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Research Article

Effect of Botanical Extrcts on Tobacco Caterpiller

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Abstract

Spodoptera litura belonging to lepidoptera order and common name is tobacco caterpillar, cotton leaf warm, cluster caterpillar. It also uses chilies as host plants, caterpillars significantly affect productivity of crops. The botanical extracts have played a significant role in management of beetles, mites and caterpillars. The farmers of mandal taluka have been engaged in cultivation of solanum annum crop. It has been observed they are utilizing large amount of pesticides which can be harmful to the ecosystem and human health. The botanical extract can be one of the alternatives to these pesticides. The present study has evaluated the mortality of tobacco caterpillar by use of botanical extracts on solanum crop.

Keywords: Pest Management; Mortality Rate; Leaf Extract of *Azadiracta indica*; *Tagetus erecta* and *Pongamia pinnata*

Introduction

Spodoptera litura belonging to lepidoptera order and common name is tobacco caterpillar, cotton leaf warm and cluster caterpillar [1]. It is widely distributed in Pakistan, shri Lanka, and India. Very commonly seen in Andhra Pradesh, Tamil Nādu, Gujarat and Maharashtra. It is serious pest for tobacco, cotton, castor, chilies, sunflower and groundnuts. It is polyphagous pest infesting 112 plants belonging to 44 families [2,3].

Though chemical control is greatly practiced by agricultural workers to destroy pests. Yet these causes serious troubles to both the environment and humans. It eradicates the standards of water, soil and harms the animals, birds as well. The exposure to these harmful chemicals puts human health in a serious trouble by causing various diseases such as skin disorders, diabetes, cancer, reproductive issues, and respiratory problems [4].

Emamectin benzoate (Ajanta et al., 2008), Lufenuron, Spinosad, methyl deltamethrin [5], Indoxacarb [6,7], abamectin, chlorfenapyr, thiodicarb [8] are reported as pest control.

Overall, this method of pest control leads to a disturbance in the ecosystem. Further, to make it worse, the evolution of pests against pesticides is an important factor leading to the need to look for biological control management. The limited range of chemical pesticides in the market could be one reason for the increased resistance [9]. Hence, it is very important to look for alternatives for sustainable pest control. Biological control is the sustainable meth-

od of pest management as they target the pest organism only using predator organisms that don't disturb the soil microflora or environment and neither causes suffering to humans. Yet this method can be very extravagant and inefficient in comparison to chemical pesticides. Organic pest control is a method where natural formulations are used as pesticides in order to control pests. It is free from chemicals which makes it environment and user-friendly saving one from all the ill effects of chemical control. The strategies for pest control are based upon expanding natural activities which brings out the durability. The belief that vegetables are not sprayed with chemicals leads to organic pest control being the most popular choice among consumers [9].

The botanical extracts have played a significant role in management of beetles, mites and caterpillars. The farmers of mandal taluka have been engaged in cultivation of solanum annum crop. It has been observed they are utilizing large amount of pesticides which can be harmful to the ecosystem and human health. The botanical extract can be one of the alternatives to these pesticides. The present study has evaluated the mortality of tobacco caterpillar by use of botanical extracts on solanum crop [10,11].

Methodology

Collection and identification of the plants:

The study material for the experiment included leaves of the ethnobotanically important plant *Bahunia purpurea*, *Azadiarcta indica*, Plant materials were collected from the Gujarat University campus. Taxonomic identification of the Specimen was done by Dr. Hitesh Solanki.

Drying and processing

Collected plant material was washed under tap water and then kept under shade for drying. After drying plant material will be crushed with the help of a motor and pestle and made into powder form.

Soxhlet extraction

The leaves bark of all species was washed, oven-dried at ±40 ◦ C, and then powdered. Soxhlet extraction has been used with 80% methanol and was dried under a vacuum with a rotary evaporator (Buchi R-210, Switzerland).

Chilli crop feild experiments

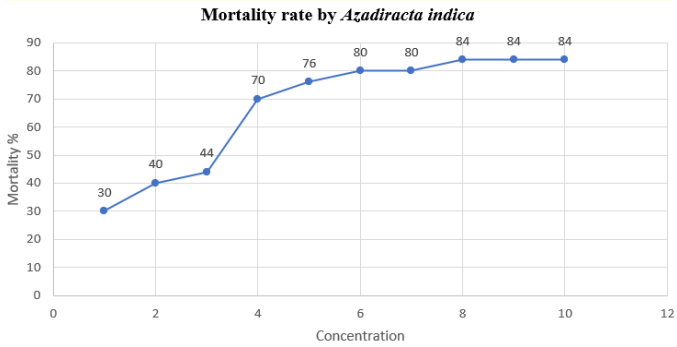
Thirty infected plants were selected for the testing formulations on the chillies. Watering was moderate to each plant. Formulation was sprayed on every interval of 5 days.

Results and Discussion

Suppression of caterpillars by using leaf extract

Only young caterpillars taken in to consideration during the study. Mortality percentage by *Azadiracta indica* extract shows eighty-four percentage of population suppression have been seen by using 10 ml per liter leaf extract. (P value = 0.06) standard error 1.3 (Graph 1). Mortality percentage of *Pongamia pinnata* is 62 percentage per 10 ml (P value = 0.009158 which is less than 1) Standard Error: 0.59028 (Graph 2). Mortality percentage by *Tagetus erecta* extract have shown 68 percentage per 10 ml (P value = 0.02 which is less than 1) Standard Error: 1.005 (Graph 2).

Mortality rate by *Azadiracta indica* (Graph 1).



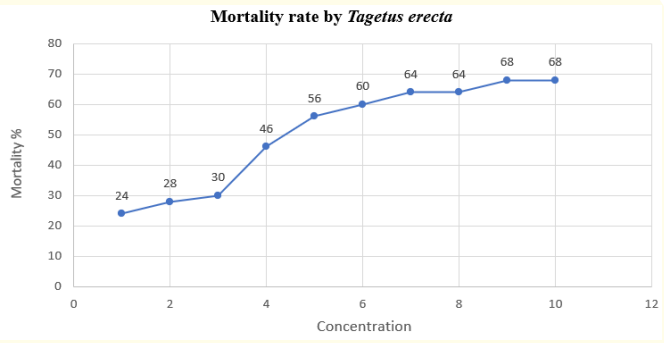
Graph 1

Mortality rate by *Tagetuserecta* (Graph 2).

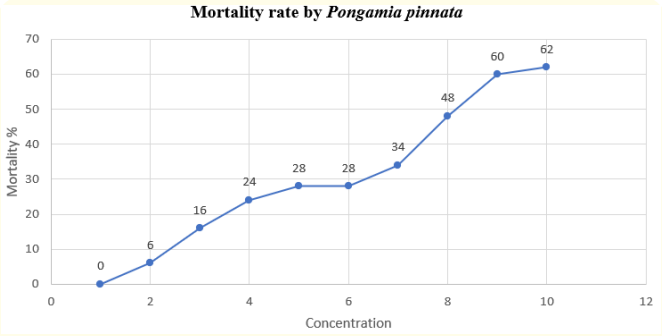
Mortality rate by *Pongamia pinnata* (Graph 3).

Effect of extract on leaves

Present work includes extraction of *Azadiracta indica, Tagetuserecta, and Pongamia pinnata*, extracts and application of extracts on the leaves for 15 days against.



Graph 2



Graph 3

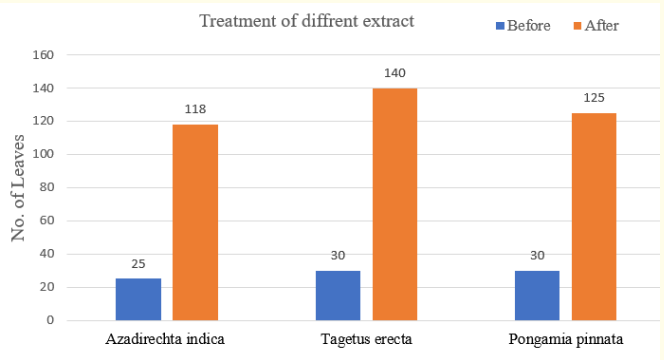
Sr No	Formulations (4 ml/liter in water)	Number of leaves before application	Number of leaves after application
1	*Azadiracta Indica leaf extract* 4 ml/liter in water)	25	118
2	*Tagetuserecta* 6 ml/liter in water)	30	140
3	*Pongamia pinnata* 10 ml/liter in water)	30	125

Table 1

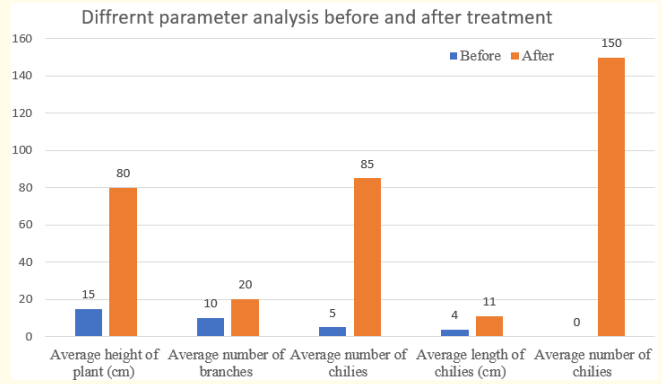
Effect of *Azadiracta Indica* leaf extract 10 ml/L

Sr no	Growth parameters	Treated	Untreated	Note
1	Average height of plant	100	15	
2	Average number of branches	20	10	
3	Average number of chilies	85	5	
4	Average length of chilies	11	4	Due to fall of flower
5	Average number of chilies	130	0	

Table 2



Graph 4



Graph 5

Effect of *Tagetuserecta* leaf extract 10 ml/L.

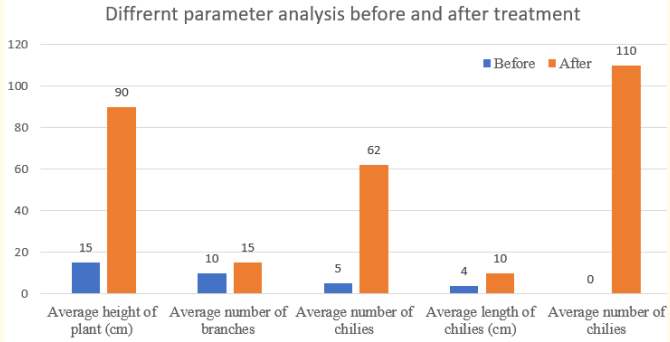
Sr no	Growth parameters	Treated	Untreated	Note
1	Average height of plant	90	15	
2	Average number of branches	15	12	
3	Average number of chilies	62	7	
4	Average length of chilies	10	4	Due to fall of flower
5	Average number of chilies	110	0	

Table 3

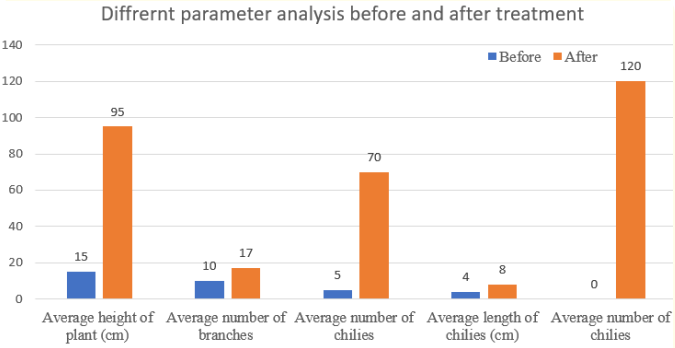
Effect of *Pongamia pinnata* leaf extract 10 ml/L.

Sr no	Growth parameters	Treated	Untreated	Note
1	Average height of plant	95	15	
2	Average number of branches	17	12	
3	Average number of chilies	70	7	
4	Average length of chilies	8	4	Due to fall of flower
5	Average number of chilies	120	0	

Table 4



Graph 6



Graph 7

It has been observed during study farmers are using heavy pesticides such as Fipronil 2.92% and copper oxychloride 50 %. which have already been reported for its toxicity i.e. (Fipronil) 0.5 ppm for chronic disease.

Study has revealed mortality of tobacco caterpillars by use of extracts such as *Azadirachta indica, Pongamia pinnata, Tagetus erecta respectively.* Mortality percentage by *Azadiracta indica* extract shows eighty-four percentage of population suppression have been seen by using 10 ml per liter leaf extract. (P value = 0.06) standard error 1.3 (Graph 1). Mortality percentage of *Pongamia pinnata* is 62 percentage per 10 ml (P value = 0.009158 which is less than 1) Standard Error: 0.59028 (Graph 2). Mortality percentage by *Tagetus erecta* extract have shown 68 percentage per 10 ml (P value = 0.02 which is less than 1) Standard Error: 1.005 (Graph 2).

Conclusion

Study also shows growth of plants after treatment which represents no negative effect on plants and its productivity. Future study can be taken on more identification of derivates and formulations for oils and mixtures of multiple botanical ingredients. The study can be helpful to farmers, refreshers and the people who are interested in pest management.

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