



**IN VITRO INSECTICIDAL ACTIVITY OF SOLANUM MELONGENA**

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**ABSTRACT**

The objective of the present study is to evaluate insecticidal activity of ethanolic extract of Solanum melongena. The ethanol extract of Solanum melongena produced significant knockdown against Sitophilus oryzae (KD 50%) in the concentration of 1% w/v and 5% w/v and tested for 24.5 min and 15.2 min respectively. The knockdown (KD 100%) was seen at 35.5min and 19.2min. For carpenter ant (KD 50%) in the concentration of 1% w/v and 5% w/v tested for 25.3 min and 12.5 min respectively the knockdown (KD 100%) was seen at 52.5min and 25.2min. Pantry weevil larvae (KD 50%) in the concentration of 1% w/v and 5% w/v were tested for 10.2min and 7.2min respectively and the knockdown (KD 100%) was seen at 23.2min and 16.7min. No mortality of the insects was found in any of the controls. The ethanolic Solanum melongena extract showed potent activity against Sitophilus oryzae, Carpenter ant Pantry weevil larvae. The finding of new insecticidal activity is of great importance. The reason for using new natural insecticides is that these are active at highly acceptable levels, biodegradable and do not leave toxic residues.

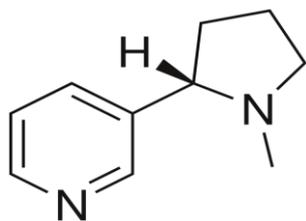
**KEY WORDS:** Solanum melongena; Insecticidal Activity; Sitophilus oryzae; Pantry weevil larvae; Carpenter ant.

**INTRODUCTION**

The protection of stored grains and seeds against insects, pests and have been a major problem for development agriculture. There are few plants which are high and also rich in source of novel natural substances which can be used to develop environmentally safe for insects and also pest's action. Due to this many insecticidal activity of plants against pests and also insects has been demonstrated.<sup>[1,2]</sup> Deleterious effects of plants extracts or pure compounds on insects and also pests can be manifested in many manners which including toxicity, mortality, antifeedant growth inhibitor followed by suppression of reproduction behavior and also education of fecundity and fertility<sup>3,5</sup>. There are few scientists who reviewed that the plants which are used for pest; insect control has very strong connection between medicinal plants and also pesticidal plants. To reduce the use of synthetic pesticides and to avoid pollution of the environment and natural antifeedant, deterrent and repellent substance has been searched for pest to control during recent times. As said earlier, insecticidal activity of many plants against several insect pests has been demonstrated and deleterious effects of plants extracts or pure compounds on insects can be manifested in several manners including toxicity, mortality, antifeedant growth inhibitor, suppression of reproductive behavior. Few insect and pest that cause irritation and they also spoils food and acts as a vector for more than hundred human and animal pathogenic organisms such as

enteropathogenic bacteria, enterovirus. For every year post-harvest losses resulting from insect damages, microbial and other factors are estimated to be 10 to 25% of worldwide production and widespread use has led to some serious problems which including development of insect strains resistant to insecticides.

Solanum melongena is a species of night shade grown and it is an edible fruit. It is egg-shaped glossy purple fruit and white flesh with a meaty texture. Fruit is less than 3cm in diameter but in cultivated forms they are very much larger in size which reaching 30cm or more length. Solanum melongena will cause itchy skin or mouth, mild headache, and also stomach upset. 10 grams of Solanum melongena contains 1µg (microgram) of nicotine and cigarettes usually contain 1mg (milligram) of nicotine which means that a person would have to eat 10 kilograms or 22.05 pounds, to reach that amount. Nicotine is an alkaloid found in the nightshade family of plants. Nicotine acts as both depressant and stimulant to the central nervous system. Nicotine first causes a release of hormone epinephrine, which will further stimulate the nervous system and is responsible for part of the "kick" from nicotine. The drug induced feelings of pleasure and over time addiction.



**Figure 1: Nicotine**

Some time stopping tobacco use will cause withdrawal symptoms, including toxic for our health (Nicotine) and it is truth that nicotine is the main reason for cancer diseases. House fly, “*Musca domestica*” {Diptera: Muscidae} is a very important medical and also veterinary insect pest. *Musca domestica* is a major vector for so many medical and veterinary pathogenic organisms. Extracts of few plants species may be useful as insecticides for controlling the housefly and they should be exploited as a component of integrated vector control. Nicotine is known as the main alkaloid of tobacco, isolated in 1828 from tobacco leaf. Apart from nicotine, anabasine, normicotines are also alkaloid found in tobaccos which also have insecticidal properties. Nicotine will works when tobacco smoke is inhaled, nicotine is absorbed through the lungs, and reaches the brain in about 7 seconds. Exposure to nicotine changes the way your brain functions. Dried leaves and stalks, and whole herb of tobacco are widely used in traditionally in subcontinent for their insecticidal, antispasmodic, analgesic, emetic, sedative properties. Nicotine was isolated from tobacco leaves (*Nicotiana tabacum*) in 1828, but the powerful effects of nicotine were well recognized. Tobacco plant is native to Americas and it is used as a medicine.

#### PROCEDURE.<sup>[10,11]</sup>

Fresh *Solanum melongena* was collected from the vegetable market. In the lab, it was washed peeled and cut into small pieces and dried under shade for two

#### RESULTS AND DISCUSSION

**Table 1: Insecticidal activity of *Solanum melongena* against *Sitophilus oryzae***

S.NO	GROUP	KD 50 (Min)	KD 100 (Min)
1	<i>Solanum melongena</i> extract 1% w/v (T)	24.5	35.5
2	<i>Solanum melongena</i> extract 5% w/v(T)	15.2	19.2
3	Control 1 (Acetone)	0.0	-
4	Control 2 (Without solvent)	0.0	-
5	Nicotine 5% w/v (S)	5.5	12.5

**Table 2: Insecticidal activity of *Solanum melongena* against Carpenter Ant**

S.NO	GROUP	KD 50 (Min)	KD 100 (Min)
1	<i>Solanum melongena</i> extract 1% w/v (T)	25.3	52.5
2	<i>Solanum melongena</i> extract 5% w/v (T)	12.5	25.2
3	Control 1 (Acetone)	0.0	-
4	Control 2 (Without solvent)	0.0	-
5	Nicotine 5% w/v (S)	5.5	12.5

weeks. It is then subjected to reduce into moderately coarse powder. The powder is extracted with ethanol and it is kept at room temperature for 24hrs. Then the collected extract is again kept for 1 weak at normal room temperature to convert the mixture into semi solid form. This semi solid mass is separated with petroleum ether and water (equal amount) in a separating funnel and the two layers are separated into aqueous layer and organic layer.

The organic layer is collected in a beaker and it is kept at room temperature for one day. The mixture is converted into solid mass. This solid mass which is used for the insecticidal activity contains nicotine in very less amount (1gm of solid mass of *Solanum melongena* contains 1µgm nicotine).

#### Insecticidal testing<sup>[1,2,6,8]</sup>

The ethanol free semisolid extract mass was dissolved in acetone at two different concentrations. (1% w/v and 5% w/v) is being reported here.

#### Contact bioassay

A contact bioassay by modified method was used to test the toxicity of the extract. Each concentration of the extract was kept in Petri dish. After evaporation of the solvent, ten adults *Sitophilus oryzae* was introduced in to the dish. Four replicates for each concentration were made to knocked down insects (i.e. those that no longer maintained normal posture and were unable to move or were on their backs) were recorded at 1min intervals up to 3hours or until total mortality was achieved. The insects were observed under an optical microscope and mortality was determined when they did not respond to mechanical stimulation. Control dishes with acetone, methanol and solvent were performed separately up to 100hours. Knockdowns (KD 50) as the minutes needed to produce mortality of 50% of insects were determined by the probability analysis.

**Table 3: Insecticidal activity of *Solanum melongena* against Pantry Weevil Larvae**

S.NO	GROUP	KD 50(Min)	KD 100%(Min)
1	<i>Solanum melongena</i> extract 1% w/v (T)	10.2	23.2
2	<i>Solanum melongena</i> extract 5% w/v (T)	7.2	16.7
3	Control 1 (Acetone)	0.0	-
4	Control 2 (Without solvent)	0.0	-
5	Nicotine 5% w/v (S)	5.5	12.5

**CONCLUSION**

In the present study Insecticidal activity of *Solanum melongena* was performed and various components present in it are responsible for Insecticidal activity. *Solanum melongena* was found to have excellent Insecticidal activity as compared to standard drug used for the study.

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