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Research Article

Insecticidal activity of *Ailanthus excelsa* against *Callosobruchus maculatus(*Linn.*)*

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ABSTRACT

Ailanthus excelsa commonly known as 'Mahaneem' belongs to family 'Simaroubaceae' found all over India; is also a medicinal plant used as insecticides. 3% concentration of extracts of *Ailanthus excelsa* is found lethal to *Callosobruchus maculatus*

KEYWORDS

Insecticidal activity, *Ailanthus excelsa, Callosobruchus maculatus,* chromatography.

INTRODUCTION

Pulses are main source of protein in India; this crop has been heavily damaged by insect pests, when stored. The pest of stored grain damages the food grains not only in size but in the nutritive value of the crop is being lost heavily. Therefore, there is a need to develop certain kind of safe insecticides which may be either repellant or phagodeterrant or having insecticidal properties. It has been proved that plants have such properties to protect themselves from insect pests. These properties are again proved as secondary metabolites or essential oils. (Brattsten 1983).

There are few reports of chemical composition of *Tagetes erecta*. Gupta and Bhandari (1974) have studied chemical composition of *Tagetes erecta*, Baslas and Singh (1980) have studied extracted yellow essential oils of steam distillation from flowers of *Tagetes erecta.* Philip and Berry (1975); Saxena *et al.,* (1992a; 1992b) have discovered the insecticidal activity of *Lantana Camara* against *Callosobruchus chinensis*; similarly Dixit and Saxena (1990) have reported the insecticidal activity of *Primina interifolia* against *Callosobruchus chinensis*. Neog and Singh (2012) have reported that some plants powders and vegetable oils are also effective against stored grain pests.

The present paper focus on insecticidal activity of a plant extract against *Callosobruchus species* infested on *Phaseolus mungo* in the storage houses.

MATERIALS AND METHODS

Collection and extraction of plant material:

For the present study, leaves of *Ailanthus excelsa* of family Simaroubaceae have been collected from local area. The aerial parts of the plants were shade dried at room temperature and powdered material of 40-60 mesh size was "Soxhlated" in n-hexane, benzene, and methanol. The percentage yield was calculated in each solvent. The crude was vacuum evaporated to dryness under reduced pressure. The semisolid crude extract was purified using column chromatography and TLC. The process of purification was continued till the single spot is obtained.

Statistical methods:

Chi-square test' and 'Probit Analysis' of Finney (1971), was used for the statistical evaluation of experimental data.

Biological assay methodology:

Insecticidal activity of plant extracts of three plants against *Callosobruchus maculatus,*

For studying the insecticidal property, 1 ml of each extracts at three different concentrations; was poured in cleaned glass tubes of 100 ml capacity and uniform film of the extract was made by rolling the vials. Freshly emerged adults (10) were then released in each of the treated vials and mouths of the vials were tied with a

piece of muslin cloth and rubber band to prevent the escape of the adult. Untreated healthy gram seeds were provided to the adults during the bioassay. The mortality of the beetles was records after every 24 hours until died, the complete exhaustion of insects. All experimental bioassay have been carried out with crude extract. The data then obtained for insecticidal activity have been evaluated biostatical using Probit Analysis (Finney. 1971).

RESULTS

Isolation of biologically active compound:

Chromatographic separation:-

The biologically active compound was separated by chromatography on columns (10x62 cm) of silica gel (60-120 mesh) successive elution with n-hexane, petroleum ether (40-60^0) and benzene removes fatty materials, carotenoids and phytosteroids, respectively. Further elution with ethyl acetate yielded (fraction I) contaminated with chlorophylls was removed by treatment with active charcoal and the concentrated extract (fraction II) rechromatographed on a small (4x40cm) columns of silica gel. Elution with benzene, ethyl acetate (9:1) yielded (fraction III) from which the biologically active principle was separated by preparative layer chromatography (PLC). TCL was performed on 0.25 mm layers of silica gel G using benzene: ethyl acetate (85:15) as the developing solvent. Preparative layer chromatography was performed on 1mm layer of silica gel G using benzene methanol (90:10: one drop MeOH) as developing solvent. Fraction I, II, III have been sent to C.D.R.I. Lucknow for further analysis, results will be shown elsewhere.

Insecticidal activity:

Insecticidal activity of the plant using three different concentrations have been analyzed using Probit Analysis Techniques, Finney(1971); as shown in the Table .(1), 24 hours LC_{50} value 1.21 % for n-hexane, 1.34 % for benzene and 1.50% for methanol extracts of *Ailanthus excelsa*. Whereas, the LC_{90} value of three different extracts of *Ailanthus excelsa* are came to be 2.14%; for n-hexane, 2.51% for benzene and 2.84% for methanol, respectively. From the LC_{50} value it appears that n-hexane extracts of *Ailanthus excelsa* is more effective than benzene and methanol extracts for *Callosobruchus maculatus.*

The results when compared by T test value, it was found quite significant at 5% level; ($P < 0.05$). n-hexane extract of *Ailanthus excelsa* found more effective than benzene and methanol extracts against *Callosobruchus maculatus*. The structure elucidation was carried out by using chromatographic techniques. Finally, the insecticidal principles were determined by comparing with the authentic markers.

Insecticidal activity of various indigenous products have been reported by Saxena *et al.,* (1999);Jotwani and Shrivastava (1981); Saxena (1992a; 1992b). The present study is quite comparable with the activities of larvacidal and anti-microbial by Sharma and Saxena (1996);Singh *et al.,* (1988);Saxena *et al.,* (1999).

Table 1: Biostatistical analysis of extracts of *Ailanthus excelsa* against *Callosobruchus maculates.*

Extract	Conc%	24hr. Mortality	Regression Y=a+bx	Regression Coefficient	Heterogenieity [X^2 (n-1)]	LC_{50} %	LC_{90} %
n-Hexane	1.0 2.0 3.0	20 30 46 53 60	15.04x	4.905	3.61(3)	1.21	2.14
Benzene	1.0 2.0 3.0	23 33 46 63 80	8.55+3.28x	3.28	2.11(3)	1.34	2.51
Methanol	1.0 2.0 3.0	24 40 53 66 73	11.129+3.890x	3.890	1.95(3)	1.50	2.84
Control		3.34					

Level of significance ($P < 0.05$) Compare to the normal control group.
DF= n-1

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