

The Role Of Malathion And Sevin Pesticides Application On Soil And Portulaca Growth.

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Abstract: This study was conducted at College of Agricultural Studies, Sudan University of Science and Technology Farm to evaluate the residual effect of the recommended dose of malathion, an organophosphate insecticide, and Sevin, a carbamate insecticide, on the dry weight and length of portulaca. The result showed that, the recommended dose of Sevin has positively affected both variables; the average length and weight of treated plants. The recommended dose gave significantly higher plant height (50cm - 48 cm) than the other treatments and higher number of leaves (113 - 67) and leaf area (11 cm² - 12cm²), for Malathion and Sevin respectively. The total nitrogen percentage was significantly affected by both pesticides. The pH and salinity were not significantly affected.

Key word: Sevin, Malathion, pesticides, recommended dose.

INTRODUCTION

It has been noticed that, the world population is rapidly increasing, delibrilily needs further research to help increase food production in order to avoid famines, malnutrition and critical shortage in food supply. During the past few decades pesticides were intensively used to increase agricultural production; however the lack of awareness of the risk involved in using pesticides has lead to environment, pollution and contamination of agricultural resources namely soil and underground water. Previous studies (Zaki, 1978) have shown that the residues of certain pesticides in soil lead to either increase or decrease in nutritional element in soil depending on many interacting factors. Shihu (1980) studied the relationship between the concentration of different pesticides in the soil and their concentration in the plant. The result showed that the ratio fluctuates between the concentration of different pesticides in the soil and their concentration in the plant. The result showed that the ratio fluctuates between 1:1 to 1:6. Hawrth (1983) explained that the type of soil has a great impact on the residues detected in plants. He found that the amount of lindane detected in carrot (*Daucus Crota L.*) grown on sand, silt and clay soils was 5.99, 0.156 and 2.41 ppm respectively. Omer (2001) investigated the possibility of contamination of soil with Sevin after 7 years had elapsed and documented that, the soil remained contaminated throughout these years. In fact the results of soil analysis showed that 0.156 ppm of Sevin was detected at the end of the 7 years. The fate of pesticides in soils is greatly determined by soil pH. According to Hagar (2002) most soils have a pH that ranges between 4.5 and 8. However the adsorption of pesticides is usually greater in soil with high degree of acidity.

Denis is (1999) observed that tomato (*lycopersion esculentum L.*) suffered from dwarfism when treated with an over dose of Sevin. He ascribed this phenomenon to the deformation of roots accompaned by its incapability to absop water and nutritional elements. When the same experiment was conducted using carrot (*Daucus Corota L.*) the vegetative part was greatly increased.

Abedalgwad (2001) performed an experiment to investigate the effect of Sevin on carrots. He found that, the weight of carrot treated with Sevin was significantly increased. This could be related to the fact that, the Sevin acts as growing hormone in certain plants (*Portulaca olerace*).

Ashraf (2007) stated that, Sevin pesticide reduce the activity of microorganism which lead to the reduction of the absorption of some minerals especially portulaca plant. He also found that the stability of pesticides in soil depends on the character of the pesticides especially their concentration, solubility and evolution in the air.

Nahla (2011) found that, the pesticides reduce negatively the absorption of some trace element (Fe, Zu) and affect the viruses found at the root zone of portulaca plant which reduce their tolerance to some disease. Gafar et. al. 2011 a, b and c showed the adverse effects of both Malathion and Sevin in both crops and soil.

This study, aims to investigate the effect of Malathion and Sevin on portulaca growth.

MATERIAL AND METHOD

A field experiment was conduced at the College Farm (380 m) above sea level) to study the effect of two pesticides on the portulaca growth. The treatment Viz, controll, Malathion and Sevin were used in six plots each. Two concentrations and the recommended dose of each Malathion (2.70 kg/ha, 0.95kg/ha) and 1.80kg/ha and Sevin (2.83kg/ha, 0.95kg/ha and 1.95 kg/ha respectively were used. Pertulaca was planted on January (2010) on ridge with a spacing of 70 cm. between rows and 10 cm. between plants. Urea and phosphours

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fertilizers were used at a rate of 150kg/ha and 120kg/ha respectively. The pesticides were sprayed one month after planting. Plots were separated by sacks to prevent lateral movement of the pesticides. The whole plants were pulled and then washed for different measurement. Soil samples were taken before and after planting from 30cm. depth for all treatment. Measurements taken were height (cm), fresh and dry weight (gm), leaf area (cm²), pH, total nitrogen%, Ece (ds/m), phosphorus (ppm), leaf number. The data was taken and subjected to statistical analysis.

RESULTS AND DISCUSSION

The results revealed that the plant height at the recommended dose of Malathion were taller than the others and the higher dose was significantly shorter than the others (27.70cm). Table 1 also showed that the number of leaves significantly affected by the different doses. Number of leaves were significantly higher at the recommended dose (113) compared with the others. Leaf area at the recommended dose (11cm²) is higher than the control but significantly higher than the lower and higher doses (6.92cm², 5.90cm² respectively). The root length was not significantly affected (table 1) but it was higher at the recommended dose (6.80cm) and the control (6.30cm). The fresh weight was significantly reduced from the recommended dose (34.80gm) to 26.23gm at the lower dose to 7.70gm at the higher dose. The dry weight followed the same trend as the fresh weight (table 1).

Table 1: Effect of Malathion doses on Growth of portulaca

Treatment	Plant Height (cm)	Number of leaves	Leaf area (cm ²)	Root length (cm)	Fresh weight (g)	Dry weight (g)
Control	38.50	77.50	9.72	6.30	22.13	2.22
Less than recommended dose (250kg/ha)	31.25	66.25	6.90	5.60	26.23	1.90
Recommended dose (450kg/ha)	50.00	113.00	11.00	6.80	34.80	4.00
Higher than recommended dose (650kg/ha)	27.70	39.70	5.90	4.60	7.70	1.50
LSD (0.05)	7.50	21.30	4.70	2.01	9.37	1.98

In general the recommended dose of Malathion (table 1) gave better results than the recommended dose of Sevin (table 2) but the reduction in both pesticides with the different doses had the same trend. These results were on line with Gafar et. al 2011 (a) and Gafar et. al 2011 (b) findings. The plant height of the recommended Sevin dose (48.50cm) was not significantly different from the control but significantly higher (table 2) than both lower and higher doses (36.70 cm and 30.50 cm respectively). Number of leavers of the control (83.50) was not significantly higher than recommended (67.00) but significantly higher than lower (53.20) and higher doses (35.50). Leaf area of the recommended dose (table 2) (12.05 cm²) was not significantly different from the control or the lower Sevin dose but significantly higher than the leaf area of the higher dose (5.80 cm²). Table 2 also showed that the effect of the doses on root length was not significant but the control (7.30cm) had the highest length while the higher dose (4.50cm) had the lowest root length. Fresh and dry weights had the same trend as Malathion as the recommended dose of Sevin and the control were not significant but they significantly higher than higher Sevin dose.

Table 2: Effect of Sevin doses on Growth of portulaca

Treatment	Plant Height (cm)	Number of leaves	Leaf area (cm ²)	Root length (cm)	Fresh weight (g)	Dry weight (g)
Control	53.75	83.50	9.80	7.80	21.80	2.00
Less than recommended dose (0.9kg/ha)	36.70	53.20	7.70	4.50	16.25	1.90
Recommended dose (1.9 kg /ha)	48.70	67.00	12.05	5.90	26.70	4.00
Higher than recommended dose (650 kg /ha)	30.50	35.50	5.80	4.50	7.30	1.50
LSD (0.05)	11.40	21.02	4.70	2.93	6.84	1.49

The effect of Malathion and Sevin addition to the soil was variable (table 3). The total nitrogen percentage was higher in the soil before planting and reduced with the pesticides addition. The pH was not affected that much by the addition of different doses but it was higher for Malathion than for Sevin. The salinity of the soil (table 3) was less before planting (2.11ds/m) and increased for the higher doses (2.57, 2.94) and the recommended doses (2.55, 2.15 ds/m) for Malathion and Sevin respectively.

Conclusion:

The use of insecticides in the recommended dose or less can be of greater value for portulaca production. Both Malathion and Sevin can be applied safely when a few basic rules are followed and common sense is used.

Table 3: Soil analysis before and after addition of Malathion & Sevin.

Parameter	Total Nitrogen percentage	pH paste	E.C. ds/m
Soil before planting	0.04	8.30	2.11
Higher Malathion dose	0.09	8.70	2.57
Recommended Metalhion dose	0.06	8.70	2.55
Higher Sevin dose	0.011	8.40	2.94
Recommended Sevin dose	0.08	8.50	2.15

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