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Effect of leaf extract of *Azadirachta indica* treated diet fed to adults of *Spodoptera litura* on fecundity and egg hatching

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Abstract

The present investigation focus on Effect of leaf extract of *Azadirachta indica* treated diet fed to adults of *Spodoptera litura* on fecundity and egg hatching. Results show that when adult females of *S. litura* were fed on extract treated diet, drastic reduction in fecundity and egg hatching was observed. Maximum reduction in fecundity (68.93%) was observed when females were given *A. indica* seed extract treated honey solution as food. The effect was dose- dependent and increased with increasing concentration of extract. Egg hatching was adversely affected when adult females were fed on extract treated food. This indicate that ingestion of extracts with food by adults of *S. litura* have strong inhibitory effect on fecundity and also on egg hatching.

Keywords: *Azadirachta indica*, *Spodoptera litura*, fecundity, egg hatching.

1. Introduction

Biopesticides are living organisms which can destroy agricultural pests. The two most important advantages of biopesticides are that a) they are target specific and do not destroy beneficial organisms and b) do not leave harmful residues. As Neem, "*Azadirachta indica*" is non-toxic to birds and mammals and is non-carcinogenic, its demand is likely to increase sharply all over the world. Large international biotechnology firms are already engaged in research and commercial production of neem-based pesticides.

Amongst various group of agriculture pest, *Spodoptera litura* is one major polyphagous pest which attacks economically important crops thereby causing extensive damage. The search for plant derived chemicals that have potential use as crop protectants (insecticides, antifeedants and growth inhibitors) often begins with the screening of plant extracts (Ho SH *et al.*, 1997) [5]. Therefore, the present investigation focus on Effect of leaf extract of *Azadirachta indica* treated diet fed to adults of *Spodoptera litura* on fecundity and egg hatching.

2. Materials and Methods

Effect of plant extracts on fecundity and fertility of *S. litura* was observed by feeding adults on extract- treated diet. Ten grams of leaf extracts and seed extract of *A. indica* were dissolved in 90ml of 15% honey solution to prepare a 10% stock solution (w/v). The stock solution was further diluted to prepare 1, 2, 3, 4 and 5% test formulations. Cotton swabs soaked in the required concentration of the extract containing honey solutions were offered as food to adults placed in 50 m.l. glass jars. In each jar 2 strips of filter paper were provided for oviposition.

Four pairs of 1 day old adults were introduced into each jar which was then covered with muslin cloth. The adults were allowed to feed on the different concentrations of the treated honey solution for 48 hours. The number of eggs laid on filter papers was counted. Muslin cloth covering the jar was also checked for any egg laying. The eggs were allowed to hatch and percent hatching was calculated. In the control jar 15% honey solution was provided as food. Three replicates were kept for each concentration. All diets were replenished after 1 day to avoid fungal growth. Following parameters were recorded:

1. Number of egg masses laid.
2. Number of eggs per egg mass.
3. Total number of eggs laid.
4. Percent hatching of eggs.

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3. Results

3.1 Leaf Extract

Adult females of *Spodoptera litura* fed on *A. indica* leaf extract treated honey solution showed a significant decrease in egg laying at all the concentrations tested. At 5% number of egg masses laid reduced to 4.66 (8 egg masses in control). 1% extract was not effective in reducing the number of egg masses laid whereas 2, 3 and 4% reduced the egg masses to 7.33, 6.33 and 6.00 respectively (Table 1).

Eggs laid in each egg mass also showed significant reduction. Highest reduction was reported at 5% where only 103.66 eggs were laid in a single egg mass (291.0 eggs per egg mass in

control). Number of eggs laid per egg mass at 1, 2, 3 and 4% were 218.33, 211.00, 164.66 and 149.66 eggs respectively.

Total eggs laid by females fed on extract treated diet were reduced drastically from 2328 eggs (in control) to 487.00 eggs (at 5%). The reduction was dose-dependent and total eggs laid at 1, 2, 3 and 4% were reduced to 1673, 1548, 1024 and 898.00 respectively.

Hatching was reduced to 38% in eggs laid by females fed on diet treated with 5% extract. At 1, 2, 3 and 4% extract hatching observed was 85.66, 73.00, 62.66 and 51.66 percent respectively. In control experiment egg hatching was 92.33 percent.

Table 1: Effect of leaf extract (*Azadirachta indica*) treated diet fed to adults of *Spodoptera litura* on fecundity and egg hatching.

Doses %	Number of egg masses laid	Number of Eggs/egg mass	Total number of Eggs laid	Number of eggs hatched /egg mass	Percent hatching of eggs
	Mean±SE	Mean±SE	Mean±SE	Mean±SE	Mean±SE
1	7.66±0.57	218.33±8.96	1673±3.33	187.05±0.33	85.66±5.77
2	7.33±0.57	211.00 ±11.53	1548±4.22	154.22±0.57	73.00±1.73
3	6.33±0.57	164.66±3.78	1024±3.00	103.39±0.56	62.66±2.30
4	6.00±0.33	149.66±11.59	898±5.00	77.41±0.65	51.66±1.52
5	4.66±0.57	103.66±9.29	487±6.05	39.38±0.57	38.00±2.00
Control	8.00±0.00	291.00±6.55	2328±8.02	266.99±3.85	92.33±3.51

Table 2: Effect of seed extract (*Azadirachta indica*) treated diet fed to adults of *Spodoptera litura* on fecundity and egg hatching.

Doses %	Number of egg masses laid	Number of Eggs/ egg mass	Total number of Eggs laid	Number of eggs hatched /egg mass	Percent hatching of eggs
	Mean±SE	Mean±SE	Mean±SE	Mean±SE	Mean±SE
1	7.33±0.57	202.33±11.67	1473.66±9.29	163.30 ±0.57	80.66±1.15
2	6.25±0.57	197.66±2.51	1299.33±11.02	135.53±0.33	65.66±5.13
3	6.00±0.00	157.33±5.51	944.00 ± 9.50	97.33±0.65	61.66±3.51
4	5.33±0.57	146.00±6.00	776.66±10.50	68.94±0.72	47.33±3.05
5	4.33±0.57	93.66±3.21	404.66±9.50	27.23±0.75	29.00±1.73
Control	8.00±0.00	291.60±5.77	2333.33±8.65	269.00±0.33	92.33±0.57

3.2 Seed Extract

Seed extract was comparatively more effective in reducing fecundity and egg hatching by females fed on treated honey. Effect was evident by reduction in number of egg masses, eggs per egg mass and percent hatching in each egg mass (Table 2).

Egg masses were reduced to 4.33 (compared to 8 in control) when females were fed on diet treated with 5% extract. At other concentrations egg masses were reduced to 7.33 at 1%, 6.25 at 2% 6.00 at 3% and 5.33 at 4% respectively.

Results show that seed extract had an adverse effect on the number of eggs in each egg mass. At highest concentration of 5% average eggs laid in each egg mass were reduced to 93.66 compared to 291.60 in control. At 1% extract effect was minimum and eggs laid per egg mass were 202.33. At 2, 3 and 4% extract 197.66, 157.33 and 146.00 eggs were laid in one egg mass respectively.

Total eggs laid were 2333.33 in control which reduced to 404.66 eggs at the concentration of 5%. At 1, 2, 3 and 4% extract total eggs were 1473.66, 1299.33, 944.00 and 776.66 respectively.

Percent hatching of eggs was also affected when females were fed on seed extract treated diet. Maximum reduction in hatching (29 percent hatching) was observed at 5% extract. At other concentrations percent hatching recorded was 80.66 (at 1%), 65.66 (at 2%), 61.66 (at 3%) and 47.33 (at 4%). In control experiment hatching observed was 92.33 percent.

4. Discussion

Results show that when adult females of *S. litura* were fed on extract treated diet, drastic reduction in fecundity and egg

hatching was observed. Maximum reduction in fecundity (68.93%) was observed when females were given *A. indica* seed extract treated honey solution as food. The effect was dose-dependent and increased with increasing concentration of extract. Egg hatching was adversely affected when adult females were fed on extract treated food.

Several plants have been reported to affect fecundity and fertility in insects (Loke *et al.* 1992, Jeyakumar and Gupta 1999, Gajmar *et al.* 2002) [7, 6, 3]. Ganesh and Sevarkodiyone (2009) reported the effect of seed extracts of *Annona squamosa* and *Lepidium sativum* on reproductive parameters of *S. litura*. Batta and Santhakumari (1970) [1] observed the antifertility effect of *O. sanctum* and *Hibiscus rosa sinensis*. Repellent activity of *O. sanctum* was reported against mosquitoes (Chokechajaroenporn *et al.* 1994) [2] and jute semilooper (Malik and Rafique, 1989) [8].

This indicate that ingestion of extracts with food by adults of *S. litura* have strong inhibitory effect on fecundity and also on egg hatching. Reduced egg laying and hatching is probably due to interference by chemical compounds present in extracts with embryogenesis and probably due to their ovidical action.

5. References

- Batta SK, Santhakumari G. The antifertility effect of *Ocimum sanctum* and *Hibiscus rosa sinensis*. Indian J Med Res. 1970; 59:77-78.
- Chokechajaroenporn O, Bunyapraphatsara N, Kongchuensin S. Mosquito repellent activities of *Ocimum* volatile oils. Phytomedicine. 1994; 1:135-139.
- Gajmer T, Singh R, Saini RK, Kalidher SB. Effect of methonolic extracts of neem (*Azadirachta indica* A. Juss)

- and bakain (*Melia azadirach* L) seeds on oviposition and egg hatching of *Earias vittella* (Fab) (Lepidoptera, Noctuidae). J Appl Ent. 2002; 126:238-243.
4. Ganesh kumar A, Sevarkodiyone SP. Effect of seeds extracts of *Annona squamosa* L. and *Lepidium sativum* L. on the pupal development and reproductive parameters of tobacco cutworm, *Spodoptera litura* (Fabricius). Hexapoda 2009; 16(2):132-135.
 5. Ho SH, Ma Y, Huang Y. Anethole, a potential insecticide from *Ilicium verum*, against two stored product insects. International Pest Control. 1997; 39:50-51.
 6. Jaya kumar P, Gupta GP. Effect of Neem seed kernel extract (NSKE) on *Helicoverpa armigera*. Pesticide Res. Jour. 1999; 11:32-36.
 7. Loke JH, Heng CK, Rejab A, Basirun N, Mardi HCA. Studies on neem (*Azadirachta indica* A.Juss) in Malaysia. In: Proc. Third International Conference on Plant Protection in the Tropics. Ed. by Ooi, P.A.C., Lim, G.S., Teng, P.S. Kuala Lumpur: Malaysia Plant Protection Society, 1992, 103-107.
 8. Malik MS, Rafique M. Effects of methanol extracts of *Ocimum sanctum* Linn. on jute semilooper. Indian J Entomol. 1989; 51:84-89.