

Effect of plant chemical Azadirachtin against pupae of *Spodoptera litura*

Sudha Summarwar* and Jyotsana Pandey

Department of Zoology, S.D. Government college Beawar, M.D.S University Ajmer (Rajasthan) India

*Corresponding Author E-mail: saraherry@gmail.com

Received: 14.05.2016 | Revised: 25.05.2016 | Accepted: 28.05.2016

ABSTRACT

The present studies were designed to assess the Effect of plant chemical Azadirachtin against pupae of *Spodoptera litura*. The result show that leaf extract of *A.indica* caused maximum pupal mortality of 84 percent when pupae were treated at 2% extract. At 0.1, 0.5, 1 and 1.5% concentrations percent mortality in pupae was reported as 25.33, 34.66, 46.66 and 62.65 respectively and Seed extract of *A.indica* was observed to be more effective in comparison to leaf extract. Maximum mortality of 92 percent was recorded when pre-pupa were treated with 2% of seed extract. At 0.1, 0.5, 1.0 and 1.5% of extract, mortality caused was 30.66, 42, 49.33 and 76 percent respectively. Highest larvicidal and pupicidal activity was shown by seed extract of *A.indica* followed by leaf extracts of *A.indica*.

Key words: Azadirachtin, Seed extract, leaf extract, Pupae.

INTRODUCTION

In India, some eighteen of food grains are lost as a result of pathogens and bug pests⁹. As a result of these issues, a probe goes on to find new, less damaging cuss management tools. Standard artificial organic pesticides are unfit within the inexperienced context by their high toxicity, future persistence and propensity of bioaccumulation⁵.

Use of chemicals for pest control indeed has been proved as boon for Agriculture and chemical insecticides are often recommended to combat the infestation of these pests, however, their indiscriminate use has tremendously raised new and unbeatable constraints. In such situation bioactive products of plant origin, being less persistent in environment, safe for mammals and non- target organism, may be better Alternative for pest control⁴.

The neem tree (*Azadirachta indica* A. Juss) is one of the most studied plants with

toxicity properties against insect pests and it is considered safe for human health and environment. Neem products activity persists on plants about four to seven days after its application^{2,7}, which means it presents fast degradation and, consequently, a low intoxication risk to mammals and birds⁶. Azadirachtin, a complex tetranortriterpenoid limonoid from the neem seeds, is the main component responsible for the toxic effects in insects.

The castor cut worm, *S. litura* is one in the entire necessary polyphagous crop pests distributed throughout south and japanese world tropical infesting 112 species of plants happiness to forty four families³ as well as groundout. In Republic of India it feeds on seventy four species of cultivated crops and a few wild plants⁸.

Cite this article: Summarwar, S. and Pandey, J., Effect of plant chemical Azadirachtin against pupae of *Spodoptera litura*, Int. J. Pure App. Biosci. 4(3): 179-181 (2016). doi: <http://dx.doi.org/10.18782/2320-7051.2287>

S. litura may be a cosmopolitan and polyphagous tormenter moving many crops worldwide inflicting intensive loss of agricultural production.

Keeping these points in mind the present studies were designed to assess the Effect of plant chemical Azadirachtin against pupae of *Spodoptera litura*.

MATERIALS AND METHODS

To assess the pupicidal action of plant extracts, late sixth instar larvae (pre-pupal stage) were treated by topical method. Pupicidal activity was calculated by subtracting the number of emerging adults from the total number of pupae treated.

Topical application: Larvae were collected from rearing stock and were kept in ventilated plastic containers (20 cm diameter and 8 cm in height) for the bioassay. For topical application, 2 ul of the solvent extract was applied topically on each larva with the help of a micropipette. After treatment the larvae were released in the plastic container containing cabbage leaves. Three replicates were run for each concentration per solvent extract and controls treated with solvent were kept in each experiment. Ten larvae were treated in each replicate. Larval mortality was observed after 48 hours of treatment. Percent mortality was calculated and corrected using Abbott's formula¹. The correction was done only when the death in control groups was between 5-20%.

RESULTS AND DISCUSSION

Leaf Extract:

Leaf extract of *A.indica* caused maximum pupal mortality of 84 percent when pupae were treated

at 2% extract. At 0.1, 0.5, 1 and 1.5% concentrations percent mortality in pupae was reported as 25.33, 34.66, 46.66 and 62.65 respectively. In control experiment, 2.35 percent mortality was recorded. (Table 1)

Mortality in newly emerged adults was induced by the leaf extract at all the concentrations tested. Maximum mortality (85%) was induced when pre-pupa were treated by the extract at 2%. At other concentrations of 0.1, 0.5, 1.0 and 1.5% mortality recorded in newly emerged adults was 34.00, 38.72, 62.44 and 75.18 percent respectively. Percent mortality observed in control experiment was 3.24.

Seed Extract:

Seed extract of *A.indica* was observed to be more effective in comparison to leaf extract. Maximum mortality of 92 percent was recorded when pre-pupa were treated with 2% of seed extract. At 0.1, 0.5, 1.0 and 1.5% of extract, mortality caused was 30.66, 42, 49.33 and 76 percent respectively. 2.30 percent mortality was observed in control experiment. (Table 1)

Percent adult mortality observed within 24 hrs of emergence was maximum of 100 in pupae treated at 2% extract. 35.29, 53.19, 66.02 and 83.01 percent adult mortality was observed at the concentrations of 0.1, 0.5, 1.0 and 1.5% seed extract respectively. In control experiment adult mortality observed was 3.35 percent.

Direct toxicity of this plant is probably due to the presence of complex mixture of active compounds like alkaloids, flavenoids and terpenoids etc. Maximum mortality occurred during metamorphosis and moultings. This is because the poorly sclerotised cuticle of larvae fails to resist the penetration of the extracts in the body which results in death.

Table 1: Toxicity of *A.indica* to pupae of *Spodoptera litura* treated by Topical application method

Doses %	<i>Azadirachta indica</i>			
	Leaf extract		Seed extract	
	Percent Pupal Mortality	Percent Adult Mortality (within 24 hrs)	Percent Pupal Mortality	Percent Adult Mortality (within 24 hrs)
0.1	25.33	34	30.66	35.29
0.5	34.66	38.72	42	53.19
1	46.66	62.44	49.33	66.02
1.5	62.65	75.18	76	83.01
2	84	85	92	100
Control	2.35	3.24	2.3	3.35
F-Value	224	217.55	128	217.22
CV at 5 %	3.61	3.34	3.61	3.61

REFERENCES

1. Abbott, W.S., A method of computing the effectiveness of an insecticide. *J. Econ. Entomol.*, **18**: 265 (1925).
2. Ahmad, F., Khan, F. R., Khan, M.R., Comparative efficacy of some traditional and nontraditional insecticides against sucking insect pests of cotton. *Sarhad Journal of Agriculture*, Khyber Pukhtunkhwa, **11(6)**: p. 733- 739 (1995).
3. Chari, M.S. and Patel, N.G., Cotton leaf worm *Spodoptera litura* Fabr, its biology and integrated control measures. *Cotton. Dev.*, **13**: 7-8 (1983).
4. Gautam, P., Effect of plant extracts on the growth and development of *Bombyx mori* L. MSc. thesis, G. B. Pant University of Agriculture and Technology, Pantnagar, India, (2003).
5. Ignacimuthu, S. and Jayaraj, S., Eco-friendly approaches for sustainable insect pest management. *Curr. Scie.*, **84**: 1292-1293 (2003).
6. Martinez, S.S., Composição do nim. In: MARTINEZ, S. S. (Ed.). O nim *Azadirachta indica*: natureza, usos múltiplos, produção. Londrina: Instituto Agronômico do Paraná, p. 23-30 (2002).
7. Quontela, E.D., Pinheiro, P.V., Redução da oviposição de *Bemisia tabaci* (Genn.) biótipo B (Hemiptera: Aleyrodidae) em folhas de feijoeiro tratadas com extratos botânicos. *Bioassay, Piracicaba*, **4(8)**: p. 1-10 (2008).
8. Ranga, Rao, G., Rabindra, R.J., Nandagopal, V. and Rameswar, Rao, *Spodoptera litura* (Fab.). In: Groundnut Entomology (eds .Nandagopal, V. and Gunathilagaraj, K.). Satish serial Publishing Hose, New Delhi, pp. 65- 99 (2008).
9. Yadav, A. and Mendhulkar, V.D., Repellency and toxicity of *Couroupito guianensis* leaf extract against silverleaf whitefly (*Bemisia tabaci*). *Int. J. Sci. Res. Pub.*, **5(4)**: 1-4 (2015).