

Advantages of Bio-Insecticides in Relation TTO Soil Quality Improvement for Agriculture

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Abstract

The use of bio insecticides for the protection of crops certainly contributed to minimizing the losses in yield. The bio insecticides are carefully applied for reducing the population of the insects that damage the crops. Moreover, the advantage of using bio insecticides for agricultural purposes is to improve the growth of the plants and the roots for enhancing the micro flora of the soil and it results in the total production of agriculture. Moreover, they are less toxic than the other conventional pesticides as they do not contaminate the total environment. Bio insecticides are the type of organism that is given to agricultural crops plants for damaging pests. Moreover, they are used in destroying small pests and weeds. Bio insecticides are the biological method of controlling the insects and the pests that are damaging the crops.

Keywords

Chronic Neurotoxicity, Food Chain, Nontoxicity.

INTRODUCTION

Bio insecticides are the organic formulations that are recommended for the total management of the insects that are fed on the crops. Moreover, they are totally different from chemical pesticides in various ways. However, they contain the live bacteria that use to produce the toxins that cause stomach poison inside the insects and kill the insects. The benefits of using bio insecticides help in controlling the disease and pests and they produce a little amount of toxic residue. Moreover, they are having the minimal risk to the health of humans. The main advantage of the bio insecticide is its capacity both to grow at the expense of the total nutrients present inside the pest and to kill the overall pest.

Impacts of Pesticides used in Agriculture

The pesticides include the enhanced potential in the increased production of fibre and food. Moreover, it ameliorates the disease that is vector borne and then their total debits result in the serious implication in the health of humans and the environment [9]. There is some evidence in which the chemicals do pose a potential risk to human beings and the other life forms and also to the unwanted effects of the environment. Moreover, there are no segments in the population that completely protect the environment against total exposures to bio insecticides. Moreover, the serious effects of health through the disproportionate burden are taken by the people in the developing countries. There are several negative impacts on the bio insecticides that are scarce in developing countries and for these impacts of the bio insecticides in the production of vegetables are in high threat for managing the pests.

Moreover, the risk of the non-target impacts of bio insecticides is increasing day by day globally. However, the increase is in the stringent standard on the residue levels of

the bio insecticides. The bio insecticides can cause chronic and acute effects on human health, affect the surface and groundwater and affect the atmosphere [12]. Moreover, several bio insecticides are implicated in endocrine disruption, chronic neurotoxicity, immune impacts, mutagenicity, carcinogenesis and genotoxicity. Moreover, in the agricultural sector, bio insecticides can contaminate the water, soil, vegetation and turf. It also kills the weeds or the insects as bio insecticides might be toxic in hosting the other organisms that include fishes, birds, non-target plants and beneficial insects. There are four negative impacts of using bio insecticide in agriculture [4]. The bioinsecticides reduce the population of the helpful insects that are useful for farming, it might lead to pollination problems for the insects and it kills the soil microbes too. The use of bioinsecticides result in making the soil toxic for the growth of the plants and it may reach the animals through the food chain and can cause harm to the animals.

Bioinsecticides and their Role in Agriculture

Bioinsecticides are the living organisms that can interfere in the life cycle of the insect pests and hence in this way the total damage of the crops are minimized. Moreover, the agents that are employed as bioinsecticides include the predators, parasites and the disease that is caused by viruses, bacteria and fungi [1]. These are the natural enemies of the pests. Furthermore, they supplement and complement the other techniques of the pest control and the utilization of the natural predators, pathogens and parasites for the pest control is a type of biological control. Moreover, these agents are conserved, multiplied and preserved under the laboratory conditions for the field release.

There are major advantages of bioinsecticides for which the bioinsecticides are preferred over chemical pesticides. The advantages are, it does not have any harmful residue,

these are safe and target specific to the beneficial organism like predators, pollinators and parasites. Moreover, another advantage is the growth of the natural enemies of the pest is not affected and thus it reduces the application of the bioinsecticides, it is also cost effective [11]. The multiplication and the growth of each and every organism fully depend on the food chain. Moreover, in the system of biological control, the interrelations of the food chain are exploited. Hence the bioinsecticides are specific in their perish and actions when the pest is exhausted. Therefore, they are fully based on the natural principles that leave no residue and they are economical and safe.

MATERIALS AND METHODS

In order to understand the advantages of bio-insecticides for improving the soil quality it is important to experiment on a vegetable to examine its growth. Data collocation is an integral part of developing research and in this research

secondary data has been chosen from authentic and reliable journals and research articles from Google scholar [10]. As per the views of El-Rahman *et al.* (2020), an experiment was conducted on soybean to analyse the impact of the bio-insecticide during the soybean growing season in 2017 and 2018. In these two seasons the sampling dates start from August 5th[5].

The Fluctuation of Population

An area approximate of 1/3 fed. has been selected for each season and this area is further divided into 2 blocks. Moreover, these blocks are divided into two equal plots devoted to one variety. The part consists of 4 rows, 5 m. in length and 55 cm in width with a distance between hills as 15cm. The chosen soybean varieties were Crawford and Giza 35 and a new genotype, Dr-101. As *E. zinckenella* can cause harm to soybean pods, the larval population of this pod borer moth has been examined from the appearances of the green soybeans pods to the last date of picking these pods.

Table 1. *E. zinckenella* larvae's mean population on a weekly basis in accordance to temperature and relative humidity during the soya bean seasons of 2017 and 2018[5]

Seasons	Sampling dates	Crawford	Giza 35	Dr-101	Conditions of the climate		
					D.Max.T.	D.Min.T	Percentage OF R.H.
2017	05/08/2017	0	0	0	34.50	24.63	48.20
	12/08/2017	6	8	2	34.53	24.63	49.00
	19/08/2017	20	22	7	34.62	25.69	51.80
	26/08/2017	30	33	13	34.10	25.12	50.92
	02/09/2017	32	34	14	33.11	24.20	49.0
	08/09/2017	29	30	13	34.50	25.06	50.20
2018	05/08/2018	1	2	0	36.82	25.25	54.80
	11/08/2018	7	7	4	35.81	25.25	49.00
	18/08/2018	17	25	9	34.60	26.50	55.00
	25/08/2018	26	28	15	34.00	24.10	53.00
	01/09/2018	27	29	16	34.35	25.00	55.20
	08//09/2018	25	26	15	35.02	24.35	54.20

In order to conduct research around 25 green pods have been chosen randomly from the diagonal of each plot. They were kept in a paper bag and then sent directly to the laboratory to experiment.

RESULT AND DISCUSSION

As per the data presented in Table 1 it can be stated that weather factors play an important role in the fluctuation of the population of *E.zinckenella*. During the 2017 season of soybeans, few larvae appeared in the second week of August. It is further observed that the number of larvae was increased in two peaks, one is during the third week of August, and then in the first week of September, the number of larvae increased again. Later, during the third week the number has increased as it can be seen on 19th August the numbers of larvae were

20, 22, 7 pods for Crawford, Giza35 and Dr-101, respectively when the maximum temperature was 34.62°C and the minimum temperature was 25.69°C.

During the first week of September the number of larvae was 32, 34, and 13 for Crawford, Giza35 and Dr-101 respectively. The maximum and minimum temperature during this time was 33.11.35°C and 24.20°C respectively and R.H value was 49.0. However it is further observed that during the second week of September a relatively lower population was observed. During this week the maximum temperature was 35.81°C and the minimum temperature was 35.81°C while the R.H. value was 49.0. During the second season the population of larvae was relatively increased during the first week of September with 27, 29 and 16 for Crawford, Giza35 and Dr-101 respectively. During this

period the maximum and minimum temperature were 34.35°C and 25.00°C respectively with 55.02% value. As per the view of KCaet *al.* (2021), photosensitizers and Biover can reduce the population of the larvae in the soybean field. Usage of Magnesium chlorophyllin in high conversion has the ability to reduce the population effectively[7].

The previous experiment shows that using Bio pesticides for farming can offer multiple advantages and it exerts their inhibitory impacts through several modes of action. This includes the growth controller and regulator, gut disruptors, and nonspecific multi-site inhibitors [8]. On the other hand, in this Green revolution era, using the traditional chemical pesticides for a prolonged period for farming can cause numerous issues. These issues are pesticide related pollution, loss of biodiversity, destruction of natural advantageous enemies and usage of bio-pesticides can reduce these negative factors.

As it was observed that in the recent time there has been a reduction of the usages of traditional pesticides [6], it has resulted in a growing demand for the bio-insecticides, bio-insecticides are quite beneficial in sustainable agriculture and these advantages included, eco-friendliness, low-intensity, low problems of post-harvest contamination and low affection on human and organisms [3]. However, there are some challenges that occur while adopting the bio-insecticides such as being unable to fulfil the demand of the global market, high investment, varying standard process of preparation and guidelines.

As per the results, the farmers spray the bio insecticides for mitigating the crop that is damaged by the pests. The insects have irreversible and large effects on the yields and crops that can have impacts on the consumers through the higher prices of the crops [2]. Moreover, the requirement for utilizing the protection of the crops products that varies by environment, geographical location and climatic conditions. Therefore, by this, each farm is having a different need in the protection of the crop products. Moreover, bioinsecticides work in several ways by affecting their own target, whether it can be pests or insects or weeds. Hence other insects cause the harm in the food that is sorted and transported to other places.

CONCLUSION

In conclusion, the above research shows that there are some changes that are needed to address and resolve in order to fully adopt bio-insecticide for farming. The above experiment shows that the larvae population of *E.zinckenella* can be reduced by using bio-insecticides. However, considerable research one usage of bio-insecticides is required to fully understand various aspects, benefits and future challenges of this bio pesticide. As the adoption of bio-insecticides is unable to meet the global market demand and require higher investment the agriculture sector needs to be dependent on both chemical and bio-pesticides. The advantages revolving around bio-insecticides have been discussed in this study where experiments and results have been aligned with each other. It is one of the essential aspect

that has been discussed where it has been found that bio-insecticides have been one of the most important living organisations on earth.

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