant in Novocheboksarsk (Chuvash Republic). Even in 1986, through 16 years after "interdiction", the volume of own DDT production in USSR was not less than 10 thousand metric tons.

The volumes of DDT use have also extended after "ban". For instance, in Uzbekistan only for period from 1970 till 1983 were used more than 70 thousand metric tons of DDT "by way of exception" and up to 1987. In other regions occurred most. Everywhere DDT usage was proceeded till the end of 1980-th. Total DDT burden on 1 hectare of ground reached up to 85 kg.

Here are some data on DDT usage (metric tons) in those regions of Russia, where it was applied very little²⁾:

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Belgorod region	1982	28,9
Voronezh region	1982	4,1
Kursk region	1978	14,5
	1982	19,9
Lipetsk region	1978	8,4
Samara region	1987	2,9
Tambov region	1978	36,6
	1979	23,4

Contamination of soils

As a result of further use of DDT after 1970 the degree and amount of soil contamination DDT/DDE remained practically constant. Approximately 15-20 % of the surveyed areas of former USSR remained polluted²⁾ for the long years.

The list of regions, which have appeared the most polluted with DDT in 1970-1980-th, usually include Azerbaijan, where the excess of hygienic standard is 6-44, Armenia - 5-26, Uzbekistan - 10-85 (cotton-plants), Tadjikistan - 10-21, Primorskii Krai (Russia) - 5-21 etc³⁾.

It is necessary to remember, that operating with values of excess of hygienic standard is not so correct because it was defined for soil as 0.5-1 ppm in 1960-1970-th and was reduced to 0.1 ppm after 1981.

In a number of regions the soil contamination by DDT and its metabolite DDE reaches 50-80% (Azerbaijan, Uzbekistan, Kirghizia and etc.). The soils of Moldavia contain nowadays about 1000 metric tons of DDT, mainly under old gardens. Now at these old gardens there are placed new cultures, including those, which are capable to take DDT from soil and to accumulate it in dangerous quantities. A situation with soil contamination shown in table 1.

Table 1. Levels of contamination by p,p-DDT of soils under gardens in 1981-1984 (ppm)³⁾

Regions	Years			
	1981	1982	1983	1984
Armenia	0,65		2,96	0,72
Moldavia	0,71	5,32	2,53	3,25
Russia (Central-chemozem zone)	0,62	0,16	0,56	0,89

It is evident, that the decrease of soil DDT contamination after 1970 was not observed. The similar sharp jumps in DDT levels occurred not only for gardens, but also (depending on region) for soils under vegetable cultures, vineyards, kitchen gardens, tea plantation etc.⁴⁾

Thus, the steady pollution of environment by DDT and its metabolite DDE is inevitable.

In this connection it is incorrect to explain an existing situation with DDT by the additional reasons except obvious. In report⁵⁾ is proposed, that if after "DDT ban" the contamination of human fatty tissues of the people in USSR by DDE (the product of its metabolism) was not reduced, but grew, so "there is another, besides DDT, source of DDE receipt in human organism". This source is suggested to be dicofol, which transforms in the environment not only to benzophenone, but also to DDE (in reductional conditions) and which "is recommended for use in USSR without restrictions". Actually "recommended" dicofol was not widely adopted in USSR, in difference to other countries, and so could not become a serious reason DDE formation in the environment. It is enough to tell, that in Voronezh, Belgorod, Tambov, Lipetsk and Kursk regions, where DDT was actively used many years after "ban", dicofol was not used at all, and in Samara region - in negligible quantities²⁾.

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Food

After 1970 in USSR was revealed not decrease, but increase of frequency of DDT detection in food: so in 1973 in meat fat DDT was found in 1.5% of samples, in 1974 - in 5.35%, in 1975 - in 8.1%. DDT also was found in 5-10% of samples of grain-crops and potatoes (concentration range was 0.05-1.11 ppm)⁶⁾.

This tendency has remained up to 1990. So, in 1988, in USSR as a whole, in 30% of samples of children's dry milk DDT was 5 times higher than the most allowed value (MAV). In 1989 in USSR DDT was found in 52% of samples of dietetic butter in concentration above 5 MAV.

Nominally in former USSR residual DDT quantities in meat, butter, milk, eggs "were not admitted" in general. However, as DDT was actually determined all time in meat-milk food, there was a system of temporary sanctions. For example "temporary" MAV (ppm), used during 15 years after "DDT ban" in USSR, were these: for milk, children's and dietetic food - 0,05, for eggs, meat - 0,1, canned fish - 0,2.

Table 2 illustrates data, concerning to Armenia.

Table 2. DDT contamination of food in rural districts of Armenia in 1977-1983⁷⁾

Food	Percent of tests, in which DDT was found out	Average DDT concentration, ppm
Milk	26,5	0,123
Butter	28,9	0,175
Cheese	25,5	0,144
Sour cream	39,0	0,144
Cottage cheese	17,7	0,106
Beef	24,9	0,142
Meat of poultry	29,8	0,162
Eggs	37,2	0,187

Background

The adduced data do not deny certain pollution of territory of former USSR owing to global DDT circulation: it is a constant planetary factor of soil pollution. Annually about 30 g DDT fall out from air on each km² of a surface at any point of USSR, and a layer of soil of 20 cm thickness contains about 300 g DDT⁸⁾ on each hectare. The comparison of data on DDT contents in agrocoenosis with those in located nearby reserves "Michailovskaja tselina" and "Ascania-nova" (table 3) shows its accumulation in an environment.

Considering, that the factors of DDT accumulation are huge and reach tens of thousands of time, and the period of complete DDT destruction covers many tens of years, becomes clear that tremendous damage, which DDT brought and will render to a nature of our planet still many decades. Unfortunately in global DDT pollution of the environment one of major factors is use of DDT in former USSR, especially, in years after "DDT ban".

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Table 3. DDT concentrations (ppm) in soils of protected and nearby located territories of forest-steppe (reserve "Michailovskaja tselina") and steppe ("Ascania-nova") regions of Ukraine in 1984-1985⁹⁾

	Steppe zone		Forest-steppe zone	
	Reserve	Nearby agrocoenosis	Reserve	Nearby agrocoenosis
Soil	0,00001	0,00009	0,00001	0,00007
Flora	0,004	0,007	0,004	0,008
Field-vole (fat)	0,88	2,59	-	-
Wood mouse (fat)	-	-	1,76	3,64

Conclusions

Despite official declarations about "ban", actually DDT existed in real life of USSR after 1970 in more active mode than before.

With the account of the extremely large DDT stability the main consequence of its wide usage in USSR after 1970 is that a contamination problem of territory of former USSR shall not disappear many-many years.

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