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Eco-friendly management of *Spodoptera litura* Fab. using plant products

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Abstract
Spodoptera litura is an economically important polyphagous pest in India, China and Japan causing considerable economic loss to many vegetable and field crops since the larvae can defoliate many economically important crops. The overuse of synthetic pesticides to control insect pests leads to physiological resistance and adverse environmental effects, in addition to high operational cost. Insecticides of botanical origin have been reported as useful for control of agricultural and public health insect pests. Present study was designed to study the efficacy of four plant products *viz.*, Neem oil, pungam oil, NSKE, Vasambu powder and an insecticide check (Monocrotophos) against the feeding activitiy of *S. litura*, each were taken in different concentrations. Among the products tested, spray application of NSKE 5% followed by neem oil 2% and vasambu 5% were found significantly effective in reducing the feeding activity and there by exhibited feeding deterrency throughout the period of experimentation.

Keywords: *Spodoptera litura*, neem oil, NSKE, vasambu, insecticide

Introduction
Chemical pesticides play a prominent role in increasing agricultural production by controlling the insect pests. However, synthetic insecticides possess natural toxicities that impact on the elimination of existing natural enemies and polluting the soil, water, air, food, health of farmers, consumers and environment. Due to indiscriminate use and its impact of chemical insecticides prompted the search for alternate techniques of insect pest management. In this connection, some plants or their constituents have been proposed as alternatives to synthetic insecticides, because they are exempt from regulatory requirements [1]. Plant products have been suggested as best alternative sources for insect control products because some are selective, biodegrade to non-toxic products and have fewer effects on nontarget organisms and the environment [2]. These potential new insecticides can be applied to field and greenhouse crops in the same manner as the insecticides currently used. They also provide an alternative for resistance management because certain plant preparations or phytochemicals can be highly effective against insecticide-resistant insect pests [3]. In this context, bioassays were conducted using plant products for effective and eco-friendly management of *Spodoptera litura* Fab.

Materials and Methods
An experiment was conducted in the Vanavarayar Institute of Agriculture during 2015. In order to determine the efficacy of four plant products *viz.*, Neem oil, pungam oil, NSKE, vasambu powder and an insecticide check (Monocrotophos) against the feeding activitiy of *S. litura*, each were taken in different concentrations. Fresh castor leaf discs (7.5 cm diameter) were cut from fully expanded castor leaves. The discs were dipped for 60 seconds in the test solutions. These treated and air- dried leaves were placed in petriplates lined with moist filter paper. In each petriplate, four third instar larvae was released using a camel hair brush and allowed to feed. Progressive consumption of leaf area was measured both in control and in treatments at first, third, fifth day after release of larvae using graphical method. Three replications of each of the treatments with four larvae per replicate were maintained.
The mean percent leaf damage and protection in the treatments over control were worked out compared to the damage in control (water dip) as standard. The mean percentage of protected area was computed accordingly.

Results and Discussion

The larval feeding damage was ranged from 3.26 to 74.49 per cent which afforded a corresponding protection ranging from 25.48 to 96.72 per cent. The leaf area consumed in treatments of monocrotophos were independently superior to other treatments followed by NSKE and Neem oil recording 3.57 and 7.17 per cent leaf consumption and 95.16 and 90.31 per cent of leaf protection, respectively. The treatments with Vasambu and Pungam oil recorded 7.69 and 31.65 per cent leaf consumption and it was correspondingly 88.94 and 68.84 per cent respectively and found superior to control. Among the six treatments the insecticide monocrotophos which is equally on par to NSKE recorded 95.59 per cent protection and 3.26 per cent leaf consumption. The present findings were in accordance with Rajendran and Abdul Kareem, 1978 [4] who reported that Neem oil and NSKE emulsions performed significant feeding inhibition against *S. litura*. Rathikannu [5] reported that the highest percent reduction of defoliator population was noticed after second spray in NSKE 5% (53.34) followed by NEEMAZAL T/S 1% 900 ml ha^{-1} (49.09) treated plots at 5 DAT. Ramprasad *et al*. [6] reported that NSKE 5% was found to be effective as fenvalerate (0.01%) against *S. litura* and Neem oil 3% and NSKE 5% bring about suppression of *S. litura* on green gram (Estoy *et al*.,) [7] and on soybean (Soejinto) [8].

Table 1: Eco-friendly management of *S. litura* using plant products (mean percent consumption and protection

Treatment	Mean percent of protection						Mean percentage of consumed area	Mean% of protected area	Corrected percentage
	1st day		2nd day		3rd day				
	Mean value of protected area	Mean% of protected area	Mean value of protected area	Mean% of protected area	Mean value of protected area	Mean% of protected area			
Neem oil (2%)	179.36	88.56	45.49	92.84	47.52	96.96	7.17	92.78	90.31
Pungamoil (2%)	35.62	17.58	46.05	93.98	46.53	94.96	31.65	68.84	58.18
NSKE (5%)	195.25	96.4	45.93	93.74	48.55	99.08	3.57	96.40	95.16
Vasambu powder (5g)	176.34	87.07	44.70	91.20	47.54	97.02	7.69	91.76	88.94
Insecticide (2ml)	192.01	94.81	47.72	97.39	48	97.96	3.26	96.72	95.59
Control	98.81	48.78	3.43	7.01	10.12	20.65	74.49	25.48	0

Conclusion

Laboratory evaluation on the effect of plant products on *S. litura* revealed that spray application of NSKE 5% followed by Neem oil 2% and vasambu 5% were found significantly effective in reducing the feeding activity and there by exhibited feeding deterrency throughout the period of experimentation.

References

1. U.S. EPA. Exemption of certain pesticide substances from federal insecticide, fungicide and rodenticide act requirements. U.S. Environmental Protection Agency, Washington, DC, 1996.
2. Singh G, Upadhyay RK. Essential oils: a potent source of natural pesticides. J Sci. Ind. Res. 1993; 52:676- 683.
3. Lindquist RK, Adams AJ, Hall FR, Adams IHH. Laboratory and greenhouse evaluations of Margosan-O against bifenthrin-resistant and susceptible greenhouse whiteflies, *Trialeurodes vaporarium* (Homoptera: Aleyrodidae). In: J.C. Locke and R. H. Lawson (Eds.) Proceedings of a workshop on neem's potential in pest management programs, USDA-ARS 86, Beltsville, MD. 1990, 91-99
4. Rajendran R, Abdul Kareem A. Studies on the effects of plant products and organotin compounds as antifeedants on the activity of amylase and protease in larvae of *Spodoptera litura* F. (Lepidoptera) on sweetpotato (*Ipomoea batatas* Lamb). South Indian Horticulture. 1978; 26(1):14-17.
5. Rathikannu S. Bio-ecology, Management of pests of *Gloriosa superba* (Linn) and *Phyllanthus amarus* (Schum and Thonn) and influence of insect damage on the medicinal properties. M.Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, 2005, 85.
6. Ramprasad S, Ramaiash S, Joshi BG, Rao SR. Relative efficacy of neem seed kernel suspension, some synthetic pyrethroids and insecticides against *S. litura* (Fab.) in tobacco nurseries. Indian Journal of Plant Protection. 1998; 15:190-192.
7. Estoy GF, Olivares FM, Obien SR. Field evaluation of neem products for the control of rice and mung bean pests. In: Botanical Pest Control Project- Proceedings of the Final Workshop, IRRI, Manila, Phillippines. 1992, 108-116.
8. Soejinto J. Efficacy evaluation of neem oil and neem seed kernel extract on pests of rice and soybean. In: Botanical Pest Control Project- Proceedings of the Final Workshop, IRRI, Manila, Phillippines. 1992, 95-99.