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PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Pakistan Journal of Biological Sciences 3 (5): 808-809, 2000
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Insecticidal and Cytotoxic Activities of *Launaea nudicaulis* (Roxb.) and *Launaea resedifolia* (Linn.)

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Abstract: Extracts of *Launaea nudicaulis* and *L. resedifolia* were subjected to the demonstration of insecticidal and cytotoxic activities by standard methods; the former was measured against red flour beetle and *Sabz Tela* and the later by brine-shrimp assay. Methanolic extracts of *L. nudicaulis* and *L. resedifolia* at concentration of 0.786 mg/cm^2 exhibited 27.5 ± 5 and 45 ± 11 percent insecticidal activity against red flour beetle. *L. nudicaulis* was also insecticidal against *Sabz Tela* of cotton plant upto 100% activity. When the cytotoxicity was measured, alcoholic as well as aqueous extracts of both these plants killed larvae at 1mg/ml concentration upto 60-100 percent.

Key words: Insecticidal activity, Cytotoxicity assay, *Launaea nudicaulis, Launaea resedifolia*

Introduction

Launea nudicaulis (Roxb.) is much branched, glabrous and is found as common weed of cultivated fields. It's local name is Jangli Booti. It secrets milky material and is taken during the constipation. Leaves are used to relieve fever in children. *Launea resedifolia* (Linn) O.Kuntze. is 30-60 cm tall, glabrous herb with greyish-purple flowers. It occurs frequently in the bushes of *Calligonium polygonoides* on the top of sand dunes and inter-dunal areas. Flowering period is almost throughout the year (Bhandari, 1988; Baquar, 1989).

Various compounds have been isolated and characterized by various workers from *Launaea* species. Bahadur and Sharma (1976) have extracted the palmitic acid, stearic acid, oleic acid and linoleic acid from the oil extracted from roots of *L. nudicaulis.* Sharma *et al*. (1980) extracted dried powder of leaves of *L. nudicaulis* with 95% ethanol and isolated glycoside comprised of xylose and a moiety of aglycon. Similarly, Mansour *et al*., (1983) isolated flavones from *L. nudicaulis* which were apigenin-7-glucoside, 7-gentiobiosides, 7-rutinosides, 7,3'- diglucoside, 7,4'-diglucoside and 7-gentiobioside-4'-glucoside. These compounds were also isolated from other species like in *L. capitata, L. cassiniana, L. resedifolia, L. spinosa* and *L. tenuiloba*. The 7'-glucosides were major glucosides in all six species. Sarg *et al*. (1986) isolated three major phenols, i.e., aesculetin, cichoriin and luteolin-7-O-glucoside from L. nudicaulis.

Saleh *et al.* (1988) have isolated and identified apigenin, dihydroxy coumarin, luteolin-7-O-glucoside and epigenin-5-O-glucoside from *L. resedifolia* grown in Egypt. Abd-el-Fattah *et al*. (1990) have isolated triterpens, alpha-amyrin, moretenol and lupeol, their acetate derivatives as well as their esters with a complex series of the large chain fatty acids from *L. resedifolia*. In addition, Δ^7-stigmasterol and its 3-O-glucoside was also isolated.

Unfortunately, the biological activity of most of the newly discovered compounds have not been determined. In an attempt, the present studies have been performed to observe the biological activity of extracts and follow up towards the isolation and characterization of active components.

Materials and Methods

Fresh plants were collected from Cholistan desert and air dried for more than a week. Red flour beetles were collected from the wheat depot at home. These were kept in bottle containing flour. *Sabz Tela* was obtained from cotton plants from the fields in September-October. Cotton plant leaves were detached and brought to the laboratory where insects were collected. These insects were used on the same day for the determination of insecticidal activity.

70 g plant sample was soaked in methanol for 8 days or extracted with in a soxhlet apparatus for 8-10 hours . Solvent was evaporated by rotary evaporator and the residue obtained was re-suspended in various solvents like methanol, ethanol, water and DMSO). Various grades of stock solutions were prepared and their activity determined. Insecticidal and brine-shrimp cytotoxicity activities were determined by standard methods as compiled by Farhana (1999).

Results and Discussion

Insecticidal activity has been demonstrated by the plant extracts against red flour beetle and *Sabz Tela* of cotton plant as given in Table 1. A concentration dependent increase in insecticidal activity is exhibited by both the plant extracts. At the highest concentration tested, extract of *L. resedifolia* posessed more insecticidal activity (45 ± 11%) than that of *L. nudicaulis* (27.5 ± 5). When the extracts of *L. nudicaulis* were tested against *Sabz Tela*, the extracts exhibited 100% insecticidal activity (Table 1). These are preliminary results and need to be performed in more detail with more insects. Further studies are needed in this regard. Neem (*Azadirecta indica*) is a known insecticidal plant. Its methanolic extract should have been obtained and run with this experiment as a positive control and compared.

Table 1: Determination of insecticidal activity of methanolic extracts of *L. nudicaulis* and *L. resedifolia* against the red flour beetle. Insecticidal activity of *L. nudicaulis* was also determined against *Sabz Tela* of the cotton plant. Results are mean of 4 independent determination (n = 4, ± SD), and expressed in terms of percent killing of insects (%)

Test solution (1 ml/expt.)	Solvent	*L. nudicaulis* (flour beetle)	*L. resedifolia* (flour beetle)	*L. nudicaulis* (*Sabz Tela*)
1.25% stock	0	12.5 ± 5	Not determined	60 ± 20
2.5% stock	0	15 ± 5.8	10 ± 2	80 ± 20
5.0% stock	0	22.5 ± 5	12.5 ± 5	100
10.0% stock	0	27.5 ± 5	45 ± 11	Not determined

Table 2: Determination of cytotoxicity of extracts of *L. nudicaulis* and *L. resedifolia* against the brine-shrimp larvae. Results are mean of 2-3 independent experiments (±SD)

Solvent	Dose (µl)	Solvent (% killed)	*L. nudicaulis* (% killed)	*L. resedifolia* (% killed)
DMSO	5	50±10	70±10	50±10
	50	70±20	90±10	80±20
	500	90±20	100	100
Methanol	5	30±10	30±10	60±20
	50	40±10	40±20	80±10
	500	70±20	80±20	90±10
Ethanol	5	10±2	40±10	10±3
	50	10±2	60±10	60±15
	500	40±5	80±20	70±10
Water	5	00	20±5	10±2
	50	00	20±10	20±5
	500	00	60±10	70±15

Four different solvent extracts were used for the determination of cytotoxicity at three different concentrations, i.e., 10, 100, 1000 µg/ml. DMSO as a solvent showed toxicity (Table 2) and just 10% more larvae died in the extracts of both the plants as compared with the solvent. When the experiment was repeated with methanolic extract, again it proved fatal for insects and most of them died in few hours of start of experiment in the solvent. Ethanol extracts of both these plants at higher concentrations were cytotoxic compared to the solvent only; 60±10% and 80±20% larvae died within 24 hours compared with 10 and 40% solvent, respectively.

The most effective of all was the aqueous extract but only at higher concentration. Water remained non-toxic solvent for the larvae but as the extract concentration increased to 1000 µg/ml, larvae death rate reached 60-70±15%. This data indicates that the sample components are cytotoxic and this activity is mainly associated with aqueous extract as compared with other extracts in which some cytotoxicity is also contributed by the solvents which may be showing additive effect of the both.

Acknowledgment

The authors are thankful to Dr. M. Arshad, CIDS (Cholistan Institute of Desert Studies, Bahawalpur), for plant samples and colleagues in HEJ Research Institute of Chemistry, Karachi, for encouragement and providing training in these assays during the 2nd National Workshop on Bioassays.

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