EFFECT OF SOIL APPLICATION OF ALDRIN AND GAMMEXANE ON GERMINATION, GRAIN YIELD AND QUALITY OF SOYBEAN (*GLYCINE MAX*)

by S. SINGH[1] *and* C. P. SINGH[2], *Faculty of Agriculture, Banaras Hindu University, Varanasi-221005*

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In the field study, soil application of 10 per cent of aldrin and gammexane at the rate of 10, 20 and 30 kg/ha significantly increased the germination percentage and oil content of soybean over control. The crude fibre content was also significantly increased with the application of gammexane, but this increase was seen only upto the dose of 20 kg/ha. No clear effect of aldrin application was noted on the crude fibre content. An irregular increase was also observed in protein content of soybean with both the insecticides but the highest dose of gammexane adversely affected the protein content. Regarding mineral matter content of soybean, a non significant decrease was noted with increasing doses of aldrin. On the contrary, gammexane showed an inverse effect. No clear effect of insecticidal treatments was observed on the carbohydrates content of soybean.

INTRODUCTION

There are several reports in literature regarding the yield of various crops as affected by insecticides but little is known about their effect on quality (Brindley *et al* 1950 and Chatterji and Sarup 1960). Hashimoto (1967) reported that PCP depressed the early growth and delayed the ripening. Davis and Kasule (1964) working with menazon reported that spraying of this insecticide increased the yield and improved the quality of groundnut. Aldrin and Gammexane are most commonly used for the control of soil borne insects in various crops. This investigation was undertaken to study their effect on the germination, yield and quality of soybean.

EXPERIMENTAL

The experiment was carried out at the Agricultural Farm of Banaras Hindu University, Varanasi. A randomized block design was followed, having net individual plot size of 27.94 sq.m. Treatments of 10 per cent aldrin and gammexane were given @ 0, 10, 20 and 30 kg/ha and replicated four times. Manurial requirements of N_2, P_2O_5 and K_2O @ 25, 60 and 40 kg/ha in the form of Calcium Ammonium nitrate, Superphosphate and Potassium Sulphate respectively were supplied. Insecticides and fertilizers both were applied at the time of sowing. Soybean variety Clark's 63 was sown in rows 45 cms apart. Plants within row spaced 10 cm apart

[1]*Present address :* Senior Professor and Head of the Department of Soil Science and Agricultural Chemistry, Faculty of Agriculture, B.H.U.

[2]Research Scholar, Deptt. of Soil Science and Agricultural Chemistry, Faculty of Agriculture, B.H.U.

by thinning. The plants of individual plots were harvested and the grain yield was recorded in quintals per hectare and composite samples from each treatment were analysed for oil by Soxhlet extractor and protein and mineral matter by Piper (1950). The crude fibre and carbohydrates were determined by methods described by Kanwar and Chopra (1967).

Along with the experiment a laboratory experiment was also carried out to see the effect on germination percentage in which 32 petri dishes were arranged in the same manner and water containing required amount of insecticides and fertilizers was filled up in each petri dish except control petridishes in which only water containing fertilizers was filled. Ten healthy seeds of Soybean were merged in each petri dish and experiment was continued till the germination and the germination percentage was recorded.

Results and Discussion

The application of aldrin and gammexane significantly increased the germination of soybean (Table I), there was gradual increase in germination with increasing doses of both the insecticides. From perusal of data it is clear that gammexane is superior to aldrin in all doses. Yield of soybean has significantly decreased by the application of both the insecticides. The minimum yield was obtained with dose of 20 kg/ha in both cases.

A significant increase was obtained regarding oil content of soybean. There was a progressive increase in oil content with increasing doses of both the insecticides. Production of oil per hectare was calculated by multiplying oil content with the grain yield of soybean. All the treatments significantly gave lower oil yield per hectare as compared to control. This decrease in yield of oil per hectare was only due to the decrease in grain yield obtained with the application of the insecticides.

Inconsistent results do not indicate any clear effect of the treatments on the protein content of soybean. From the perusal of data given in Table I it seems that application of aldrin and gammexane has increased the protein content but independent of the amount of treatments. However, there was a relative decrease in the protein content with 20 kg/ha dose of aldrin and the highest dose of gammexane. Nandra and Chopra (1969) have also reported an increase in protein content of groundnut kernels with the application of thimeton.

Aldrin and gammexane both behave similarly in their effect on the crude fibre content. The crude fibre content was significantly increased over control with the application of these insecticides. This increase was seen only upto 20 kg dose/ha but there was comparatively a decrease in crude fibre content at highest dose i.e., 30 kg/ha of both the insecticides. No clear effect was observed by the application of aldrin and gammexane on the carbohydrates content of soybean. Both aldrin and gammexane behave quite independently on the carbohydrates content.

A non-specific effect of aldrin could be observed on mineral matter content. But from the perusal of data, it seems that aldrin has some depressive effect on mineral matter content while in case of gammexane just a reverse result was obtained. Gammexane has non-significantly increased the mineral matter content with its

TABLE I

Effect of insecticides on germination percentage, yield and quality of soybean (Glycine max)

Treatments (kg/ha)	Germination (%)		Yield of grains (q/ha)		Oil (%)		Production of oil (q/ha)		Protein (%)		Crude fibre (%)		Carbohydrates (%)		Mineral matter (%)	
	Aldrin	Gammexane	Aldrin	Gammexane	Aldrin	Gammexane	Aldrin	Gammexane	Aldrin	Gammexane	Aldrin	Gammexane	Aldrin	Gammexane	Aldrin	Gammexane
Control	47.5	47.5	12.50	12.50	20.625	20.625	2.575	2.575	34.125	34.125	4.55	4.55	33.34	33.34	3.422	3.422
10.00	57.5	60.0	11.70	11.77	20.725	20.875	2.417	2.450	35.000	34.125	4.65	4.87	32.40	32.59	3.260	3.530
20.00	70.0	77.5	11.00	11.25	21.200	21.120	2.325	2.372	31.937	35.625	4.62	5.00	34.95	30.91	3.362	3.560
30.00	85.0	92.5	11.27	11.52	21.370	21.420	2.402	2.477	35.000	31.475	4.80	4.87	32.52	34.20	3.230	3.722
Mean	65.0	70.6	11.61	11.76	20.980	21.010	2.429	2.468	34.015	33.837	4.65	4.82	33.30	32.78	3.318	3.558
C.D. for doses at 5%	5.861		0.288		0.227		0.068		—		0.17		—		—	
C.D. for insecticides at 5%	—		—		—		—		—		—		—		—	

increasing doses. The highest mineral matter content was obtained with highest dose of gammexane.

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