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COMPARATIVE LARVICIDAL ACTIVITY OF *Syzygium cuminii* AGAINST *Heliothis armigera* (COTTON BOLLWORM) and *Spodoptera litura* (TOBACCO CUTWORM)

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ABSTRACT In the present study, efficacy of *Syzygium cuminii* was evaluated in the laboratory against the third instar larva of *Heliothis armigera* (Cotton bollworm) and *Spodoptera litura*. (Tobacco cutworm). Toxicity of Jamun seed powder was assessed with topical application method. Extract of *Syzygium cuminii* used in three different doses i.e.5gm, 10gm and 15 gm. It is clearly indicated by the results that percentage of larval mortality was directly related to the dose of powder. 15 gm dose of Jamun seed powder was proved to be most effective against both pests. 15 gm dose of treatment caused 28% mortality in *Heliothis armigera* after 15th day of treatment. Similarly, highest larval mortality (40%) in *Spodoptera litura* recoded after 25th day of 15 gm dose treatment. Jamun seed found to be more effective against *Spodoptera litura*.

KEY WORDS: *Spodoptera litura*, *Heliothis armigera*, *Syzygium cuminii*, Jamun, Biopesticide, Natural protectants

1.0) INTRODUCTION:

Tomato is the edible berry of the plant Solanium. Tomato is a warm season crop and thrives well in those regions that are free from frost. During adverse climate, monetary return from tomato crop is most fluctuating counting on the season of production and ruling market value due to the genetic potential of the germplasm material. Tomato production is greatly influenced by environmental factors and cultural practices [4]. *Spodoptera litura* and *Heliothis armigera* are the two main pests causing damage of tomato fruit and affected its qualitative and quantitative production [6]. *Spodoptera litura* is specialy problematic on vegetables, ornamentals, and leguminous forage crucifers, legumes, millets, deciduous fruit trees [2,3]. Young larvae feed at numerous small feeding points on newly infested host that eventually spread over the entire leaf. Older instars mine their way

into young shoots or bare sections on young stalks, bolls, and buds or chew large holes or wholly consume leaves [1,8]. *Heliothis armigera* is a polyphagous pest. It attained the status of most serious pest in recent years in terms of economic damage caused to different agricultural crops. *Helicoverpa armigera* is the most destructive pest causing the loss in tomato yield up to 50%-70% [10]. The use of synthetic, chemical pesticides is that the best method for agricultural pest control in terms of cost and efficiency. However, the conventional pesticides could induce pest resistance [11] and the residues of pesticides also confer negative consequences on human health and environment. Combined, these issues have created an urgent need for sustainable, effective pest control solutions. The plant-based pesticides could be considered to be an alternative tool for integrated pest management due to the advantages of rapid degradation in environment, low toxicity to mammals, and a low risk of resistance development in target pest population [8,13]. Biopesticides have usually no known function in, growth photosynthesis, or other basic aspects of plant physiology. Instead, they are active against biological pests.

Jamun is a widely distributed forest tree in India and other tropical and sub-tropical regions of the world. This fruit is a rich source of natural antioxidant, vitamins and minerals having good nutraceutical and medicinal value [4].

2.0) MATERIAL AND METHOD

2.1) Collection of plant material: Fruits of Jamun plant collected from the local area. Fruits gets deseeded. Fresh plant materials were washed through the distilled water thoroughly and dried on blotting paper. All plant materials shed dried under room temperature (25°C). Seeds of *Syzygium cuminii* were powdered by using grinder. Powder was extracted by soaking in ethyl acetate for 48 hours [5]. Then it filtered by Whattman filter paper no.-1. Solvent get evaporated to air dryness at room temperature to give crude extract.

2.2) Rearing of pest: Larvae of *Spodoptera litura* were collected from the plots and reared in petridish containing castor leaves [3]. Larvae of *S. litura* were reared in groups of 12-15 in containers on castor leaves. Larvae were allowed to pupate in moist and loose soil. Larvae were separated according to sex. Adult moth enclosed in 7-8 days. 10-12 pairs of moths were held for mating and oviposition in cages with 15-20% honey solution as food.

2.3) Application of treatment Laboratory experiments were set up with *Syzygium cuminii* against both the pest. Laboratory experiment was set up in three replications with one control. Jamun seed powder sprinkled over *Heliothis armigera* and *Spodoptera litura* fed on tomato. Powder was sprayed in 5gm, 10gm and 15gm doses.

2.4) Data collection Data of larval mortality and adult emergence was recorded after 5^{th} day, 10^{th} day, 15^{th} day, 20^{th} day, 25^{th} day, 30^{th} day, 35^{th} day, 40^{th} day and 45^{th} day after the treatment.

3.0) RESULT AND DISCUSSION

It is observed that the 5gm Jamun seed powder treated larva of *Heliothis armigera* showed 3% and 13% mortality on 15 days and 20 days respectively. In 10gm dose, on 10 days 8% mortality and on 15 days 15% mortality was recorded. In 15gm dose, 2%, 8% and 28% mortality were observed on 5 day, 10 days and 15 days respectively.

The treatment of 5 gm Jamun seed powder on larva of *Spodoptera litura* caused 9% mortality on 15 days and 14% mortality on 20 days. In 10 gm dose, 5% mortality noticed on 10 days, while 20% and 38% being on 15 days and 20 days respectively. In 15 gm dose, 3% mortality in 5 days, 13% ,24% and 40% being on 10 days, 15 days and 20 days respectively. It was observed that the plant product affected the larvae significantly in comparison to untreated control.

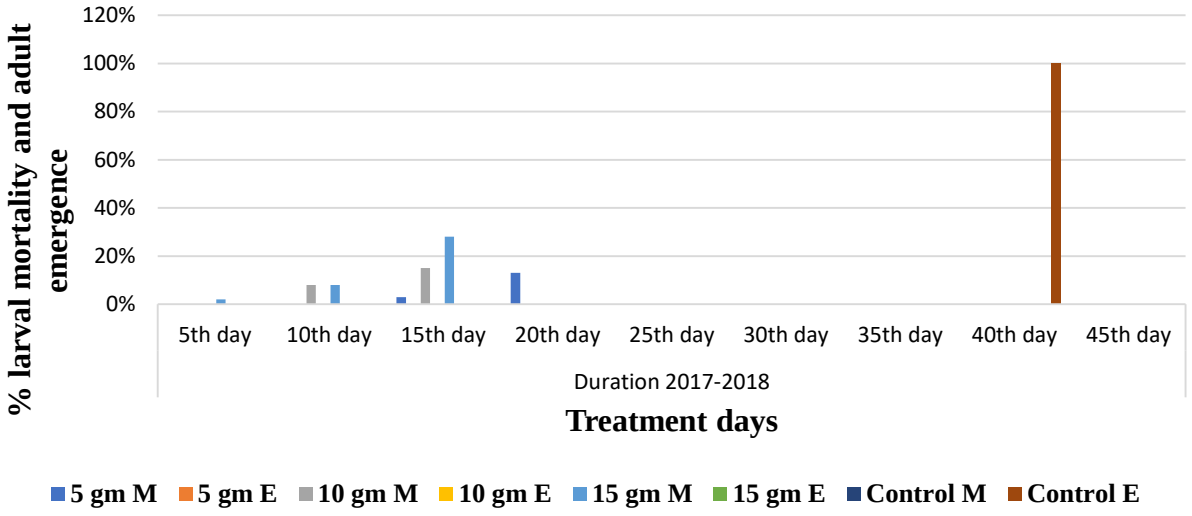
Table 1: EFFECT OF JAMUN SEED POWDER ON LARVAL MORTALITY AND EMERGENCE OF *Heliothis armigera*

Doses		Duration 2017-2018								
		5th day	10th day	15th day	20th day	25th day	30th day	35th day	40th day	45th day
5 gm	M	00%	00%	3%	13%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
10 gm	M	00%	8%	15%	00%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
15 gm	M	2%	8%	28%	00%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
Control	M	00%	00%	00%	00%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	100%	00%

Table 2: EFFECT OF JAMUN SEED POWDER ON LARVAL MORTALITY AND EMERGENCE OF *Spodoptera litura*

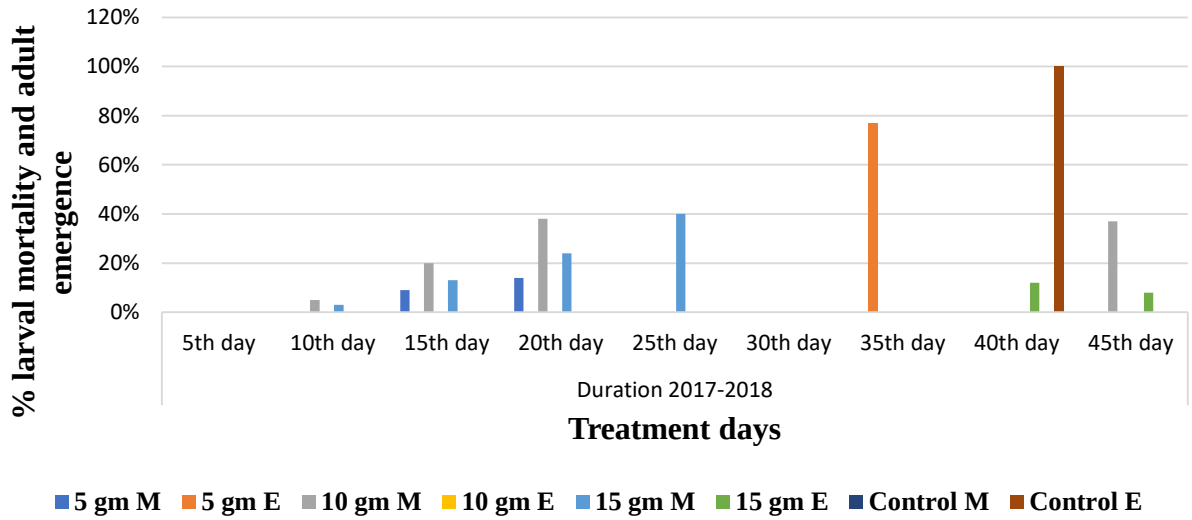
Doses		Duration 2017-2018								
		5th day	10th day	15th day	20th day	25th day	30th day	35th day	40th day	45th day
5 gm	M	00%	00%	9%	14%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	77%	00%	00%
10 gm	M	00%	5%	20%	38%	00%	00%	00%	00%	37%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
15 gm	M	00%	3%	13%	24%	40%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	12%	8%
Control	M	00%	00%	00%	00%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	100%	00%

Figure 1: Effect of Jamun (*Syzygium cuminii*) seed powder on larval mortality and emergence of *Heliothis armigera*



4.0)

Figure 2: Effect of Jamun (*Syzygium cuminii*) seed powder on larval mortality and adult emergence of *Spodoptera litura*



CONCLUSION It is concluded from the experiments that highest larval mortality (28%) was recorded during 15gm dose treatment after 15th day in *Heliothis armigera*. While in *Spodoptera litura* highest larval mortality (40%) was observed during 15 gm dose after 25th day of treatment. It is clearly observed that Jamun seed extract shown significant larvicidal effect against both the pests but it is found more effective against *Spodoptera litura.*

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