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Pharmacological potentials of crude extract and different fractions of *Prangos pabularia*

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Abstract

Plants are practicing by man since ancient times to alleviate his suffering. Statistical data indicated that approximately 250000 higher plants exist on the earth. A wide range of these plants are utilized for various therapeutic purposes. *Prangos pabularia* (*P. pabularia*) is one of them, conventionally practiced in traditional medications as diuretic, carminative, laxative, stomachic, stimulant, anti-inflammatory, antinociceptive, antibacterial, antifungal and to manage many blood disorders viz leukoplakia. The *Prangos pabularia* methanolic extract (PPME) and its different fractions were utilized to assess the insecticidal and anti-termites activities of the selected plant. The methanolic extract and its various fractions were investigated for their insecticidal potentials, eliciting significant activity against the tested insects. The crud extract and its various fractions were also tested for their anti-termites activity expressed excellent results. Insecticidal and anti-termites activities of PPME and its various fractions were ranged from good to significant.

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Introduction

Phytomedicines have been used for the cure of various diseases since ancient times. In different cultures, plants and animals of land and aquatic habitats have gone through experimentations for this purpose. Statistics shows that some 35000–70000 plant species are nowadays utilized for primary health care (Mamedov, 2012). Scientific studies estimate that up to 67% of world herbal medicines used, are from plant origin. Herbal therapy carries immense importance as compared to the synthetic medicines because these are affordable, safer and easily accessible. Statistical records of World Health Organization (WHO) revealed that upto 80% of the world population utilized plants derived medicines (Newman and Cragg, 2012).

Prangos pabularia (*P. pabularia*) is a prominent member of the family *Apiaceae*, a tall, perennial herb and widely explored species of the family. *P. pabularia* is found in many parts of the world such as Pakistan, India, Afghanistan, Iran, Iraq, Russia, Turkey and many regions of the Central Asia (Sharma *et al.*, 2013). The plant produces flowers in June while the fruits can be collected in the months of August and September. The underground parts can be obtained in October and November when the aerial organs are dry (Sharma *et al.*, 2013).

Medicinally it is an important plant and carries many therapeutic potentials and occasionally used as feed for the animals. Many organs like roots and fruits exhibiting a wide range of healing effects and practiced extensively to manage a plethora of abnormal conditions. The aerial parts such as leaves and flowers are as mosquitos repellent. The plant is a rich source of coumarins and many other useful secondary constituents. The plant is practiced in traditional medications as diuretic, antibacterial and to manage many blood disorders viz leukoplakia (Sharma *et al.*, 2013). The fruits are used as carminative, laxative, stomachic, stimulant, emmenagogue, and potent tonic. The fruits are also very effective to manage many harmful bacterial and fungal infections. Fruits of the plant showed excellent results in urinary disorders, gravel, strangury, dyspepsia, dropsy and gonorrhea (Ballabh and Chaurasia, 2009). Thick paste of the leaves are effective against scorpion bite in order to relieve pain (Khan *et al.*, 2011). Studies showed that the plant is also beneficial in normal delivery. *P. pabularia* displayed many useful properties like diuretic, aphrodiasic, anti-inflammatory and antinoceciptive (Kirtikar and Basu, 1991). Roots of the plant is a good remedy for the management of many dermal disorders. Mixture of the roots is effective in many gynae and digestive problems (Kumar *et al.*, 2012). The plant is an excellent source to stop bleeding and heal scars when applied externally (Ulubelen *et al.*, 1995). Roots of the plant can be utilized to cure different kinds of kidney and urinary diseases, soothing and controlling urine discharge, inflammation and bleeding in the kidneys (Ballabh *et al.*, 2008). Literature review shows that no work has been done so far regarding anti-termites and insecticidal studies, therefore, the current research project has been undertaken with the aim to assess the crude and its various fractions.

Materials and methods

Extract Preparation

The chosen plant was washed using clean water to eliminate dirts and dry in shade at 37°C and convert to find powder using grinder. The materials were then dipped in methonal. The crude preparation was filtered using Whatmann filter paper and concentrated using evaporator. The crude extract was then stored for further exploration.

Fractionation

The crude preparation (1000g) of the *P.pabularia* was mixed in 700mL clean water and then dissolved in various solvents such as *n*-hexane, chloroform and ethyl acetate to acquire the respective fractions.

Insecticidal Activity

The materials, chemicals and equipments needed for the current investigations are; various selected insects such as *Tribolium castanum*, *Rhizoperthica dominica* and *Callosobruchus analis* were utilized. Methanol, growth chamber, test samples, Petri dishes, micro pipettes, filter papers and brush were used in these experiments.

The *Khan et al* protocols were employed (Khan *et al.*, 2008). The filter papers equal to the size of Petri plates were kept in these plates. The selected plant samples stock solution was poured to these plates. These dishes were then kept at 37°C for the evaporation of solvent. Healthy insects from the *T. castanum*, *R. dominica*, and *C. analis* were chosen and placed in Petri dishes having the test samples and control. Methanol and Permethrin were run as negative and positive control, respectively. Afterwards these plates were kept at 27°C for 1 day. Then the percent mortality was calculated.

$$\% \text{ Mortality} = \frac{\text{No. of living insects in test}}{\text{No. of living insects in control}} \times 100$$

Anti-termites Activity

PPME and its succeeding fractions were analyzed for the anti-termites potentials applying *Salihah et al* protocols (Salihah *et al.*, 1993). Filter papers of equal size to the Petri plates were placed in these Petri dishes. Stock solution of the *M. jalapa* samples were transferred to these plates and kept at 37°C for some time, in order that evaporation of organic solvent occurred. Then these dishes were kept in desiccator. The plates were keenly checked after first, second and third day. The Eta and MeOH were used as negative control over here. The investigations were performed in triplicate and termites died every day was noted.

Results

Insecticidal Activity

The PPME and its various fractions like hexane fraction of *P.pabularia* (PPHF), ethyl acetate fraction of *P. pabularia* (PPEta) and aqueous fraction were assessed for their insecticidal potentials. The PPME expressed 20%, 30% and 20% activity to *T. castanum*, *C. analis* and *R. dominica*, correspondingly. The percent potentials of PPHF were noted as 100%, 30% and 50% against *T. castanum*, *R. dominica* and *C. analis*, respectively. PPEta showed 60% and 40% potentials against *T. castanum* and *R. dominica* respectively, while the same gave 20% action against *C. analis*. The aqueous fraction gave 10% result against *T. castanum* and *C.analis* and did not produce any result against *R. dominica*. Tables 1, 2 and 3 expressed the relevant results.

Table 1. Insecticidal Activity of *P. pabularia* crude extract and its various fractions.

Test samples		Percent mortality
PPME	*T. castanum*	20
PPHF		100
PPEta		60
Aqueous		10

Table 2. Insecticidal Activity of crude preparation and its solvent fractions.

Test samples		Percent mortality
PPME	*C. analis*	30
PPHF		50
PPEta		20
Aqueous		10

Table 3. Insecticidal Activity of ME and its successive fractions.

Test samples		Percent mortality
PPME	*R.dominica*	20
PPHF		30
PPEta		40
Aqueous		00

Anti-termites Activity

PPME and its successive fractions were examined for their anti-termites potentials. After 72 hours no termite was survived. The collected results expressed that the crude preparation and its different fractions elicited excellent activity against the tested termites. The results are obtainable from Table 4.

Table 4. Anti-termites Activity of ME and its successive fractions.

Samples	No. of termites utilized	Day	Average termites killed
PPME	25	1st	8
		2nd	12
		3rd	18
PPHF		1st	6
		2nd	11
		3rd	19
PPEta		1st	7
		2nd	12
		3rd	22
Aqueous		1st	2
		2nd	4
		3rd	6

Discussion

Plants are the rich sources of natural constituents and playing a significant role to overcome different pathological conditions such as diarrhea, piles, muscular pain, constipation, sprain, bruise, jaundice, skin diseases, wound injuries, eyes inflammation as

well many female abnormalities such as amenorrhea and dysmenorrhea etc. A wide range of heart diseases such as hypoglycemia, hypolipidemia and hypertension can be managed successfully by taking juice of various organs of the selected plant.

The present project was set to examine the insecticidal and anti-termites activities of PPME and its solvent fractions. A wide range of studies have been done and reported various biological potentials of the crude extract and various fractions of many important medicinal plants. Very little studies are available concern with the various activities of the selected plant.

Synthetic insecticides bear many harmful effects on the surrounding environment. So, demand in environment friendly natural insecticides are increasing day by day (*Khattak et al.*, 1985). The insecticidal action of PPME and its different fractions such as PPHF, PPEta and Aqueous fractions were performed against *T. castanum*, was 20, 100, 60 and 10% respectively. The activity expressed against *C. analis* was 30, 50, 20 and 10% respectively while in case of *R. dominica*, the results obtained were 20, 30, 40 and 0% respectively.

Similarly, results of the anti-termites studies expressed that few termites were killed on day 1 of the experiment, on day 2 nearly half of the termites were alive while on the day 3, all the termites were killed. The anti-termites potentials of PPME and various fractions such as PPHF, PPEta and Aqueous fractions were recorded as 72, 76, 88 and 24% respectively. The current research work gave that the *P.pabularia* is a suitable candidate to acquire pharmacologically effective compounds because the PPME and fractions showed promising activities.

Conclusion

From the current project, it is clear that PPME and its various fractions elicited significant insecticidal, and anti-termites activities. Comprehensive studies in this regard will be beneficial to isolate active phytochemicals, which are to be utilized in the synthesis of possible novel products.

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