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Ethnopharmacology, Phytochemistry, Traditional Uses, Pharmacology and Chemistry of *Crataeva magna* and *Ficus dalhousie*

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Abstract

The plant *Crataeva Magna* family (capparidaceae) and plants *Ficus Dalhousie* family (moraceae)are medicinal plants that represents the traditional medicinal herbs used in eastern as well western countries. Leave, flower and bark of *Crataeva Magna* contain various phytochemical constituents. *Ficus* is genus of approximately 850 species of tree shrubs vines epiphytes and semi epitopes of the Morus family commonly known as the fig tree or fig. The present review is displaying the information of *Crataeva Magna* and *Ficus Dalhousia* and its botanical description, phytochemistry traditional uses, pharmacology and chemistry. From various studies, it is observed that these plants are commonly and traditionally used in various biology virtues like Anti diabetic, Anti-inflammatory, Anti pyretic. But other than these CM has Anti fertility, Anti arthritic activity, Anti-Cancer and cardioprotective activity anti-Urolithic, anti-nociceptive estrogenic properties and FD has Anti-convulsant, Anti-hermetic, Anti hyperlipidemic.

Keywords
Crataeva Magna, Ficus Dalhousie, Phytochemistry, Pharmacology, Anti-diabetic.

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INTRODUCTION:

Figure 1 - *Ficus Dalhousia*

Figure- 2- *Crataeva Magna*

The herbal medicine is also called herbalism is study of pharmacognosy and use of medicinal plant underlying traditional medicines (1) there is limited scientific evidence on the safety and efficacy of plant used as medicinal herb in the 21st century (1)(2). Herbs have been around since time immemorial.

There is a growing interest in the use of the plant for treatment of disease. Due to availability and low cost of finishing medicinal plant, there uses is recommended, but most of the applications have not been tested. According to World health organization (WHO) let drop that more than 80 percent of world population depends on traditional herbal medicine for their primary health care. *Crataeva Magna* (figure 2) is a species of Flowering tree, it belongs to the member of capers (3). The *Ficus dalhousia* (figure 1) is common temperate species native to Southwest Asia and the Mediterranean region (from Afghanistan to Portugal) and had been widely cultivated since ancient time for its fruits, also known as figs. Most of the other species are edible as well, but most are of local economic importance or as food for tree (4).

Plant Name	Synonyms	Common name
Crataeva Magna	Capparis Magna Lour	Large garlic pear (english)
	Crataeva lophosperma Kurzl	Tikoshak (Bengali)
	Crataeva nurvala	Bama (Hindi)
	Buch.-Ham	Nirvala (kannada)
	Triclanthera corymbolsa Raf (5).	Mavilingam (Tamil) (6).
Ficus Dalhousie	Covellia costata Miq.p	Dalhousiae's Ficus (English)
	Ficus costigera Miq.p.	Kallaal (Malayalam)
	Urotigma dalhousia Miq.l	Kal-aal
		Pei-aal (Tamil)(7)

Taxonomical classification:

	***Crataeva Magna* (8)**	***Ficus Dalhousie* (9)**
Kingdom.	Plantae (plant).	Plantae
Subkingdom.	Trachibionet (vascular plant).	Iridaeplantae
Super division.	Spermatophyta (Seed plant).	Tracheuphyta
Division.	Mangnoliophyta (flowering plant).	Mangnoliophyta (flowering plant).
Class.	Mangnoliopasida (dycotyledon).	Spermatofida
Subclass.	Dilleniidae.	Rosidae
Order.	Cappparals	Urticales
Family.	Capparasea (caper family).	Moraceae
Genus.	Crataeva 1(crateva).	Ficus
Species.	Crataeva religiosa g. Forest.	Dalhousie Miq

Geographical distribution:

CM is a small that is 6-7 m tall wild tree or cultivated tree native to India, China, Bangladesh, Sri Lanka, Burma, Malaysia, Indonesia and Indo China (10). In India it is commonly grown along the bank of river in central Bengal, Assam, the Canary and Malabar Islands.This plant usually growns in the southernmost mountains of the Himalayas and it is native to Karnataka, Kerala and Tamil Usually flowers in March and bears fruit in June (10).

FD Miq is this having 9-12 m young branches. It's flowering and fruiting time is started from December to January. It is mainly found in dry and moist forest area in south india. IT is mostly found in Kerala, coimbatore, Andhra pradesh, Namakkal, Salem, Dundigal, Tirunelveli, Niligiri, Theni and Vellore are the district of Tamil Nadu State in India (11).

Morphological characteristic:
***Crataeva Magna* (12)**

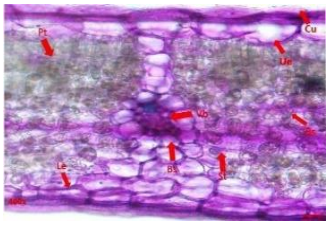
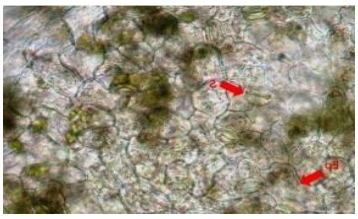
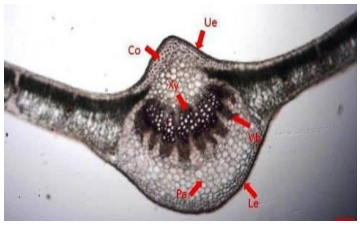
Bark		The bank is gray and the colour of wood is yellowish- white. When it became old, the colour changes to light brown.
Leaf		Leaf collected from the top of the branch and has a common stem,5to 10 cm long , on which leafs are located.
Leaflet		Leaflets are ovate-lanceolate or ovoid,7.5 to 12 Inches long and 4to 6 inches wide , tapering at the base and slightly tapering at the tip.
Flower		Flower is present in extreame abdomen, and about 5 cm in diameter, the stamens are greenish-yellow and the stamens are purple.
Fruit		*Crataeva Magna* is round/ ovoid fruit with a diameter of 3 to 5 cm. The fruit has a hard, leathery rind with an pleasant odour and a panget test. Seed are about 10 cm long nenumerous, reniform, immersed to yellow pulp.

***Ficus Dalhousie* (13)**

Bark		The bark colour is brown, trees to 10 cm high, sometimes epiphyte. The arial root is absent.
Leaf		The leaves are simple alternate, it is lateral, stipules to 3 cm long.
Leaflet		There is ovate-lanceolate, puberulous, petiole 4to10 cm long stout, not articulated pubescent; lamina 25-30 x12 -18cm, ovate or ovate-oblong, base deeply cordate, apex, acute, margin.
Flower		The flower unisexual; inflorescence syconia, in axillary pairs,1x 0.8cm obovoid, flower of 4 kinds, male flower very few, only near apex of receptacle sessile, globose; sepal 3, concave round, stamen 1.
Fruit		Fruits have a long history of use and medicinal properties by Indigenous communities in India. Fruits are used as cardiotonic.

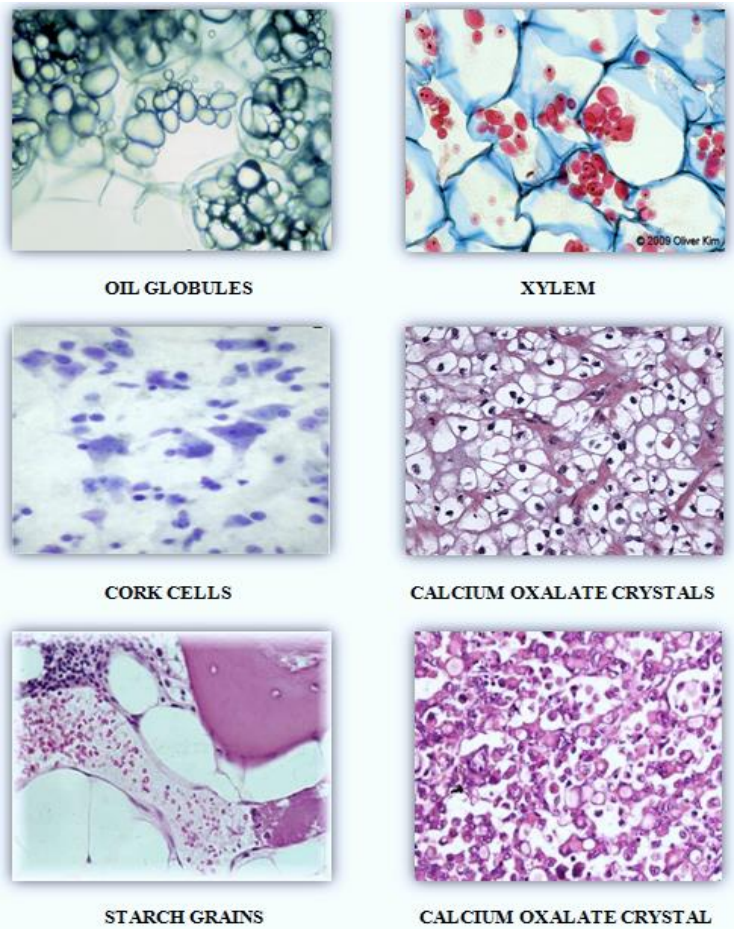
Microscopic characteristic:

***Crataeva Magna*:** Some of the important microscopic features such as surface area, shape, size, venation were studied and displayed the characteristic feature **(14).**

Phyllotaxis steam length leave length etc.

Ficus Dalhousie: Microscopy of the bark of the Ficus religious. **(15)**



Preparation of bark extract of CM:

Firstly, crushed and coarsely powered to air- dried bark of CM and then subjected to extraction with methanol (3L) by Soxhlet apparatus. The solvent was evaporated under the reduced pressure to give 46g of crude methanol extract. The crude methanol extract (45.5g) was suspended in methanol: water (2:8) and partitioned between ethyl acetate and saturated n – butanol to give fraction of 16.1 g and 4.2g respectively. The EA fraction showed good melanin- stimulating activity, while the n- butanol showed low activity (16)

Preparation of leaf and bark extract of FD:

Firstly, collected fresh leaves and bark of FD. Under running water washed collected leave and steam bark. After that for the water to dry off Leaves and bark kept for 5-6 hours. The leaves and bark cute in to small pieces and air dried for 8 days. By using grinder, the dried leaves and bark were coarsely powered. The resulting powered was successively extracted with a solvent (hexane, chloroform and

ethanol) of increasing polarity using a Soxhlet apparatus. Then the resulting mixture become a magnet, stir in round bottom flask overnight at a room temperature. The resulting mixture was then heated on a water bath at 70° C for 6 hours with constant stirring the mixture was filtered through cotton wool and whatman filter paper. After filtration, the extracted filtrate is lyophilized by using lyopholilizaer. The resultant lyophilized extract is found as a brown solid. In addition, the aqueous extract is obtained by immersing 10 g of leaves and skin in 100 ml boil water. The mixture was boiled in an Erlenmeyer flask for 30 min and left for 24 hours. The extracted was filtered through filter paper and evaporated the extract obtained above are called n-hexane extract, chloroform extract, ethanol extract and aqueous extract. (17)

Phytochemical constituents:

Phytochemical show or play the important role in cosmetic preparation or as Anti-microbial agent and sometime as Anti-oxidant agent. In this study, the *Crataeva Magna* was extracted with various solvents to preserve the polar pattern and then the extract was subjected to initiate phytochemical analysis, Table No 1 (18) where as ficus Dalhousie extracted with various parts of the plant like steam bark, leaf and root extract. The phytochemicals are widely used in the treatment of renal disease, cholesterol, carcinomas (19).

Table No 1: phytochemical screening of powdered bark and various extract of *Crateva magna* (20)

Bioactive constituents	Powder	Benzene	Diethyl Ether	Chloroform	Ethyl acetate	Methanol
Carbohydrates	+	+	+	-	+	+
Gums and Mucilage's	+	-	-	-	-	+
Protein	+	-	+	-	-	-
Alkaloids	+	+	-	+	+	_
Glycosides	-	-	-	-	-	-
Saponins	+	+	-	-	+	+
Steroids	+	+	-	+	+	-
Flavonoids	-	-	-	-	-	-
Tannins	-	-	-	-	-	-
Phenolics	_	-	-	-	-	-
Terpenoids	+	-	+	-	+	-

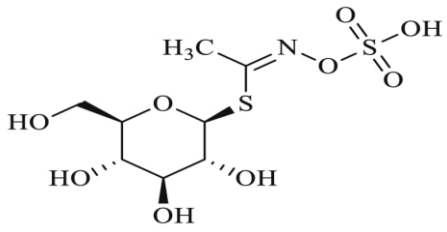
(+) positive sing indicates Present. (-) negative sing indicates Absent

Table No 2: Phytochemicals screening analysis results of *Ficus Dalhousie* leaf, steam bark, root extract (21)

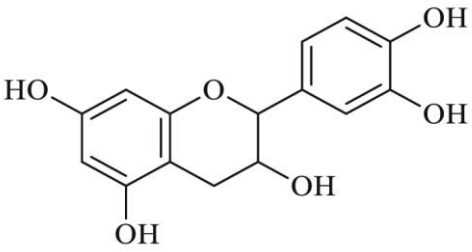
Sr.no	Phytoconstituents	Pet Ether	n-Hexane	Acetone	Chloroform	Ethanol	Methanol
1	Alkaloids	++	++	++	++	++	++
2	Glycosides	+	++	+	+	+	+
3	Carbohydrates	++	++	+	++	++	++
4	Tannins	++	++	++	++	++	++
5	Steroids	++	++	++	++	++	++
6	Terpenoids	++	++	++	++	++	++
7	Flavonoids	++	++	++	++	++	++
8	Saponins	+	+	++	++	++	++
9	Anthraquinones	-	-	+	+	++	++
10	Coumarins	-	-	-	-	-	-
11	Protein and amino acid	-	-	+	+	+	++
12	Resins	+	++	++	++	++	++
13	Gums and Mucilage	-	-	-	-	-	-
14	Fats and oil	++	++	++	++	++	++
15	Reducing sugar	++	++	++	++	++	++
16	Quinones	-	-	-	-	-	-
17	Anthocyanins	+	+	+	+	+	++

From the above screening results, it clearly said that the plant parts like root and leaves contain more number of chemical constituents than steam bark. A microscope analysis is very useful tool to describe the plant pathologist it helpful trying to identify the causal agent of the plant disease. Sometimes it will give a information it help to you understand what exactly causes of disease. (20)

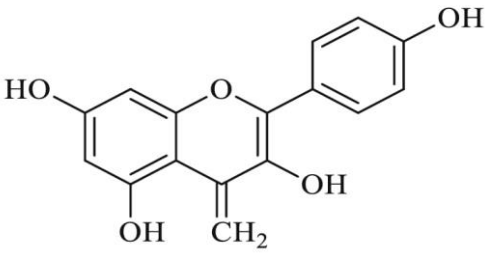
Structure of phytochemical constituent *Creteva magna*:(22)



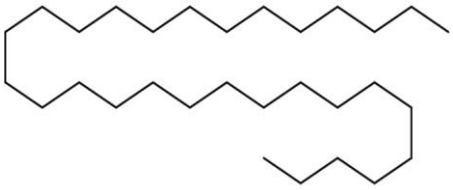
Glucocapparin



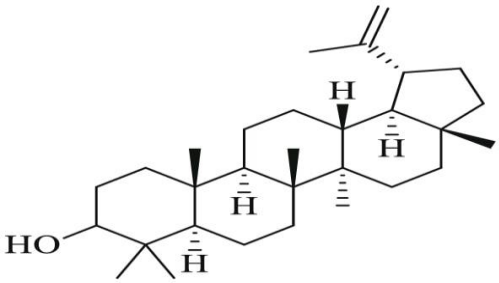
Catechin



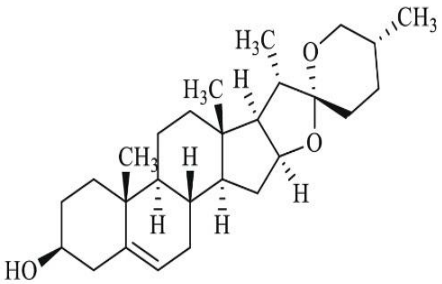
Kaempferol



Tricontane

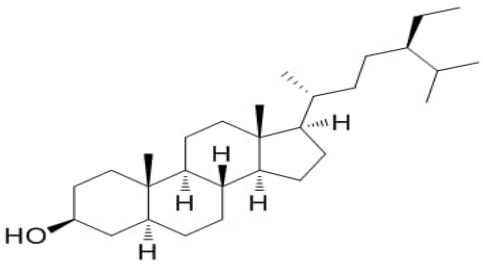


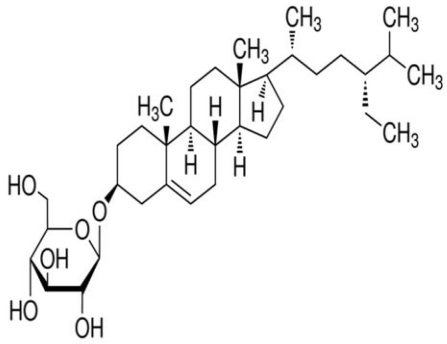
Lupeol



Diosgenin

Structure of phytochemical constituent *Ficus Dalhousia: (23)*





Sitosterol Stigma sterol-D-glucoside

Traditional Uses of CM and FD:

The *Crataeva Magna* and *Ficus Dalhousie* plant parts are used as raw material in traditional system of medicine in Ayurveda, siddha, and Unani etc. (22) In CM root bark is used to treat urolithiasis. To treatment of female disorders generally bark and root of this plant is used as well as a tonic effect. They used as a tonic and skin irritant against a high fever. The plant has a berry-like fruit has used as a leathery skin and pulpy flesh. The CM bark root decoction is used for stimulating pulpy flesh. The CM bark root decoction is used for stimulating the appetite or as a digestive, as a laxative and as a febrifuge. (23)

The ficus Dalhousie leaves and the steam bark is used in treatment of liver and skin disease. For the treatment of leprosy bark pest is used as a Cardiotonic (23).

Pharmacological activities of CM

Estrogenic activity:

Estrogenic activity of the extract was evaluated immature female rat are suggested by Zarrow et al. (1664). Selected rats underwent bilateral oophorectomy under light ether anesthesia through a lateral skin incision just below the last rib. Overestimated rats were divided into group of 4 animals and administrated once daily with one of the following oral solutions (2 ml/kg), diethylstilbesterol (1.5 mg/kg), ethanol and water extract (300 and 600 mg/kg). Once daily for the period of 4 days after 24 hr. of treatment with the last dose the animals were sacrificed. The uterus was removed from the attached tissue and weighed. vaginal opening and cornification of the vagina have also been reported (22)

Cardioprotective:

In this study, lupeol, a pentacyclic tri terpene isolated from the bark of *Crataeva species*, and its ester, lupeol linoleate, were evaluated from their potential cardioprotective effects against Cardioprotective induced toxicity. White male Wistar rats were administered a single dose of Cardioprotective (200 mg/kg body weight, IP). Serum lactate dehydrogenase and creatine phosphokinase activity was increased in Cardioprotective-treated mice. But decreased in cardiac tissue. A significant increase in lipid peroxide (PB<0.001) and a decreased in enzyme e(PB<0.001) (peroxide dismutase, catalase, glutathione peroxidase, glutathione reductase, glucose-6-phosphate dehydrogenase-transglutase–glutase Tan-glutane-glutane) (glutathione, vitamin C and vitamin E in reduce heart) antioxidants were not observed. Cardioprotective effects of lupeol (50 mg/kg body weight orally for 10 days) and linoleic acid ester lupeol (50 mg/kg body weight) (23)

Anti-Urolithic property:

A detailed description of urolithiasis is mentioned in Ayurveda under the name Ashmari. Ancient literature described ayurvedic medicinal group for the treatment of urolithiasis, such as Pashanbheda (Reed Sheep), Varuna (*Krataeva Nurvala*), kullatta (*Dolishos biflorum*), Gokshur (*Tribulus terrestris*) and others the purpose of this study was to study the influence of Varuna (*crateva nurvala*) on an experimental model of urolithiasis (white rat). The study was divided into 2 group: group 1, treatment and group 2, Control. All albino rats had a bladder stone surgically implanted. Electrolytes in urine and serum are measured regularly and periodically subjected to X-rays. This study show that Varuna (CM) decoction is effective. (24)

Anti-cancer activity:

HNSCC is a head and neck squamous cell carcinoma. NF -kappaB depletion has been identified as the primary mechanism behind lupeol's anti-cancer property against HNSCC. Lupeol itself was found not only to inhibit tumors growth, but also to interfair with HNSCC cell invention by reversing the NF -kappaB – depend epithelial – mesenchymal junction. Lupeol interact with seplatin, causing chemo-sanitization of HNSCC cell lines with high NF -kappa B activity in vitro. In an in vivo study using a nude mouse model of orthotopic metastatic squamous cell carcinoma of the mouth, 2 mg of lupeol per animal dramatically reduced tumor volume and inhibited local metastatic, which was more effective than cisplatin alone. Lupeol showed a significant synergistic sytotoxic effects when combine with low dose of cis platin without side-effects. Our results indicate that lupeol, alone or in combination, may be an effective treatment for advanced tumors (25).

Anti-nociceptive:

A crude ethanolic extract of c nurvala (250-500 mg/kg po) showed a dose -dependent and significant **(P<0.05-0.001)** anti-nociceptive effects on chemically induced nociceptive stimuli in rats. The results is obtained in this study indicates that the antinocicptive effects of C nurvala extract are both peripherally and centrally mediated. The results of this experimental animals study indicates that the crude ethanolic extract of C. Nurvala had antinocicptive properties, supporting unconfirmed pharmacological use of borun in folklore treatment, and/management of painful rheumatic inflammatory conditions. (26)

Pharmacological activities of FD

Anti-diabetic activity:

In our present study, alcoholic leaf extract FD (ELEFD) land aqueous extract FD (WLEFD) Showed a dose dependent increase in radical scavenging activity and

power reduction assays. In addition, plant extracts normalize glucose levels similarly to standard drug and have a pronounced antidiabetic effect. The ethanolic extract is effects on wistern diabetic rats. Oral administration of ELEFD also increased body weight in diabetic rats. In addition, the use of herbal extracts was effective in increasing serum HDL level and lowering TC, TG, LDL and VLDL cholesterol level band increased SOD, CAT and GSH levels. In view of the above can be concluded that ELEFD, validated by *in vitro* and *in vivo* phytochemical and pharmacological studies, shows promising antioxidants and antidiabetic effects. (27)

Antihyperlipidemic activity:

Methanol extract from the bark of FD (250 and 500 mg/kg b.w.) were evaluated for anti-hyperlipidemic activity in rat with hyperlipidemia induced by Triton WR-1339 and high fat diet. FD extract altered serum level of TC, TG, LDL-C and HDL-C to nearly normal level in Triton WR-1339 rats and rats with high fat diet-induced hyperlipidemia rats. The liver total cholesterol and triglycerides were also significantly reduced after treatment with 250 and 500 mg/kg of FD. The result of this study indicates that FD has a significant potential to use as a natural anti hyperlipidemic agent. (28)

Anti-inflammatory activity:

Evaluation of the anti-inflammatory activity of ethanol extract of *ficus dalhousia* Miq root (FDREE)in albino wistern rats using a carrageenan-formaline - induced paw edema model. The Anti-inflammatory was determined by modelling paw edema. Induced by carrageenan and formalin at three doses of 150 mg/kg, 300 mg/kg and 600 mg/kg. Male and female Wistern rats weighing 140-150 g were used in the study. At the result show that in test group, a significant decrease in the increase in paw volume was observed in the model of paw edema induced by carrageenan and formalin. In addition, the level of anti-inflammatory agents is higher in the test group compare to the negative control group. (30)

Anti-analgesic and antipyretic activity:

The FD Miq ethanolic extract tested for analgesic and antipyretic effects in albino wistern rats. analgesic and antipyretic activity was shown in white rats. Hot plate and acetic acid induced in convulsions were used to evaluate analgesic activity. Antipyretic was determined in an east fever model. Ethanol extract of the leaves of FD Miq. At doses (250 mg/kg and 500 mg/kg), a significant dose dependent analgesic effect was observed with the hot plate and acetic acid induction method ($P<0.001$), However, the extract was taken at the same dose. (30)

Anti-helminthic activity:

The FD Miq methanolic extract, petroleum ether, n-hexane, water, at a concentration of 25 mg/ml, 50 mg/ml and 100 mg/ml. FD leaves extract show the significant Anthelmintic activity at concentration of 25 mg/ml, 50 mg/ml and 100 mg/ml compared to standard preparation of albendazole. The results show that the leaf of FD is significant Anthelmintic when compared to the standard drug albendazole. (31)

Abbreviations:

CM- *Crataeva Magna*
FD- *Ficus Dalhousie*

AUTHORS CONTRIBUTION:

All the authors have equally contributed in conceiving this research and designing of experiments; all authors have participated in the design and interpretation of the data; writing the paper and participated in the revisions of it. All authors read and approved the final manuscript.

CONFLICT OF INTEREST:

The authors Mohsina F.P, Dr Aamir Quazi, Faheem IP, Dr.Ustad Almas, Shaikh Rohin Fatema declare that there is no conflict of interest.

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