

Effect of insecticide malathion on weight of *Eisenia foetida* Earthworm

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ABSTRACT-

Earthworm are invertebrates and contribute to soil fertility improvement and plant growth. Malathion is widely used organophosphate insecticide in agriculture. *Eisenia foetida* has been suggested as a sensitive and standard species for ecotoxicological studies. *Eisenia foetida* were exposed to malathion via soil. Three series of different concentration 100, 200 and 300 mg/kg soil were prepared. In control group soil was used with tap water. The aim of the present investigation was to assess the effect of insecticide malathion on weight of worm. *Eisenia foetida* are exposed to different concentration of malathion for definite period of time. It was observed that there is reduction in weight on exposure to 100mg/kg soil, but after exposure for 15 and 20 days to concentration of 300 mg/kg soil there was increase in weight. There was no loss of weight in worms of control group and they showed normal growth with increase in weight.

I INTRODUCTION

Earthworms represent a great proportion of biomass of terrestrial invertebrates. They have been selected as suitable representative of soil organisms as they are key components of soil biota. They are found almost all over the world in the temperate and tropical regions wherever there is plenty of moisture in the ground. They prefer loamy or partly sandy soil rich in humus. Annelids are of great interest because the successful groups of animal kingdom such as Arthropoda and vertebrata also have the parts metamericly repeated. Metameric segmentation of the body encountered for the first time in Annelids. Metamerism is visible in most annelids both externally and internally. Great power of regeneration is seen in earthworms. Earthworm have numerous enemies eg. Centipedes, moles, frogs, toads, lizard, hedgehog, birds and above all human. *Eisenia foetida* is the standard test organism used in ecotoxicology because it can be easily bred on a variety of organic waste within short generation times. Earthworms contribute to soil fertility, improvement, plant growth and play a key role in converting a organic matter (Reynold 1994). Earthworms are key components in natural food chain providing food source for many small mammals, birds, fishes and prawns (satchell 1967). Earthworms are one of the most important organisms responsible for mechanical mixing of soil and play a major role in maintaing physical soil characteristics, aerations, water permeability and mineral turnover (Barley and Jennings 1959). *Eisenia foetida* is bisexual having both male and female reproductive organs. Earthworms are good friends to the gardener and farmer as they are continually ploughing and manuring the soil. Malathion is an organophosphate insecticide of relatively low human toxicity. It is widely used in agriculture and residential landscaping.

II MATERIAL AND METHODS

Eisenia foetida were selected for study because it is cheap test species, easy to maintain and is readily available. Healthy, sexually matured *Eisenia foetida* approximately weighing 1 to 1.3gms length 3 to 12cms were collected from Rau (M.P.) India. *Eisenia foetida*

were kept in culture pots with moisture soil, before the commencement of the experiment. 25 earthworms were kept in each pot which were filled with 1 kg soil. They were fed with organic matter such as decaying leaves, manure etc.

Eisenia foetida were exposed to insecticide malathion via soil. Concentration series of insecticide malathion were prepared by diluting stock solution. 3 series of different concentration of malathion 100, 200 and 300 mg/kg soil were prepared. In the control group only soil was used with tap water. Worms were exposed to different concentrations for 10, 15 and 20 days. Effect of insecticide malathion was studied on weight, length and colour of *Eisenia foetida*. Matured worms were collected from the soil and weighed. 25 worms were treated each with different concentrations 100, 200 and 300 mg/kg soil of insecticide for 10, 15 and 20 days. After treatment change in weight and effect on length and color of *Eisenia foetida* was recorded.

III RESULTS AND DISCUSSION

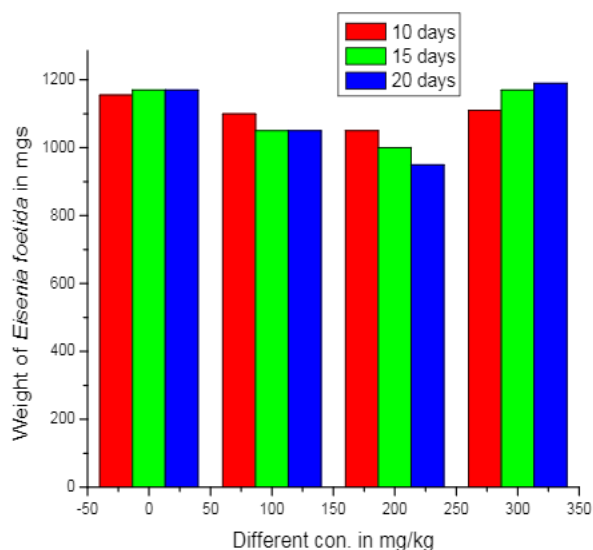
Present study was carried out to see effect of insecticide malathion on weight, length and colour of *Eisenia foetida*. *Eisenia foetida* of control group were not exposed to insecticide and only tap water was used. *Eisenia foetida* of experimental group were exposed to 100, 200 and 300 mg/kg soil of insecticide malathion. Result was recorded after exposure to malathion for 10, 15 and 20 days. It was observed in *Eisenia foetida* of control group there was increase in weight from 1155mg to 1170mg after 15 and 20 days but in *Eisenia foetida* exposed to 100mg/kg soil malathion there was decrease in weight to 1100, 1050 after exposure for 10 and 20 days. On exposure to 200 mg/kg soil there was decrease in weight to 950 mg after exposure for 20 days. But it was observed that on exposure to 300mg/kg soil it was observed that there was increase in weight to 1170mg and 1190mg after exposure for 15 and 20 days. Slight increase in weight may be due to degradation and deposit of pesticide residues. Insecticide malathion has a high use in agriculture and garden. It has a lethal effect on many living systems. Choo and Baker (1998) found endosulfan significantly reduce the weight of juvenile *Aporrectodea trapezoids*. Booth and Halloran (2002) found growth to be

significantly reduced in *A. caliginosa* on exposure to two organophosphate pesticides, diazinon and chlorpyrifos at 60 and 28 mg/kg doses. Bustos-obreg and Goicochea (2002) explored the effect of exposure to commercial parathion on *Eisenia foetida* and observed decrease in body weight of treated worm. Singh *et al* (2003) reported the significant contribution of soil microorganisms to the degradation of organophosphate insecticides in natural soil. Khan *et al* (2007) reported a significant reduction in earthworm biomass after exposure to different concentration of copper chloride and concluded abnormal functioning of major physiological systems such as digestion and absorption. Effect of pesticides on growth and reproduction of earthworm was studied by shahla *et. al* (2010). Corria and Moreira (2010) studied effect of glyphosate on earthworm *Eisenia foetida*. Insecticide malathion has a high use in agriculture and gardens but it has lethal effects on many living systems. Espinoza-Navarro and Bustos-Obreg(2003) treated *Eisenia foetida* with organophosphate insecticide malathion. Zhou *et al* (2006) reported that weight of the earthworms was a more sensitive index compared to the mortality in indicating toxic effect. Observation were made on length and colour of worm. There were no changes in length and colour of worms exposed to insecticides.

Table1: Changes in weight of *Eisenia foetida* (earthworm) after exposure for 13,15 and 20 days to insecticide malathion

S.No.	No. of Earthworms	Different doses of malathion in (mg/kg)	Weight in mg (after 13 days exposure)	Weight in mg (after 15 days exposure)	Weight in mg (after 20 days exposure)
1.	25	Contro. group	1155	1170	1170
2.	25	100	1000	1050	1050
3.	25	200	1050	1000	950
4.	25	300	1100	1170	1190

Fig.1 Weight change in *Eisenia foetida* exposed to malathion



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