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Evaluation of antimicrobial activity of '*Ferronia elephantum* corr.' Leaves methanolic extract

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Abstract
Different parts of *Ferronia elephantum* corr. Is being used for various ailments by the local people in north Karnataka region. In the present work we collected leaves in and around Bijapur district in the month of January 2014, shade dried and crushed into raw powder. Continuous solvent extraction of the powdered leaves using soxhlet was carried out with hot methanol. The methanolic extract showed positive results for glycosides and alkaloids. The antimicrobial evaluation of methanolic extract using two gram positive, two gram negative bacteria and two fungi at different concentrations was carried in comparison with a standard drug by cup pate method.

Keywords: antimicrobial, *Ferronia elephantum* corr., antifungal

Introduction
Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, ungi and herbivorous mammals. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total [2, 3]. Chemical compounds in plants mediate their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to be as effective as conventional medicines, but also gives them the same potential to cause harmful side effects [2, 3].

The use of plants as medicines predates written human history. Ethno botany (the study of traditional human uses of plants) is recognized as an effective way to discover future medicines. In 2001, researchers identified 122 compounds used in modern medicine which were derived from "ethno medical" plant sources; 80% of these have had an ethno medical use identical or related to the current use of the active elements of the plant [4]. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine, and opium.

The use of herbs to treat disease is almost universal among non-industrialized societies, and is often more affordable than purchasing (WHO) estimates that 80 percent of the population of some Asian and African countries presently use herbal medicine for some aspect of primary health care. Studies in the United States and Europe have shown that their use is less common in clinical settings, but has become increasingly more in recent years as scientific evidence about the effectiveness of herbal medicine has become more widely available. The annual global export value of pharmaceutical plants in 2011 accounted for over US$2.2 billion [5].

The present Plant
A moderate sized to fairly large glabrous deciduous tree, armed with strong, straight, axillary spines, having a much branched dense crown of dark foliage and dark grey longitudinally furrowed rough wrinkled bark; leaves compound imparipinnate, alternate, rachis narrowly winged, leaflets 3-7, obovate, crenulated, tip often notched, gland dotted; flowers small, frangrant, dullered, polygamous in lateral and terminal pubescent panicles; fruit globose, woody, rough, grey coloured barriers, seeds oblong, compressed, embedded in the pulp.

Kingdom	:	Plantae
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Order	:	Sapindales
Family	:	Rutaceae
Genus	:	Limonia

Indian Names

Beng.	:	Kayat Bael, Kavataleal, Kavita
Eng.	:	Wood Apple
Guj.	:	Kotha, Kondhu
Hindi	:	Kaitha
Kan.	:	Bekalu, Belada hannu, Bilvara, Belalu, Balada, Haminamara
Mar.	:	Kavatha
Punj.	:	Kainth
Tam.	:	Vilamaram, Vilangai
Tel.	:	Velaga
Urdu	:	Kaith

Growth and Distribution

Throughout India, in the hotter and drier parts up to 450m. Also cultivated in Bangladesh, Pakistan and Srilanka. Propagation is done by seed and vegetative method [6]. But high rate of seedling mortality and outbreeding nature of this plant account for poor regeneration and inferior germplasm. To overcome this, *in vitro* propagation through axillary bud proliferation has been developed [7].

Materials and Method

Extraction

Extraction, as the term is used pharmaceutically, involves the separation of medicinally active portions of plant or animal tissues from the inactive or inert components by using selective solvents in standard extraction procedures. The products so obtained from plants are relatively impure liquids, semisolids or powders intended only for oral or external use.

The extract thus obtained may be ready for use as a medicinal agent in the form of tinctures and fluid extracts, it may be further processed to be incorporated in any dosage form such as tablets or capsules, or it may be fractionated to isolate individual chemical entities such as ajmalicine, hyoscine and vincristine, which are modern drugs. Thus standardization of extraction procedures contributes significantly to the final quality of the herbal drug.

The plant material was collected from the village Nagur of district Bijapur. In March 13, during morning hours between 09.00 AM and 10.00 AM. Leaves were dried in shade at room temperature, powdered and passed through sieve no-22. The obtained fine powder was macerated with sufficient amount of 350ml of methanol in a closed percolator for 72 h, shaking uniformly and then allowed to stand for 72 hours Sufficient overhead volume of water was kept initially. Then it was allowed to elute and filter through a fine muslin cloth. The filtrate was placed in a round bottom flask and was evaporated below 60 °C under reduced pressure. The obtained residue was collected (yield- 10%) and stored as extract in amber coloured bottle in a cool and dark place. The obtained extract was kept in airtight amber coloured bottles, stored at room temperature until use.

Phytochemical screening

Preliminary screening of secondary metabolites such as alkaloids, flavonoids, saponins, coumarins, antraquinons, terpenoids, steroid and sterols were carried out according to the common phytochemical methods described by TREASE and Evans (1983) and Harborne (1973). T results of pphytochemical screening are summarized in the table. No.1.

Anitbacterial Activity

The extract was subjected for comparative antibacterial screening against a standard drug using E.coli , S. Aureus, K. Pneurominae and P.aeruginase bacterial strains by cup plate method [8]. Test samples were prepared in distilled water in different concentrations viz. 500, 1000, 1500 and 2000 mg/ml and the standard drug was used at a concentration of 100 mg/ml. The results obtained are summarized in the table No-2.

Results and Discussion

The extract used in this investigation has shown moderate activity against almost all the organism used. Based on the results summarized in the table No 2 it is clear that the crude extract is more active against E coli and S. aureus while it is moderately active against other organism used.

Conclusion

The plant *ferronia elephantum* corr crude methanolic extract has revealed that it contains active chemical constituents therefore the crude extract shall be further isolated and each class of compounds isolated may be screened for biological potency. Based on the results of this extended study future course of research in this regard shall be planned.

Table 1: Phytochemical screening on the methanol extract of the aerial parts of *Feronia elephantum* Corr Leaves

Class of compounds	Methanol extract
Phenols	-
Flavanoids	-
Steroids	-
Glycosides	+
Lignans	-
Saponins	-
Alkaloids	+

+ = Presence of constituents
– = Absence of constituents

Table 2: Results of antibacterial activity.

Test Sample	Concentration (mg/ml)	Zone of inhibition (in mm)			
		E.Coli	*S.aureus*	*K. Pneurominae*	*P. aeruginase*
Sample-1	1000	14	15	11	12
Sample-2	500	12	13	09	11
Sample-3	250	09	11	08	09
Sample-4	175	07	09	06	07
Streptomycin	100	18	15	14	15
D. Water	--	06	06	06	06

Cup diameter= 6 mm Quantity of drug solution and control fed into each cup = 5ml

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