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Preliminary phytochemical screening of a medicinal tree plant *Gynocardia odorata* found in the native of mon district, Nagaland India

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Abstract

Gynocardia odorata tree plant found in Nagaland is commonly used by the Konyak tribe for fishing, honeybee harvesting and as a traditional medicine to heal gastric and abdominal pain. It is reported that the seed of *Gynocardia odorata* when consumed in its raw form causes hallucination and at worst, even death when taken in excess. However, the tribal people had improvised techniques to detoxify the seeds and since then it has been a delicacy to the diet of the people of konyak tribe. This study was aimed to screen preliminary phytochemicals presence in various parts of plant leaves, stem bark, seed and fruit extracted from polar, intermediate polar and non-polar solvent such as methanol, ethyl acetate and hexane. The analysis revealed the significance presence of alkaloids, terpenoids and flavonoids which are of important medicinal value and therefore need the plant conservation strategies for the benefits of the local people and the society in large.

Keywords: *Gynocardia odorata*, traditional medicine, phytochemical screening, conservation

Introduction**Traditional belief and uses**

Gynocardia odorata tree plant reported from Nagaland is commonly used by the Konyak tribe. It is commonly known as *Bah khah* in konyak local dialect. *G. odorata* is used for fishing, honeybee harvesting and as a traditional medicine to heal gastric and abdominal pain. The seed of *Gynocardia odorata* when consumed in its raw form causes hallucination and at worst, even death when taken in excess. However, the tribal people use it by processing the seed through multiple steps of treatment like cooking the fruit/seed with water and ashes, rinsed in hot water for multiple times until the seed cease to form and finally allowed to remain soaked in water for a couple of days to detoxify the seeds and use by the ethnic communities as a delicacy in their cuisine.

Gynocardia odorata R.Br. grows wildly throughout India and other tropical countries of the world [1]. It is an important medicinal plant which is indigenous to Indian subcontinent and grow extensively in the tropical forest and Hilly region of north east India [2]. It is an evergreen tree native to the moist forests of North East India belonging to the family Achariaceae. The species is found in the moist forests of mountain valleys in South Asia-India, South- East Xizang and Yunnan in China, Bangladesh, Nepal and Myanmar. This monotypic genus is indigenous to the moist forests of the North East India and is fairly common in the evergreen forests throughout Assam [3]. It is widely distribute in India north east Sikkim, Meghalaya, Bangladesh and Burma [4]. *G. odorata* R. Br. is a crooked, moderate to large sized East Indian tree which occurs in the dense tropical and temperate forest, also in secondary forest margin [5]. *Gynocardia odorata* is a thickly spreading branches which grows from 10 to 20 meters high. The tree can be easily recognized by its hard, round, dark-grey, rough-textured fruit, growing on its stems and branches [6]. The study on the antiulcer activity of seed extracts of *Gynocardia odorata* Roxb. on pylorus ligation and indomethacin induced gastric lesions in Albino Rats has been reported. The observed pharmacological activity reveals that the aqueous extract significantly rise the gastric content, lowered the free and total acidity and ulcer index as compared to standard drug Ranitidine significantly [7]. Study on the evaluation of anti hyperglycemic effect of *Gynocardia odorata* Roxb in streptozotocin induced diabetic rats is being reported in the literature. The plant material was extracted with methanol. The methanol extract of *G. odorata* showed analgesic, anti-inflammatory, antipyretic effects,

similar to those observed for steroidal drugs such as, phenylbutazone and paracetamol [8]. Phytochemical screening and ulcer protective activity of ethanolic seeds extract of *Gynocardia odorata* in different ulcer model suggested its potent gastro protective effect, which may be due to extract contain flavonoid because bioflavonoid have potent antioxidant activity or free radicals scavenging activities [9]. Investigation of bioactive phytochemicals compound by GC-MS analysis revealed the total of fifty compounds of different molecular weight detected from the methanolic extracts of *Gynocardia odorata* R.Br. leaf. This phytochemical constituents of medicinal or poisonous plants have different roles for the protection of the plants and also the different poisonous properties [10]. Evaluation of the Leaves of the *Gynocardia odorata* Plant for Antibacterial Activity was undertaken to appraise the antibacterial activity of the leaves of the *Gynocardia odorata* plant. The study covered the various macroscopic and microscopic behaviors of the proposed leaves. The phytochemical analysis gave valuable information about the different valuable phytoconstituent present in the various extract. The results of the pharmacological activity show that the methanolic extract of the leaves having good antibacterial activity [11]. The antioxidant potential of some wild edible plants, traditionally used by the local people of Meghalaya state in India was investigated. The effect of solvent extraction system (aq. methanol and acetone) on the total phenolic, flavonoids and flavonols content, reducing power and antioxidant activity of the plants. The results indicate that the type of extragent significantly influenced the antioxidant activity of these wild edible plants and could be utilized as potential source of natural antioxidant in the food or in pharmaceutical industry [12]. Study of the antidiabetic activity of ethanolic and aqueous seed extracts of *Gynocardia odorata* in brewer's yeast induced pyrexia in rats and TAB vaccine-induced pyrexia in rabbits had been reported in the literature. Ethanolic and aqueous extracts were prepared and the phytochemical screening was performed. Both the extracts showed the significant antipyretic activity but the maximum antipyretic activity by aqueous extract of *Gynocardia odorata* roxb seeds [13].

Methodology

Plant materials collection

Extensive collection of leaves, barks and fruits of *Gynocardia odorata* were made during the year 2020 from different areas of Totok Chingnyu Village, Mon District Nagaland which is situated at an altitude of 897.64 meters above sea level [14]. The collected plant species material was authenticated from the relevant taxonomist of Botany Department, Kohima Science College Jotsoma and also from the reported literatures.

Preparation of plant extract

The collected plants material like fruits, leaves and barks were properly washed and separated from foreign material such as topsoil, pebbles or rocks, weeds, and materials non-suitable for extraction. The cleaned, healthy plant materials such as leaves and barks were cut into small sections and sun dried under shade for few days while the fruits are crushed and the seed are extracted. In the process, it was ensured to preserve the active biomolecules in the plants prior to extraction. Shade dried materials were then grinded into coarse powder and processed for further studies. About 15g of the crushed plant materials was used and exhaustively extracted using cold

maceration process for a few days and as well as soxhlet extraction continuously for a numerous cycle respectively. It was then followed by reflux condensation to separate plant extract from the solvent. The used solvent was recovered and plant extract containing essential oil was separated. The solvents used for maceration and soxhlet extraction were polar such as methanol, intermediate polarity such as ethyl acetate and non-polar solvent such as hexane respectively.

Identification Test

Analysis of active phytochemicals constituent's such as Alkaloids, Terpenoids, Flavonoids, Tannins, Saponins, Steroids, Phenols, Soluble Carbohydrate, Proteins and Amino Acids were carried out with the extracted oil from fruits, leaves and barks following standard procedure [15].

Figures Showing The Plant Species *Gynocardia odorata* And Its Fruits At Different Stages Found In Mon District, Nagaland India



Fig 1: Flowering of *Gynocardia odorata*



Fig 2: Seeds on the corky stem



Fig 3: Fruits on the corky stem

Fig 4: Matured *Gynocardia odorata* fruitFig 5(a): Crude extract of *Gynocardia odorata* fruit (b) Test showing the presence of alkaloid (Dragendroff's test) and terpenoid extracted from hexane solventTable 1: Phytochemical constituents present in the extract of *Gynocardia odorata*

SL. No	Phytochemical Constituents	Test	Solvent		
			Hexane Extract	Methanol Extract	Ethyl Acetate Extract
1	Alkaloid	a. Dragendroff's Test	+	+	+
		b. Mayer's Test	-	-	-
		c. Hager's Test	+	+	+
		d. Wagner's Test	-	-	-
2	Terpenoid	a. With Sulphuric acid	+	+	+
		b. With Chloroform	+	+	+
3	Glycoside	a. Bornstrager's Test	-	-	-
		b. Legal's Test	-	-	-
4	Saponin	a. Distilled Water	-	+	-
5	Carbohydrate	a. Molisch's Test	-	-	-
		b. Fehling's Test	-	-	-
		c. Barfoed's Test	-	-	-
		d. Benedict's Test	-	-	-
6	Tanins	a. Ferric Chloride	-	-	-
7	Phenols	a. Distilled Water	-	-	-
	Amino Acid	a. Million's Test	-	-	-

8		b. Biuret's Test	—	—	—
		c. Ninhydrin Test	—	—	—
		d. Xanthoproteic Test	—	—	—
9	Flavonoid	a. Lead Acetate test	+	+	+
		b. NaOH test	+	+	+

Note: (+) Present; (-) Absent

Results and Discussion

The result of phytochemical screening of the plant *Gynocardia odorata* extracted with polar, intermediate polar and non-polar solvents from leaves, stem barks and seed/fruits confirmed the strong presences of alkaloid, terpenoids and flavonoids. The phytochemical analysis of the leaves extract showed the presence of alkaloid, terpenoids, flavonoid and a minor presence of carbohydrate while the stem bark and the seed/fruit extracted with hexane and methanol solvent revealed the presence of alkaloid, terpenoid, flavonoids and minor presence of saponins.

Conclusion

This study conducted on the leaves, stem bark and seed or fruit of *Gynocardia odorata* confirmed the presence of important primary and secondary phytochemical constituents which play an important role in the field of ethnomedicine. This study also confirmed the rationale in its usage traditionally. Therefore, further investigation is essential to isolate and identify the bioactive constituents present in the plants. It also needs to conserve the candidate plant for the benefit of the community.

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