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DDT RESIDUE PROBLEMS ON VEGETABLES

by

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DDT RESIDUE PROBLEMS ON VEGETABLES

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One of the more serious problems arising from the use of DDT on food crops is the existence of residues resulting from excessive applications. This discussion will indicate the limits of DDT residue that may be tolerated, and what may be expected under various conditions.

DDT Less Poisonous than Other Common Insecticides:

The acute poisonous or toxic action of DDT on humans is relatively low. It is much less poisonous than the older insecticides such as the arsenicals, fluorides, and nicotine. Care must be taken in using DDT sprays or dusts, however, to avoid excessive residues on any food crops treated because of the possible chronic effects or hazard to health that may result from eating foods daily over a period of time that contain enough of the toxic spray to be injurious eventually to health.

Obviously, DDT residues on food products must be far below the amount that may cause a health hazard to humans. At present up to 7 ppm (parts per million) are allowed on apples and pears by the U. S. Food and Drug Administration. Extensive toxicological studies have indicated that this amount is too high if food is consumed daily carrying that amount of residue. Every effort should be made to not exceed about 3.0 ppm at harvest. When food crops carrying this amount of residue are processed by either freezing or canning, only traces have been detected chemically. It is very important that recommendations be followed closely.

Several Factors Influence DDT Concentration:

The amount of DDT residue on food crops at harvest time depends on several influencing factors. These include the concentrations of the dusts or sprays used; the amount applied per acre; the particular DDT formulation used; the length of time between the date of application of the DDT and harvest; the surface area of the food crop, such as spinach, in relation to weight. On a commercial scale, the amount of DDT applied per acre may be controlled accurately by proper adjustment of the duster, the speed of the machine during operation, and use of the recommended DDT dust formulation. When hand-operated dusters are used, more care should be taken in order to avoid heavy, uneven applications.

For the past several seasons, chemical analyses have been made by the chemistry department of the Oregon Agricultural Experiment Station to learn the amount of DDT residues that remain on various food crops at harvest after dust or spray treatments for the control of insect pests. Analyses of these food crops after

washing and blanching before freezing and after processing for canning show that these treatments further lower the trace of residue left on them. Only limited studies have been made on the effects of processing in removing the residues and definite conclusions will be presented when future work has been completed. The following table shows a few representative analyses for the amount of DDT residue on some food crops at harvest that had received dust treatments as indicated. Some results are also included indicating high deposits from dust treatments that are unnecessary for effective control.

DDT Residue on Vegetables at
Harvest and on Processed Food

Vegetable	DDT dust used	Time between last dust and harvest	DDT parts per million
Asparagus	5%	56 hours	5.9
"	"	" " and processed	1.7
Beans	3.0%	72 hours	.6 to 1.8
"	"	" " and processed	negative to .3
"	"	" " (overhead irrigation before last application)	.9
"	5.0 oil	" "	4.1
Broccoli	5.0%	12 hours	10.2
"	"	56 " and processed	4.8
Corn	5.0%	3 weeks	.0 to .4
"	"	" " and processed	negative
Peas	5.0%	7 days (from viner)	trace
"	"	" " and processed	negative
"	3.0%	10 " (hand picked & podded)	negative
(Pea vines)	5.0%	7 " (from viner)	.8 to 22.0
Tomatoes	3.0%	7 weeks (when 1" in size)	negative
"	"	1 week (full size)	1.8

Comment on Residue Analyses:

The chemical analyses made for DDT residues on different vegetables were on samples obtained both from experimentally treated crops and from commercial vegetable growers. The results are averages of several samples taken at different times, different localities, and in some cases, during several seasons. Suggestions are made for the use of DDT on different vegetables as follows:

Asparagus--When a 5 percent DDT dust is used on asparagus, as high as 5.9 ppm was found when the last application was made 3 days before harvesting. After processing for freezing, the residue was lowered to 1.7 ppm.

Beans--Dust treatment for the 11-spotted cucumber beetle on beans should not be made after the bean pods are about 3 inches long. Analyses of different samples show a wide range in deposit of DDT but low enough not to be considered excessive. After processing, averages show below .3 ppm. Overhead irrigation apparently removes part of the dust and lowers the amount present at harvest. One analysis is shown where 5 percent DDT plus oil was used which left a deposit at harvest of 4.1 ppm. This is an example of a dust treatment that deposits an excessive amount of DDT and yet in no way increases control of the insect. A 3 percent dust is effective for the purpose and future investigations may show that 2 percent is sufficient.

Broccoli--Analyses for residues on broccoli indicate that a 5 percent dust deposits excessive amounts of DDT and treatment should be avoided after the heads form. The large, irregular surfaces of cauliflower and broccoli, especially Italian broccoli, retain excessive amounts of the dust.

Corn--When the silks of corn were heavily dusted with DDT and the corn analyzed at harvest time, after husking, only traces of the residue were found, due probably to contamination by normal handling. After washing and blanching for freezing, negative results were obtained.

Peas--DDT dust may be used on peas without danger of residue on the edible product. Analyses showed a trace present on samples of peas taken from the viner but this was due to contamination with the vines that carried the residue. After processing for freezing and canning, analyses gave negative results.

Pea vines that have been dusted with DDT may carry heavy deposits of the insecticide, depending upon climatic conditions. These pea vines should not be fed to milk cows since the DDT enters the fat of the milk in amounts that may be considered a health hazard to children.

Tomatoes--Tomatoes may be dusted freely with DDT formulations for the control of the flea beetle and the cucumber beetle until the fruit is about an inch in diameter. Thereafter, one application of a 3 percent dust may be made on the full-sized tomato without exceeding residues in excess of 2.0 ppm. Processing further reduces the DDT to amounts varying between a trace and .5 ppm.

Potatoes--DDT preparations may be used on potato vines without danger of contaminating the potatoes. Chemical analyses for DDT that might have been washed by rain down the stalk of the plant to the potato gave negative results.

Spinach, lettuce, beets, and other leafy vegetables--DDT should not be used on leafy vegetables. The large leaf area permits a heavy deposit per unit weight of the vegetable. A 3 percent DDT dust may be used on beets for the control of beetles, providing the tops are not to be used for greens or salads.

Squash, pumpkin and melons--A three percent DDT dust may be used on these products in accord with recommendations for the control of the 11-spotted cucumber beetle. The outside rind of the cucurbits is not eaten and no residue complications result.