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Pupicidal activity of plant extracts of *Catharanthus roseus* against 6th instar of *Spodoptera litura*

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Abstract

The present investigation focus on the pupicidal action of plants was evaluated by treating the pre-pupal stage of *Spodoptera litura* with the leaf extract of *Catharanthus roseus* by topical application method. 73.33, 49.33, 33.33, 28.00 and 17.33 percent mortality was observed when pre-pupae were treated with 2.0, 1.5, 1.0, 0.5 and 0.1% of leaf extract of *C. roseus* respectively.

Keywords: *Spodoptera litura*, *Catharanthus roseus*, Pupae, Leaf extract.

1. Introduction

Catharanthus roseus (Madagasker periwinkle) formerly known as *Vinca rosea* Linn. Grows throughout India and is found in wet and sandy land. It has great medicinal value and extensive work has been done on the medicinal uses of this plant. A new antitumour compound catharanthamine has been isolated from *Catharanthus roseus* by El- Sayed and Cordell (1981) [5]. Sukumar and Osmani (1981) [11] reported the isolation of insect sterilants from *Catharanthus roseus*. Chattopadhyay *et al.* (1991) [2] reported the hypoglycemic and antihypoglycaemic effect of leaves of *Vinca rosea*.

Spodoptera litura (Fabricius), the tobacco caterpillar is a sporadic pest of several plants with high mobility and reproductive potential. It is widely distributed in Asia, Australasia and pacific islands. Several outbreaks of this pest on cotton, tobacco and chillies have been reported in India (Rao *et al.* 1983) [10] causing great economic loss (Hosny *et al.* 1986) [6].

Pupal period in *S. litura* can be distinguished in three stages: Pre-pupal, Mid-pupal and pupal stages. Pre-pupal stage starts with the shrinkage of larval body at the end of 6th instar larval stage. Mid-pupal stage is intermediate larval-pupal stage and pupal stage is the fully formed pupa.

The present investigation focus on the pupicidal action of plants was evaluated by treating the pre-pupal stage of *Spodoptera litura* with the leaf extract of *Catharanthus roseus* by topical application method.

2. Materials & 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.

2.1 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 formula (Abbott, 1925) [1]. The correction was done only when the death in control groups was between 5-20%.

3. Results & Discussion

The pupicidal action of plants was evaluated by treating the pre-pupal stage of *Spodoptera litura* with the leaf extract of *Catharanthus roseus* by topical application method.

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The result show that 73.33, 49.33, 33.33, 28.00 and 17.33 percent mortality was observed when pre-pupae were treated with 2.0, 1.5, 1.0, 0.5 and 0.1% of leaf extract of *C.roseus* respectively (Table 1).

Table 1: Toxicity of *C. roseus* to pupae of *Spodoptera litura* treated by topical application method

Doses %	<i>Catharanthus roseus</i>	
	Leaf extract	
	Percent Pupal Mortality	Percent Adult Mortality (within 24 hrs)
0.1	17.33	40.39
0.5	28	54.02
1	33.33	68.01
1.5	49.33	83.33
2	73.33	100
Control	2.5	3.5
F-Value	231	205
CV at 5%	3.34	3.61

Mortality in newly emerged adults from treated pupae was highest of 100 percent at 2.0% extract. At 0.1, 0.5, 1.0 and 1.5% extract, mortality recorded was 40.39, 54.02, 68.01 and 83.33 percent respectively. In control experiment percent mortality in newly emerged adults was 3.50.

The effect was dose-dependant and higher concentrations were found to be more effective compared to lower ones and also instar-dependant, the earlier instars being more susceptible than the later instars.

Insecticidal properties of *Catharanthus roseus* have been reported earlier (Deshmukhe *et al.* 2010) [3]. Insecticidal properties of *C.roseus* have been reported against *Phthorimaea operculella* and *Spodoptera litura* Prajapati *et al.* 1998) [9] and *Spodoptera littoralis* (Meisner *et al.* 1981) [7]. Nelson *et al.* (2006) [8] suggested that leaf and flower extracts of *C.roseus* cause imbalance in enzyme activity which could have collapsed the digestive system of larvae. According to them larval and pupal mortality could be attributed to direct insecticidal action or due to feeding inhibition and disruption of food assimilation.

4. References

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