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COMPATIBILITY OF INSECTICIDE THIODAN WITH SOME AGROCHEMICALS

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Thiodan and agrochemicals viz. urea, zinc sulphate compatibility can be known by two type of experiments – Field experiment and laboratory experiment. In field experiment mixture of Thiodan + urea, Thiodan + zinc sulphate is applied on paddy jaya. However there is no significant increase in the yield because there was no incidence of insect-pests or weeds on the crops. In laboratory experiment pH, emulsion stability and active ingredient values after testing a regular intervals are verified. So, combinations are compatible with each other.

KEY WORDS : Thiodan, insecticide, compatibility, urea.

INTRODUCTION

It is well known that modern agricultural system, the stress is given on high yield of crop to meet out the emerging demand due to increase in population. To get more production different type of insecticides, herbicides and fertilizers are used. It is well known that insecticides are used to control the unwanted insects, herbicides to remove weeds and fertilizers to remove minerals deficiency. Work of Jain and Agnihotri (1981) has shown that stable mixtures of fertilizers and pesticides can be easily prepared for commercial use to increase crop yield. Among various factors known to affect the yielding potential of the crops nutritional deficiency in soils, insect-pest infectification. It was therefore planned to conduct studies on the tendency of insecticides to coexist with some agrochemicals.

In the earlier work, Singh and Chauhan (2000) revealed that endosulfan is compatible with urea showing no adverse effect on yield. It has also been seen by Singh and Chauan (2001) that endosulfan and urea as well as endosulfan and 2, 4-Dare compatible with each other. Pandey, Agnihotri and Jain (1983) supported that organochlorine insecticides formed more stable mixtures of fertilizers in comparison to organophosphorus insecticides. Lokesh and Shetty (1996) concluded that D.A.P. with muriate of potash remained highly compatible with Apron fungicide in persisting the efficacy of fungicides against Bajara dowry mildew. In present studies, we use Thiodan to find out compatibility with urea and zinc sulphate. Urea being nitrogenous compounds has its own specific influence on plant growth whereas thiodan checked the insect pests which are harmful to main crop.

MATERIALS AND METHODS

The present study is divided in two parts, field experiments and laboratory experiments. Field experiments were carried out at Quarsi Agricultural Farm, Aligarh on paddy jaya. It was grown in kharif season. To find out optimum requirement of insecticide, thiodan 35 EC with

urea and Thiodan with zinc sulphate sprays were applied on paddy crop on 20 Sept. in different combinations. Paddy crop was harvested and threshed on wooden plane on 20 Nov. and weighed. Laboratory experiment was also prepared to test emulsion stability, pH and active ingredient of thiodan. The emulsion was prepared by mixing the desired concentrations of thiodan 35 EC with urea and zinc sulphate.

Thiodan	0.25%	0.5%
Urea	2%	4%
Zinc sulphate	2%	4%

The observations regarding the change in pH, emulsion stability and active ingredient were made after regular intervals.

Determination of Thiodan : It is determined as 4.8 gm and 9.8 gm of thiodan was weighed separately and transferred into two beakers. It was diluted upto 1500 ml, by adding tap water. Then 500 ml emulsion was put into beaker for laboratory observations. 20 ml emulsion each from top and bottom was taken in conical flask after required intervals of time separately from each beaker.

40 ml methanol and 5 gm sodium hydroxide pellets were introduced in each conical flask. The contents of flasks were digested for three hours on sand bath, than it was allowed to cool and washed with distilled water. The contents of flask were neutralized with 5N sulphuric acid, added in excess. It was titrated immediately with N/20 iodine using starch as indicator.

RESULTS AND DISCUSSIONS

It is well known that compatibility of pesticides/insecticides with other agro- chemicals can be decided on the basis of their positive effect in crop yield and some other chemical properties of combination viz. emulsion stability, pH and a.i. of pesticides in combination etc.

In the present investigation, Table-1 indicates that at field rate application of thiodan did not increase the yield of paddy significantly when applied with urea. The fact was that there is no incidence of insect pests. This finding reveal that thiodan did not show any growth promoting property. On the other hand by application of thiodan, zinc sulphate with urea showing significant increase over control. It is due to the urea which was, in itself growth promoting substance.

Application of thiodan in combination with urea increase the pH with time, table-4 shows a constant increase in pH i.e. 7.6 to 8.4 was observed when emulsion of thiodane and urea was allowed to stay for a period of 18 hours. But table-5 shows pH range 6.3 to 5.6.

The emulsion of Thiodan should not be kept more than two hours because its stability disturbed. Therefore combination of thiodan + urea should be used within two hours of preparation. Table-6 concludes thiodan is concentrated more at bottom. However, work of, Sardana and Verma (1987), has proved insecticide and fertilizers applied alone as well as together significant increase the yield.

Table 1. Grain yield, Jaya (kg/plot and Q./ha/) under sprays of Thiodan, urea and zinc sulphate

S.No.	Treatment	Mean yield (kg*/ plot)	Yield (Q./ha)
1.	T_1	8.062	40.62
2.	T_2	7.562	37.71
3.	T_3	7.00	35.00
4.	T_4	7.687	38.75

5.	T_5	7.25	36.25
6.	T_6	8.50	43.22
7.	Control	7.00	35.00

T_1 = Urea @ 20 kg/ha
T_2 = Zinc sulphate @ 10 kg/ha.
T_3 = Thiodan @ 1.5 lit./ha.
T_4 = Thiodan + Urea
T_5 = Thiodan + zinc sulphate
T_6 = Thiodan + zinc sulphate + urea
*Plot size = 5 x 4 m (20 sq.m.)

Table 2. Emulsion stability of Thiodan with urea

S.No.	Combination	After 30 minutes		After one hour		After two hour	
		Top (ml)	Bottom (ml)	Top (ml)	Bottom (ml)	Top (ml)	Bottom (ml)
1	A + X	0.1	Nil	0.1	Nil	0.2	Nil
2	B+X	0.2	Nil	0.2	1	0.3	5
3	A+Y	0.1	Nil	0.2	Nil	0.2	Nil

A = 0.25% thiodan in 50 ml
B = 0.5% thiodan in 50 ml
X = 2% urea in 50 ml
Y = 4% urea in 50 ml

Table 3. Emulsion stability of Thiodan with zinc sulphate

S.No.	Combination	After 30 minutes		After one hour		After two hour	
		Top (ml)	Bottom (ml)	Top (ml)	Bottom (ml)	Top (ml)	Bottom (ml)
1	A + P	0.2	9	0.4	10	0.5	12
2	B+P	0.2	10	0.2	11	0.3	12
3	A + Q	0.2	13	0.5	14	0.9	16
4	B + Q	0.2	13	0.2	15	0.3	16

P = 2% zinc sulphate in 50 ml
Q = 4% zinc sulphate in 50 ml

Table 4. Change in pH of Thiodan with urea

S.No.	Combination	After one hour	After 1.5 hour	After two hour	After 18 hours
1	A+X	7.6	7.8	8.0	8.4
2	B+X	7.6	7.8	8.0	8.4
3	A+Y	7.6	7.8	8.0	8.4
4	B+Y	7.6	7.8	8.0	8.4

Table 5. Change in pH of Thiodan with zinc sulphate

S.No.	Combination	After one hour	After 1.5 hour	After two hour	After 18 hours
1	A+P	6.0	6.1	6.2	5.6
2	B+P	6.3	6.3	6.3	6.3
3	A+Q	5.8	5.9	6.1	5.6
4	B+Q	5.9	6.0	6.1	5.8

Table 6. Distribution of active ingredient in 20 ml Thiodan emulsion

S.No.	Combination	After zero hour		After one hour		After two hour		After four hour	
		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
1.	α	0.190	0.204	0.190	0.210	0.578	0.228	0.160	0.234
2.	β	0.019	0.020	0.018	0.022	0.017	0.023	0.016	0.024

α = 16 gm of thiodane equivalent to 5 gm actual dissolved in 500 ml tap water.

β = 3.2 gm of thiodan equivalent to 5 g actual dissolved in 50 ml tap water.

Conclusion

On the basis of above discussion and tables given, indicates that thiodan and urea as well as thiodan and zinc sulphate compatible with each other. However these combinations was not showing significant positive effect on yield but chemical properties favours their compatibility.

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