



## BIO-EFFICACY EVALUATION OF *LANTANA CAMARA* BOTANICAL EXTRACT AGAINST *SPODOPTERA LITURA* (TOBACCO CUT-WORM)

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### Abstract

India is a forming based country just about 70% family population depends on Agriculture for their livelihood. *Spodoptera litura* is a phytophagous pest, which attacks spacious range of cultivated crops. Use of pesticides such as organophosphate and Carbamates for controlling various pests in an effective strategy for protecting crops, but these synthetic chemical pesticides pose serious threats to the environment and to non-target organisms due to its persistent nature. Use of natural pesticides based on phytochemicals as active ingredients obtained from botanical is a viable option and being popular due to their eco-friendly and non-toxicological properties. *L. camara* is a weed having different medianol properties. The study was performed using Methanolic extract of *L. camara* at five different concentration (1.25%, 2.50%, 5.00%, 10.00% and 15.00%). Against third instar larvae of the pest results showed significant mortality rate and dose dependency. From this screening investigation, we concluded that Methanolic extract of *Lantana camara* exhibit significant mortality rate (above 90%) at 15% concentration in Aqueous solution then by 83.33% mortality in chloroform solvent, 60.0% mortality in Ethyl-acetate and 66.6% in methanol solvent at 15% concentration, it could also be concluded that *Lantana camara* do have mortality activity at these concentrations. These collected data were carefully analysed using MS Excel and Poloplus software.

**Keywords :** *Lantana camara*, *Spodoptera litura*, Mortality, Phytophagous, Bio-efficacy.

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### Introduction

*Lantana camara* L. (Family : Verbenaceae) is a woody shrub with diversified number of flower colours. It is one of the most toxic weeds in the world (Holm and Heberger, 1969). Earlier researches have shown that aerial parts of *Lantana camara* is a rich source of insecticidal activity (Dua *et al.*, 2010; Pandey *et al.*, 1982) and bioactive molecules (Sharma *et al.*, 1988). Biofumigant particle was also screened and characterized from leaves against the storage pest (Rajshekar *et al.*, 2013).

*Spodoptera litura* (Lepidoptera : Noctuidae) larvae feeds prodigiously as it advances in time period, therefore it is regarded as one of the major threats to the present day in-depth agriculture (Nataraj and Balikai, 2017). The pests of Noctuidae are very damaging for crops and other economic plants (Thakur *et al.*, 2012-2013). To reduce the defoliation of leaves and destruction of crops caused by pest, aimless applications of pesticides are used by farmers (Ali *et al.*, 2018; Yooboon *et al.*, 2019).

Due to collective and unrestricted use, the pesticides residue concentrations in vegetables are observed highest in

India (Devi, 2007). Earlier reports also showed high resistance of *Spodoptera litura* to many frequently used synthetic insecticides including organophosphates, pyrethroids, carbamates (Armes *et al.*, 1997; Kranthi *et al.*, 2002; Gandhi *et al.*, 2016). This motivates scientists and researchers to identify alternative options i.e. biopesticides can be utilized for integrated pest management (IPM). It is observed that plant based biopesticides may play a vital role in achieving constant revolution on account of their biodegradable nature, and the magnitude to alter the behaviour of target pest and favourable safety profile (Dubey *et al.*, 2010).

### Material & Methods

The Aerial parts of the *Lantana camara* were collected randomly from the fields of Chaudhary Charan Singh University, Meerut, Uttar Pradesh, India. The plant samples collected then allowed to wash and then dry at room temperature in shaded area then grind and sieved to get fine powdered form and stored in tightly sealed polythene bags.

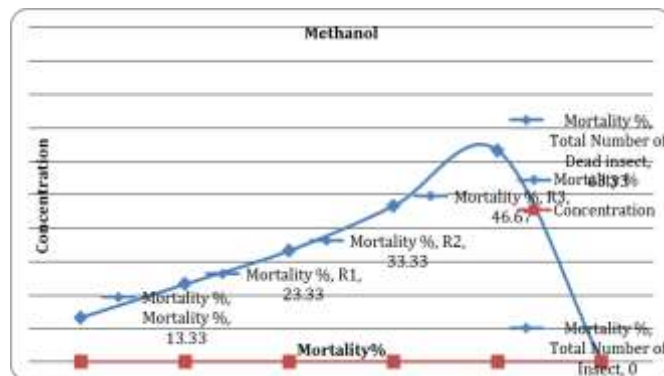
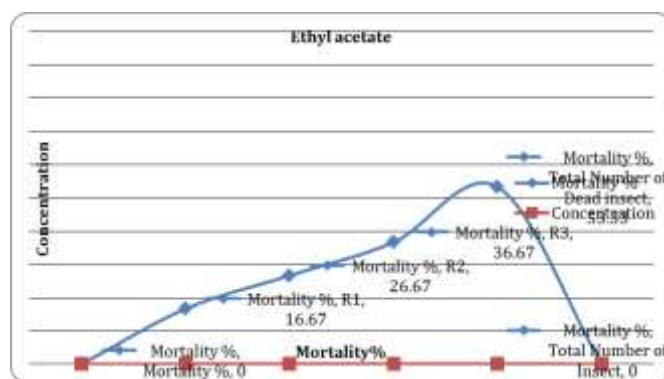
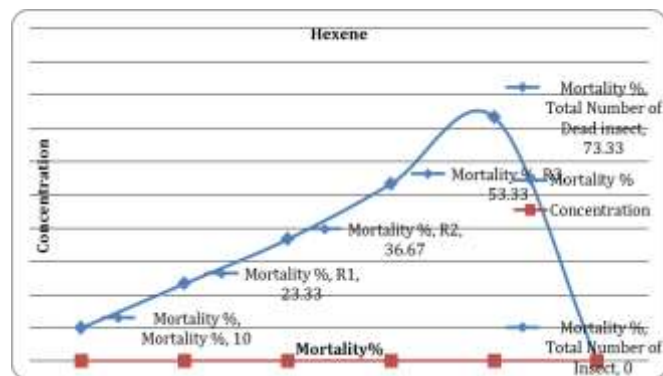
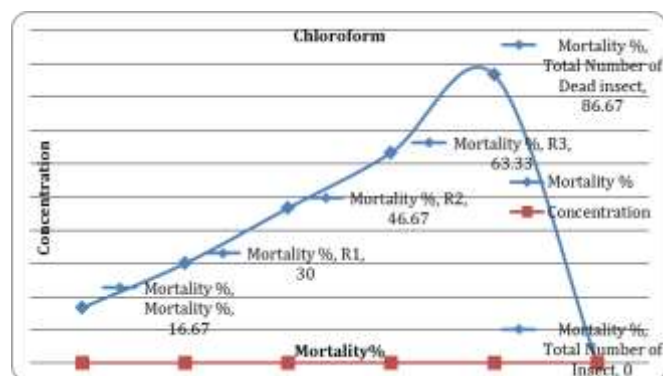
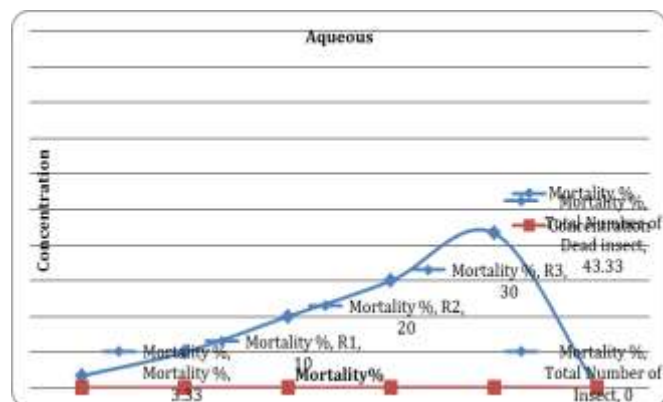
Methanol extract of the plant was prepared by using 100gm of dried powder. 300ml of methanol was added into

dried powder and kept for 24 hours with in the shaker for shaking periodically then filtered and filterate was collected. This process was three times repeated with fresh value of methanol. The filterates were collected and then methanol extracts were concentrated by Rotary Vacuum evaporator (Buchi-Rotavopour R-200/R-205) at 70°C and evaporated to dried crude extract and stored at 4°C in an air tight bottle.

### Result & Discussion

In this study mortality was observed at all respective concentrations (1.25%, 2.5%, 5.0%, 10.0% & 15%) compared to positive control. After that we observed significant mortality activity against all five concentrations compared with control with dose (1.25%, 2.5%, 5%, 10% & 15%) respectively in other words *Spodoptera litura* shows treated mortality significant over control at all concentrations with dose 1.25%, 2.5%, 5%, 10% & 15% respectively. Extract from *L. camara* also provided moderate mortality activities at concentration i.e. 5.0 mg/l. Aqueous (53.33%), chloroform extract (50%). 5 mg/L Hexane crude extract (33.33%). ethyl Acetate crude extract (26.6%) and methanol crude extract (30.0%) against notorious pest.

Mortality Effect of Crude extracts of different solvents of *Lantana camara* against *Spodoptera litura* through choice feeding procedure. As depicted in tables:



### Conclusion

In this study, we observed significant mortality activity against the test pest *Spodoptera litura* in all the five concentration. We also observed insecticidal activity at all respective concentration which might be due to toxicity/poison induced after ingestion of food. A correlation between concentrations activity and mortality was observed.

Aspects that it also influencing antifeedant activity and types of solvents used in screening and concentrations of crude extracts.

The LD<sub>50</sub> and LD<sub>90</sub> limits estimated with hexane, aqueous, chloroform, ethyl-acetate, methanol extracts of *L. camara* were at 7.89, 4.11, 5.02, 11.79, 9.23 and 54.14, 23.54, 26.74, 94.27, 31.68 respectively with fiducial limits of 5.69 to 12.50, 1.59 to 8.73, 3.72 to 6.82, 8.01 to 23.91, 7.31 to 12.47 and 26.89 to 243.13, 10.29 to 1270.69, 16.3 to 67.12, 38.69 to 806.11, 20.72 to 69.33 respectively.

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