



INSECTICIDAL ACTIVITY OF ETHANOLIC EXTRACT OF LEAVES OF *EUPHORBIA NIVULIA*

G. Sandhyarani ^{*1} and K. Praveen Kumar ²

¹Vaageswari College of Pharmacy, Karimnager, Andhra Pradesh, India.

²Vaagdevi College of Pharmacy, Medicinal Chemistry Research Division, Hanamkonda, Warangal, Andhra Pradesh, India.

Article Info	ABSTRACT
<p>Received 25/10/2013 Revised 27/11/2013 Accepted 18/12/2013</p>	<p>The objective of the present study is to investigate Insecticidal activity of ethanolic extract of <i>Euphorbia nivulia</i>. The preliminary phytochemical investigation was carried out to identify the various constituents present in the extract. It was found that the <i>Euphorbia nivulia</i> contain alkaloids, protein, amino acid, carbohydrate, glycosides, phytosterols, tannins and phenolic compounds. The ethanol extract of <i>Euphorbia nivulia</i> produced significant “Knockdown” (KD50) in the concentration 1% w/v and 5% w/v tested 23.1 min and 11.4 min for respectively. The mortality(100%) was achieved at 39.6±1.4 and 14.5±1.1min for 1% w/v and 5% w/v concentration respectively. No mortality of the insects was found in any of the controls up to 100hours. The ethanolic <i>Euphorbia nivulia</i> extract showed potent activity against Sitophilusoryzae pest. The finding of new insecticidal activity is of great economic importance both from the agronomic and preventive medicine point of view. The reason for using new natural insecticides is that these are active at highly acceptable levels, biodegradable and do not leave toxic residues while the commonly used phosphorous and chlorinated insecticides contaminate the environment.</p>
<p>Key words: <i>Euphorbia nivulia</i>, Sitophilusoryzae, Insecticides, Mortality.</p>	

INTRODUCTION

Euphorbia nivulia Buch. – Ham. a member of *Euphorbiaceae* family is a wild, thorny, xerophytic, succulent plant, commonly used in fencing of the agricultural field and also in dry barren areas. It has different biological activities for the treatment of several ailments of human being. It possesses antimicrobial, wound healing, haemostatic, larvicidal, insecticidal, nematocidal and cytotoxic activity. Chemically, it contains terpenes, glycoproteins, phytoelements and phytochemicals[1-3]. The herbal drugs have been used throughout the world have received greater attention in recent times, well tolerated remedies compared to the conventional medicines[4]. A rational approach is being developed to use medicinal plants as a insecticide. The

Insecticidal activity is due to the presence of active molecules.[5],[6]. Thus, the object of this work was to assess the insecticidal activity against the storage pest *Sitophilusoryzae*.

EXPERIMENTAL SECTION

Collection and Identification

The fresh leaves of the plant *Euphorbia nivulia* were collected from Tirumala hills, Tirupati, Andhra Pradesh, Identification and authentication of the crude drug was carried out by K.Madhava chetty, Botony Department, S.V.University, Tirupati, Andhra Pradesh, India.

Extraction

The leaves was dried under shade, reduced to moderately coarse powder, loaded into Soxhlet extractor and was subjected to successive extraction with ethanol. Then the ethanolic extract was concentrated under reduced pressure. The ethanol free semisolid mass thus obtained was used for the experiment.

Corresponding Author

G.Sandhyarani

Email:-sandhyaguggilla9@gmail.com



Preliminary Phytochemical Studies

The ethanolic extract was then subjected to qualitative phytochemical screening for the identification of the phytoconstituents. However ethanolic extract showed positive test for presence of alkaloids, protein, amino acid, carbohydrate, glycosides, phytosterols, tannins and phenolic compounds [7].

Insecticidal Testing

The ethanol free semisolid extract mass was dissolved in acetone at two different concentrations (1% w/v and 5% w/v) is being reported here.

i) Insect assayed: *Sitophilusoryzae* were provided by the research department of zoology, American college, Madurai, Tamilnadu, India. The adult insects were fed with maize and incubated under controlled conditions of temperature.

ii) Contact bioassay: A contact bioassay by modified method [8] was used to test the toxicity of the extract. Each concentration of the extract was applied on a glass Petri dish (9 cm diameter). After evaporation of the solvent, fifteen adults of *Sitophilusoryzae* were for introduced in to the dish. Four replicates for each concentration were made, knocked down insects (i.e. those that no longer maintained normal posture and were unable to move or were on their backs) were recorded at 1min intervals up to 3hours or until total mortality was achieved. The insects were observed under an optical microscope and mortality was determined when they did not respond to mechanical stimulation. Control dishes with acetone, methanol and without solvent were performed separately up to 100hours. Knockdowns (KD50) as the minutes needed to produce mortality of 50% of insects were determined by the probit analysis.

RESULTS AND DISCUSSION

Table 1. Insecticidal activity of *Euphorbia nivulia* against *Sitophilusoryzae*

S.No	Groups	Knockdown(KD50)(min)	Mortality(100%)(min)
1	<i>Euphorbia nivulia</i> extract (1% w/v)	23.1 (22.1-23.9)	39.6±1.4*
2	<i>Euphorbia nivulia</i> extract (5% w/v)	11.4(10.7-12.2)	14.5±1.1*
3	Control 1 (Acetone)	0.0**	-
4	Control 2 (Methanol)	0.0**	-
5	Control 3 (Without solvent)	0.0**	-

Values are expressed as mean ±S.D.(n=4); *Mortality(100%); ** No mortality of insects was observed in the 100hours (Controls).

CONCLUSION

Phytochemical observation of the *Euphorbia nivulia* plant extract showed the presence of alkaloids, protein, amino acid, carbohydrate, glycosides, phytosterols, tannins and phenolic compounds. The ethanolic extract of *Euphorbia nivulia* showed the potent insecticidal activity against the storage pest *Sitophilusoryzae*.

The ethanol extract of *Euphorbia nivulia* produced significant "Knockdown" (KD50) in the concentration tested 23.1min and 11.4 min for 1% w/v and 5% w/v respectively (Table-1). The mortality (100%) was achieved at 39.6±1.4 and 14.5±1.1min for 1% w/v and 5% w/v concentration respectively. No mortality of the insects was found in any of the controls up to 100hours. The finding of new insecticides is of great economic importance both from the agronomic and preventive medicine point of view. The reason for using new natural pesticides is that these are active at highly acceptable levels, biodegradable and do not leave toxic residues while the commonly used phosphorous and chlorinated insecticides contaminate the environment. The extract of *Euphorbia nivulia* being a contact poison for insects can penetrate the body wall and tracheal system bringing about death probably lending the extract the insecticidal activity against *Sitophilusoryzae*. The leaf of *Euphorbia nivulia* has been reported to contain essential oil, terpenes, alkaloids-anonaine, roemerine, corydine, norcorydine, isocorydine and norisocorydine. The insecticidal activity appears to be due to the presence of its active principles. The use of plant derived toxicants as insecticides may allow a reduction in the health hazards of synthetic pesticides and the high degree of insecticidal activity of *Euphorbia nivulia* seems to confirm the traditional claims for this herb. This present study establishes the insecticidal activity. It was found that the ethanolic extract at the concentration 5% w/v showed a significant knockdown and mortality rate

Statistical Analysis

Four replicates of experimental sets were carried out (KD50) Knockdown (min) of 50% of insects determined by Finney's probate analysis and confidential limits 95% in parentheses [9]. The results are summarized in the table given below.

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