JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

# A compendious review on Fagonia cretica linn

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***Abstract:*** *Fagonia cretica* has attracted the focus of various researchers nowadays. Species *Fagonia* belongs to tropical herb which is extensively distributed India, America, Africa. *Fagonia cretica* is a highly potential medicinal herb whose dried aerial parts are used in folk medicine for a number of diseases as reported in historical monograph. Plant possesses highly significant bioactive compounds such as glucoside, flavonoids, Saponins, triterpenes and pharmacological activities. The plants belonging to *fagonia* species have medicinal importance and used to treat various ailments such as hormonal imbalance, microbial infection, antioxidant, cytotoxic activity, thrombosis etc. The explored scientific data proves the *fagonia cretica* as a potent medicinal agent. Thus, *Fagonia cretica* offer a lot of future scope for the researcher.

**Keywords: Fagonia cretica Linn, Pharmacological activities, Pharmacotherapy, Phytochemistry.**

## 1. INTRODUCTION

The man has been using herbs and plant products for combuting diseases since times immemorial. Herbal medicines contain extensive biological and therapeutic activity, higher safety margins and lower pricing they are much sought after for primary healthcare in both developed and developing nations. After decades of intense obsession with the modern medical system, people have begun to look toward the traditional medicinal systems like Ayurveda, Siddha, and Unani to treat a variety of illnesses. This is as a result of the negative consequences of synthetic medications. Target plant research has increased recently all around the world and a sizable body of evidence has amassed to suggest the potential of healthy plants used in various ancient systems. Over the past ten years herbal traditional medicines have gained enormous momentum across the globe and are more important in health care programmes, particularly in developing nations. The notion of healthy plants in ancient Indian literature is extraordinarily broad and all plant parts are seen as potential sources of medicinal compounds[1].

The flora of the Indian subcontinent is diverse and includes both aromatic and medicinal species. This is because India has a vast range of climatic extremes from swamplands to deserts. Botanists have identified and catalogued a wide variety of herb species from the high Himalayan mountains to Kanyakumari's seashore. This abundant flora has been extensively used in India's traditional medical system as a source of numerous medications.

In India, the Rigveda, which was composed between 4500 and 1600 BCE has the earliest reference to the use of therapeutic plants. The first chapter of the Vrihat Samhita provides a through account of the first symposium on medicinal plants ever held and there has been an endless supply of literature on this topic since 1600 BCE. Even now, 75% of Indians still rely on this traditional method of medicine for healing since it is so deeply ingrained in our society. Given the sizeable percentage of the population that uses herbal treatments, it is crucial to provide scientific evidence for the effectiveness of these plant-based products that have been in use for such a long period. The World Health Organization is currently actively promoting the use of herbal medicine, which has been used for generations in developing nations. 3000 plants from the jungles of India and other tropical nations have been discovered as having medicinal use. For the US market alone the active components from these plants are valued close to $2,000,000,000 and approximately $8 Billion on the global market. Drug development based on natural ingredients has only intensified in Europe and the USA as a result of scientific developments in the disciplines of pharmacology and toxicology in the western hemisphere. The significance of such an examination was long ago recognised in India, and Sir Ramanath Chopra launched the first systematic investigation with these objectives in Calcutta around 45 years ago. The discipline of medicine first revolved around the plants that had healing qualities. Over the course of several centuries the hunt for medicinal plants has produced a large number of plants that are extremely useful for curing illnesses and enhancing health. More or less accurately, it may be said that every ailment has a plant growing in nature that can treat it. Recently, Moose has discussed a variety of herbal medications that can be used as standalone treatments[2].

The bean-escapade and caltrop are members of the Zygophyllaceae family of flowering plants. 22 genera and 285 species make up the family[3]. *Fagonia*, one of the important genera belonging to this family has 35 species that are native to various regions of Africa the Mediterranean Basin, the Middle East, India, and parts of America. Traditional healers have employed *F. Cretica L.* ethnobotanically as part of ayurveda and other treatment regimens for a variety of ailments[4].

*Fagonia* species are typically terete, triate, glabrous, upright, more or less grandullar, sherbets or herbs with minor under-hedge spikes. Petioles are totally factor long from 3 to 30 mm long, severely striate and exceedingly thin. Stipules are two sets of sharp, thin thistles that can extend heights of up to 100 cm and a width of up to 60 cm[5], [6]. From *F. Cretica L.* isolated chemicals and phytochemical extracts exhibit a range of biological actions including anti-tumor, anti-inflammatory, endocrinological and neuroprotective properties[7]–[9]. The methanolic extract of *Fagonia cretica* has demonstrated high free radical scavenging abilities against reactive oxygen and nitrogen species as well as antidiabetic activity. It is assured to have acceptable antibacterial potential[6], [10].

Regarding their medicinal applications a lot of experts focused on the *F. Cretica L.* since they were antioxidant, anti-tumor, analgesic, febrifuge, astringent and preventative against smallpox agents. In the native system other varieties of *Fagonia* were also employed to treat

fever, urine discharges, asthma, toothaches kidney problems and stomachaches. There have been discoveries of vitamins, coumarins, trace minerals, terpenoids, alkaloids, proteins, sterols, flavonoids and saponins in several types of *Fagonia*.

## 2. BOTANICAL CHRACTERISTIC

2.1. **Vernacular Epithets**[11]

Sanskrit: Duhsparsa, Virupa, Dhanvyasakha.
English: Khorsosan thoran.
Hindi: Hinguaa, Dhanhare, Dhamaasa.
Marathi: Dhamaasaa.
Guajarati: Dhamaaso.
Malayalam: Kodidduva.
Tamil: Tulganari.
Telugu: Chittigava, Gilaregati.
Panjabi: Dama, Dhamah

2.2. **Taxonomical Hierarchy**[4], [12]

Kingdom: Plantae
Subkingdom: Viridaeplantae
Phylum: Tracheophyta
Subphylum: Euphyllothytina
Infraphylum: Radiatopses
Class: Magnoliopsida
Subclass: Rosidae
Order: Zygophyllales
Superorder: Geranianae
Family: Zygophyllaceae
Genus: Fagonia
Species: *F.albifora, F.arabica, F.cretica F.latifolia, F.ovalifolia, F.Indica*

## 3. GEOGRAPHICAL ALLOCATION

The native of *F. Cretica L.* Mediterranean and Saharo-Sindian regions. Widely distributed South and North America and South Africa. North Africa May be considered the centre of distribution of genus *Fagonia* in the world. many species of *Fagonia* are widely distributed in Pakistan, Egypt, Aden, Nubia, Algeria, Tunisia, Nesopotomia and Persia. *Fagonia* is genus known from the warm arid regions of all continents accept Australia. *F. cretica* grows in habitats with fine - textured, compact soils: fields, beside hedges and walls. Wherever it occurs, it usually grows showing considerable gregariousness[13].

## 4. MORPHOLOGICAL CHARACTERIZATION

*F. Cretica L.* is a small shrub containing thorns grow in dry regions and up to a height of 1-3 feet. *Fagonia* shows unpleasant odour and bitter taste[14].

## 5. MICROSCOPIC CHARACTERIZATION

5.1. Seed: The Fagonia seeds shows D-shaped. The size of seed is 2.5-3.5×2.1-2.8 mm. Epidermal cells are 5-6 gonals to indistinct shape. Periclinal cell wall is flat, dome-shaped[15].

5.2. Stem: The transverse section of stem is consisting of irregular circular in shaped. The epidermis are single layer rectangular cells and thin cuticle layer are surrounded by them. Cortex is composed of collenchymatous cells and parenchymatous cells. Stellar region contains xylem, phloem and medullary rays. Xylem shows wedge shape patches. Phloem is appearing like caps over metaxylem. Medullary rays are looks like spokes of wheel and composed of thin walled elongated parenchymatous cells packed with starch grains[16].

5.3. Leaf: Leaf is equilateral, single-layered epidermis consisting of mostly tangentially elongated cells covered with a thick cuticle. In surface view, both the loftier and subordinate epidermis show acellular stomata, polygonal epidermal cells. Two or three layers of palisade cells on each side adjacent to the epidermis. The vascular bundle shows the xylem below and the phloem above. Scleral tissue arises as a bundle cap just above the phloem. A small outer vascular bundle is also present in the lamina. The number of venous islets is 11 to 14. The stomatal index is 16 to 17 in the lower epidermis and 5 to 7 in the upper epidermis. A palisade ratio of 2 or 3 in the upper epidermis and 2 to 4 in the lower epidermis[12], [17].

5.4. Powder: Powder microscopy showed simple, covering trichomes with unicellular stalk scattered as such or attached to the epicarp and wall of ovary, cells of the former are covered with striated cuticle, simple trichomes uni to bi-cellular, thick walled, lignified, with pointed apex and bulging base, of various sizes from fruit; fragments of testa in surface view showing polygonal thick walled cells; fragments of longitudinally cut thick walled, lignified groups of sclerenchymatous cells of mesocarp often seen overlapping with the underlying cells of endocarp; isolated and groups of stone cells; fragments of fibrous layer of anther in surface view; radially longitudinally cut medullary rays crossing the bordered pitted vessels, anomocytic stomata and lignified cork in surface view[18].

## 6. PHYTOCHEMISTRY

### 6.1 Chemical configuration

In a long time period by various studies conducted, numerous types of plant metabolites were isolated from different *Fagonia* species with some important groups like saponins, sapogenins, alkaloids, terpenoids, tannins, flavonoids, proteins, amino acids and trace elements[19]. The remaining constituents are found in the remaining parts of the shoot system of the plant in week moderate amounts[17].

### 6.2 Saogenins

Preliminary phytochemical screening on shoot system of species- *Fagonia cretica* shows it contains 3 sapogenins named hederagenin-1, hederagenin-2 and ursolic acid along with pinatol[20].

### 6.3 Saponins

Terpenoid saponins are most essential component in *F. Cretica L.* They were solitude and associated from arial parts of *F. Cretica L.* Namely as- 3-O-{[β-D-glucopyranosyl-(1→2)]-[α-L-arabinopyranosyl-(1→3)]-α-L-arabinopyranosyl}-ursolic acid-28-O-[β-D-glucopyranosyl] ester (indicasaponin A), 3-O-{[β-D-glucopyranosyl-(1→2)]-[α-L-arabinopyranosyl-(1→3)]-α-L-arabinopyranosyl}-oleanolic acid-28-O-[β-D-glucopyranosyl] ester (indicasaponin B)[21]. 3-O-[β-D-glucopyranosyl-(1→3)-α-L-arabinopyranosyl]-ursolic acid-28-O-[β-D-glucopyranosyl] ester, 3-O-[β-D-glucopyranosyl-(1→3)-α-L-arabinopyranosyl]-oleanolic acid-28-O-[β-D-glucopyranosyl][22]. 3-O-β-D-xylopyranosyl(1→2)-[β-D-glucopyranosyl(1→3)]--L-arabinopyranosyl ole-anolic acid 28-O-fl-D-glucopyranoside, 3-O-β-D-glucopyranosyl(l→2)-[fl-D-glucopyranosyl(1→3)]-α-L-arabino pyranosyl oleanolic acid 28-O-β-D-glucopyranoside, 3-O-β-D-xylopyranosyl(1→2)-[β-D-glucopyranosyl (1→3)]-α-L-arabinopyranosyl oleanolic acid, 3-O-β-D-glucopyranosyl(1→2)-[β-D-glucopyranosyl(1→3)]-α-L-arabinopyranosyl oleanolic acid, 3-O-β-D-xyiopyranosyl(1→2)-[β-D-glucopyranosyl (1→3)]-α t-L-arabinopyranosyl 27-hy-droxyoleanolic acid[23].

### 6.4 Glycosides

The methanolic extract of *Fagonia* contains apigenin 7-O-glucoside, kaempferol 3-O-glucoside, kaempferol 3,7-di-O-rhamnoside, quercetin and quercetin 3-O-glucoside kaempferol3-O-b-L-arabinopyranosyl-(1→4)-a-L-rhamnopyranoside-7-O-a-L-rhamnopyranoside[24].

### 6.5 Flavonoids

In *F. Cretica L., F.tacckholmiana* and *F.arabica* reported 6 types of flavonoids such as herbacetian 8-rutinoside, , isorhamnetin 3-glucoside and 3-rutinoside, 3,7-diglucoside and 3-rutinoside-7-glucoside, herbacetin 8-methyl ether-3-rutinoside[25].

### 6.6 Other chemical compounds

Quinovic acid-3βOβD-glycopyranoside-17, quinovic acid-16, quinovic acid- 3β O-β-Dglycopyranosyl(28→1) β-D-glucopyranosylester-18 and stigmasterol-19[26]. minerals such as sulphate and chlorides, anthraquinone, cyanogenins, and coumarin. Docosyl docosanoate, cerylalcohol, β-setosterol, n-tricontanol chenovic acid, 4,5-dicaffeoyl quinic acid-, 3,5dicaffeoylquinic acid, syringaresinol hd glucoside, scopoletin, rutin and kaempferol[24]. Diosgenin, cryptogenin, lanosterol, harmine, chinovic acid, oleanolic acid, fagogenin, betulin, campesterol these are other chemical components present in *Fagonia cretica linn*[27].

## 7. PHARMACOGNOSTICAL EVALUATION[28], [29]

Foreign matter: Not more than 2%
Alcohol soluble extractive: Not less than 5%
Water soluble extractive: Not less than 10%
Total ash value: Not more than 10%
Acid insoluble ash value: Not more than 0.5%

## 8. PHARMACOLOGICAL ASPECT

Various species of *fagonia* recorded to contain various types of pharmacological activities some author reported anti-inflammatory activity, androgenic activity, endocrinological activity, anti-microbial activity, anti-oxidant activity, thrombolytic activity, cytotoxic activity[30].

### 8.1 Anti-inflammatory activity

The current study was carried out to examine the wound healing and anti-inflammatory effects of 90% alcoholic extract of *F. schweinfurthii* formulated gel on carrageenan-induced rats' paw edoema and excision wound model effects were compared with the anti-inflammatory diclofenac sodium ointment (Diclomax) and the wound healing povidone - iodine Betadine) drugs. The planter surface of the left arm was topically treated (0.5 g) with the herbal gels and diclofenac sodium ointment The anti-inflammatory impact of the herbal gels and diclofenac sodium ointment was noticed after 3 hours of topical application to the plantar facet of the left hind paw. The impact of applying 0.5 g/wound of the *F. schweinfurthii* gel and Betadine once daily for 19 days to albino rats' excision wounds was studied and observations were made every four days. It has been noted that gel formulations have an expedited healing period and a gradual anti-inflammatory impact. According to this study a gel formulation of *F. schweinfurthii* plant extract may be produced as a medicinal agent for its anti-inflammatory and wound-healing properties[31], [32].

### 8.2 Anti-microbial activity

The study examines the phytochemical composition and antibacterial activity of aqueous and ethanol extracts from the Libyan medicinal herb *Fagonia Arabica L.* Results of phytochemical examination showed that tannins, phenols, proteins, terpenoids, saponins, and alkaloids were set up in the aqueous and ethanolic crude extracts. While the resins, coumarins and glycosides are absent from the ethanolic extract of *Fagonia Arabica L.*, crude leaf extracts are and for quantitative the % yield of the crude leaf extracts for this plant was 93% in the aqueous extract, 80% in the ethanolic extract, 13% in the alkaloids, 17% in the saponins, and 12% in the flavonoids. Using the method of disc diffusion, the antibacterial activity of this plant's leaf extract was ascertained. The leaf extracts had notable antibacterial efficacy and the crude extracts had the capacity to inhibit Gram-negative bacteria more so than Gram-positive bacteria. The *Fagonia Arabica* ethanolic extract (14mm) of *Klebsiella pneumonia* showed significant antibacterial activity. For the other plant extracts the area of inhibition is: (9 mm) for the plant's aqueous extract against *Klebsiella pneumonia* (*Fagonia Arabica*), and (13 up to and 10 mm) for the plant's extracts against *Escherichia coli*. Aqueous and ethanolic extracts against *Staphylococcus aureus* and *Staphylococcus epidermis*. respectively, were (negative, 12, negative, and 10 mm), whereas an ethanolic extract of *Fagonia Arabica* was (10 mm) effective against *Staphylococcus aureus*[33].

Utilizing phytochemical analysis, the active phytoconstituents of *F. cretica* were identified in the current study. By using the disc diffusion method, different concentrations of *Fagonia* cretica plant extracts were examined for their antimicrobial activity against *B. subtilis, S. aureus, S. epidermidis, P. aeruginosa* and *E. coli.* Plant extract MIC tests were also done for *S. aureus, B. subtilis and P. aeruginosa.* Bioactive substances were found in the plant *Fagonia* cretica after a preliminary phytochemical screening. In comparison to ethanolic extract, methanolic and aqueous extracts shown greater activity against all of the tested microorganisms. The findings support the traditional medicinal usage of this plant also the isolation and characterisation of the active ingredient for future application in medical microbiology[34], [35].

### 8.3 Anti-oxidant Activity

Oxygen/nitrogen free radicals are produced when pro-oxidants and anti-oxidants are not balanced, and these free radicals have been linked to a number of neurological illnesses. An essential Ayurvedic plant called as *Fagonia arabica* has extensive range of anti-inflammatory, analgesic, and antipyretic actions are examples of medicinal qualities. However, its potential as an antioxidant has not

yet been studied. The goal of the current investigation was to research F. arabica's ability to act as an antioxidant and its ability to protect the brain on the chemically induced ischemia of PC12 cells. Chemical ischemia was brought on by exposing the cells to sodium azide, an oxidative phosphorylation uncoupler (5.0 mM) and 2-deoxyglucose (2.0 mm), a competitive inhibitor of glycolysis, for two hours, then Reperfusion for 24 hours using regular culture media. Utilizing DPPH and ABTS•+ scavenging and Ferric ion reducing antioxidant potential (FRAP) tests, the herb's total polyphenolic content (TPC) and antioxidant capacity were determined. Additionally, its impact on neuroprotection and energy metabolism was investigated. The ischemia damage was characterised by a compromised Energy status, which was shown by the cells' lower ATP levels and elevated Lactic acid content. Both the alterations gave significant neuroprotection from ischemia and positively reacted to *F. arabica*. They also aided in maintaining the cellular viability and mitochondrial integrity of the cells. Significant levels of TPC and antioxidant activity were found in *F. arabica*. This study demonstrates the F. arabica plant's antioxidant capacity and its effectiveness in protecting against ischemia/reperfusion-induced cell death. Thus, *F. arabica* may be taken into consideration for more research on the creation of a therapeutic or preventative agent for the treatment of ischemic stroke[36]. The existence of powerful antioxidant principles in the methanol extract of the roots of *Fagonia cretica* was confirmed by the values for 2,2′-azinobis(3-ethylbenzothiazoline-6-sulfonic acid) radical scavenging, ferric ion reducing antioxidant potential and total antioxidant potential [37].

### 8.4 Androgenic Activity

*Fagonia cretica* was investigated by Abirami V. et al. The impact of an alcoholic extract of *F. cretica's* arial portions on the estrous cycle and applicable in female albino rats was studied. In the investigation, it was discovered that *Fagonia cretica* causes distortions in the rats' menstual cycle's regularity. Where the heat period has been omitted at random (estrous phase). Its index of disappearance is +53.33. It explains why females are less inclined to mate with guys now. as soon as it's used It considerably functioned as an ant implantation agent at a dosage of 250 mg/kg p.o. the stopping of the medication The weights of the seminal vesicles and the ventral prostate increased in comparison to the control value, indicating considerable androgenic activity. Given that the values obtained after treatment with testosterone propionate showed no substantially different results when the two substances were combined, it does not appear to have any antiandrogenic effect[38].

### 8.5 Cytotoxic activity

*Fagonia cretica* is said to have therapeutic use, particularly for the treatment of malignancy and tumours. This data was examined at the laboratory level in the current investigation using antitumor (potato disc), cytotoxic and DNA damage assays. At LD50 of 118.89 ppm, significant cytotoxicity was observed against brine shrimps, and an antitumor experiment revealed that the Extract prevented the development of tumours on potato discs. All of the tumor-causing *Agrobacterium* strains studied (At77, At10 and At6) exhibited significant anticancer activity, with At10 showing the highest tumour inhibition (77.04%). However, the extract did not exhibit any fatal or DNA-damaging action when tested against strains of *Agrobacterium tumefaciens*. The total findings show that this plant has a high anti-cancerous potential[8], [39].

By using p53-dependent and independent pathways, Matt Lam et al. show how an aqueous extract of *Fagonia cretica* may cause apoptosis and cell cycle arrest while also activating the DNA destruction Response. Additionally, they demonstrate that FOXO3a is necessary for activity even in the absenteeism of p53. Their results suggest that the aqueous extract of *Fagonia cretica* contains potential anti-cancer compounds that inhibit breast cancer cell growth via DNA destruction-induced FOXO3a and p53[40], [41].

Expression *Fagonia indica's* impact on rat tumours created in an experiment was studied by Soomro AL et al. It was discovered that the rats given *Fagonia* extract lived noticeably prolong than the control group. Female rats in the treatment group survived 83.2+12.67 days (range 55-118 days), while treated male rats lived 59.4+10.07 days (range 39-98). The survival rate for untreated female rats was 38.9 + 4.16 days (range: 21-57 days), whereas the survival rate for untreated male rats was 17.0 + 2.55 days (range 10-27 days). In both the female and male rats, the dissimilarities in survival between the treated and untreated groups was statistically significant (P 0.01), with the females being significant (P 0.01) in both groups. The difference in the length of survival of female and male rats in the treatment group. There was no such difference in the existence of female and male rats in the untreated group (P>0.1). This initial study has demonstrated that *Fagonia indica* has a tumor-suppressing action that is more pronounced in females[42].

### 8.6 Endocrinological activity

The impact of the two main triterpenoid saponins (saponin-I and saponin-II) from the powder *Fagonia cretica* herb on several blood endocrinological parameters. The levels of prolactin, specifically the blood concentrations of thyrotropin, thyroxine, and cortisol in normal male rabbits were inspected by employing recurrent chromatography on silica gel, biogel P-2 and sephadex LH-20, two important triterpenoid chemicals, saponin-I and saponin-II, were separated from its ethanolic extract. After comparing these compounds' 1 H NMR and 13C NMR chemical shift values to previously published values for analogous compounds, these compounds were discovered. Animals treated with crude drugs and saponins had their blood hormone levels measured using a radio-immunological technique employing radioactive I125.On the NE-1612 gamma scintillation counter, the radioactivity of the standard and the unrevealed material in each example was then monitored for 90 seconds. Prolactin and serum TSH levels were significantly lower in the 30 mg dosages of both saponins compared to the herbal drug treatment and control groups. While the crude medication and saponin-I had non-notable effects on thyroxine after 16 days, saponin-II dramatically decreased the amount of thyroid hormone in a 30 mg dosage. When given the crude medication in a 1g dosage and both saponins in 30 mg amounts, there was a significant rise in serum cortisol. With saponin-II, the maximum increase in serum cortisol happened after 16 days[43].

### 8.7 Thrombolytic Activity

Effect of aqueous FA extract on thrombin-induced t-PA and PAI-1 release from cultured human umbilical vein endothelial cell line (HUVE) for analysing its clot-lytic action. To achieve this, cells from the human umbilical vein were isolated and used to establish a cell line model. The XTT test was used to assess cell toxicity. t-PA and the PAI-1 t-PA complex was estimated using the ELISA technique. The exposition of t-PA and PAI-1 from the HUVE cell line is stimulated by thrombin treatment, and the release of these molecules is shown to be inhibited by FA therapy. Our first findings imply that FA utilized in place of thrombolytic medication. To confirm the role of FA as a novel thrombolytic drug, further research is needed using animal models of thrombosis[44], [45].

### 8.8 Antidiabetic activity

In order to determine the antidiabetic activity of *F. indica*, several experiments were carried out utilising a variety of techniques. The test results revealed that several plant extracts had the efficiency suppress glucosidase (maltase) activity. The alpha-amylase enzyme was inhibited to determine the antidiabetic activity. One of the compounds from *F. indica* that was extracted had glucose-dependent Insulin secretory activity and appeared to have a lower risk of drug-induced hypoglycaemia, suggesting that it might have particular

benefits as an anti-diabetic medication[46]. The traditional medicine applied in this study was prepared as a tea, and the profile of the principal metabolites it contains was analysed using LC/MS/MS. It was discovered that the extract contained many phenolic glycosides. Including isorhamnetin-3-O-rutinoside, isorhamnetin-3-(6''- Malonylglucoside), quercetin-3-O-rutinoside, kaempferol-3-O-glycoside, kaempferol-3(6'-malonylglucoside), and unidentified sulphonated saponins. With an IC50 of 4.62 g/ml, traditional medicine inhibits -glucosidase in vitro. Using normoglycaemic and streptozotocin-treated diabetic rats, the hypoglycaemic impact of traditional medicine was assessed. The internal control used was glibenclamide. Once daily for 21 straight days, the medication (250 or 500 mg/kg body weight) was administered. At the terminate of the experimental term, plasma glucose levels had decreased by 45 percent due to the 500 mg/kg dose's effectiveness in the management of the condition. Pancreatic sections from treatment groups demonstrated that the extract and glibenclamide both partially avoided this degeneration, but pancreatic sections from streptozotocin/nictotinamide therapy induced the loss of pancreatic islet cells[10].

### 8.9 Hepatoprotective activity

The goal of the investigation was to evaluate the hepatoprotective and cytotoxic properties of methanolic and aqueous extracts of *F. cretica L.* These extracts' ability to prevent liver damage from CCl4 exposure in Wistar albino rats was investigated. At an oral dosage of (400 mg/kg), the aqueous and methanolic extracts of F. cretica L. demonstrated a highly significant (p0.01) hepatoprotective effect. These biochemical findings were supported by histological analyses of liver sections compared to a positive control treatment, Silymarin (100 mg/kg), which is a standard hepatoprotective medication[47]. The study looked at the hepatoprotective effects of the *Fagonia indica* contains methanolic extract burm on albino rat liver damage caused by CCl4. The levels of biochemical markers like Total bilirubin, SGPT, ALP, SGOT, Direct bilirubin, and Cholesterol were crucially higher in CCl4-treated rats than in the control group (P 0.05), but MEFI (400 mg/kg, bw)-treated rats displayed the greatest reductions in SGPT, SGDH, SGOT, ALP, direct bilirubin, total bilirubin, and The hepatoprotective activity of MEFI is also revealed by histopathological investigations in dependent on dosage[48].

### 8.10 Anti-Allergic Activity

The ability of *Fagonia bruguieri* to prevent allergies. This is the whole *Fagonia bruguieri* DC plant. was frozen-dried after being extracted using hot water. In mice and rats, the dried extract's LD50 values were examined to be 11.5 and 10.75 g/kg i.p., respectively. Treatment of albino Guinea-pigs with the extract at dosages of 200 mg/kg (i.v.) or orally inhibited capsaicin (100 g/kg i.v.) and histamine (20 g/kg)-induced bronchoconstriction without altering that caused by Ach and 5-HT. The percentage antagonisms opposed to histamine and capsaicin were, respectively, 72 0.9 and 65 4 percent (P 0.01, N = 10). Histamine aqueous Aerosols (10 mg/ml) exposure caused reversible unconsciousness and first graspings in conscious guinea pigs within 5 minutes. The guinea pigs were given the extract at dosages of 1.25 g/kg (i.p.) for 20 minutes or orally for 2 hours, which significantly reduced the animals' susceptibility to histamine-induced seizures and unconsciousness (P 0.01, N = 11)[49].

### 8.11 Gastrointestinal Activity

The results of the current investigation showed that *Fagonia cretica* had a similar dose-dependent relaxing effect on rabbit jejunum to that of regular adrenaline. Additionally, the extract's affinity to adrenoceptors appeared to be lower than that of adrenaline (p = 0.04), and its efficacy was roughly half that of adrenaline (p = 0.01), suggesting that *Fagonia cretica* may have some partial agonistic properties or be affected by the effects of other mixture components. These results were consistent with the contradictory effects noted in traditional use. There are only two possible mechanisms by which the relaxant effect can occur because the experiment was done on isolated rabbit jejunum: either through the adrenergic pathway or directly relaxing the smooth muscle. Propranolol, a non-selective -blocker, shifted the ethanolic extract of *Fagonia cretica linn's* dose-response curve to the right in a dose-dependent manner similar to that produced by adrenaline, providing evidence of the involvement of -Adrenoceptors in mediating the extract's relaxing effects. The measured pA2 verified the importance of the difference in receptor affinities between the extract and the standard adrenaline in a competitive manner (p=0.001 and p=0.003). Despite the fact that *Fagonia cretica* was a traditional remedy for bronchial asthma, the research demonstrated that its use was supported by science. The non-selective -blocker (phentolamine) was used to confirm the presence of the role of activity that may underlie the extract relaxation, but our results showed that phentolamine successfully shifted the dose- response curves of *Fagonia cretica* to the right in a dose-dependent manner. This is due to the well-known pharmacological feature of rabbit intestine, the unusual effect in which both and adrenergic receptor types *Fagonia cretica's* action on -receptors was consistent with the plant's traditional use of inducing abortions since the smooth muscle of the uterus is rich in 1-adrenoceptors, which when stimulated, cause the uterus to contract more vigorously. However, our findings rule out the other alternative theory that suggests the relaxant effect may be mediated by the direct effect of the plant extract on the intestine's smooth muscle filaments. This theory was tested by competitively blocking both and -adrenergic receptor types in the rabbit small intestine and comparing the results to those of standard adrenaline. These results corroborated the effects of harmine, a well-known monoamine oxidase A and B inhibitor extracted from the plant, which lessens the rate at which monoamines are degraded in the gut and increases their ability to relax gut smooth muscle[50].

## 9. POSOLOGY

The endorsed dose of *Fagonia cretica l.* powder is 3 to 5 grams. The decoction of whole plant (50 to 100 ml) is used in treatment of various disease[51].

## 10. SUMMERY

There is evidence-based research on the security and efficacy of conventional Indian medical systems. The number of ailments for which *F. Cretica L.* is used as medication is fairly extensive, but only a small number of those disorders have had their therapeutic efficacy evaluated, according to a cretical study of the literature searched for this review. It is essential that more clinical and pharmacological research be carried out to study the untapped potential of *F. Cretica L.* as a medication in light of the extensive range of medicinal benefits of the plant stated in Ayurveda, Homeopathy, Unani system, and other systems. The *F Cretica L.* is an origin of chemicals with medicinal use and exhibits a range of pharmacological actions. These investigations will be beneficial in drawing attention to the *F Cretica L.*, and they may also be helpful in creating novel formulations that are more therapeutic and in providing a direction for future research.

***Figures and Tables***

Table 1 Morphological characterization

| Plant part | Morphology |
|---|---|
| Stem | The colour of stem is green when young, whitish brown when dry and striated. The pieces of the stem for the most part 0.5 to 1.5cm thick and range in length. They are spin with 2 pairs of spines present at each node[6], [16], [52]. |
| Root | The tap root is brownish-green on the outside, rough and longitudinally striped with a yellow-green core. Fracture, fibrous[6], [52]. |
| Leaves | Leaves small opposite, almost sessile, linear, elliptical, entire leaflets green or blackish brown, 0.5-1.5 cm long, 0.05-0.1 cm wide without protruding midrib area above leaf level[52], [53]. |
| Fruit | A pentagonal split fruit consisting of 5 compacted 2-valve cocci[6], [52]. |
| Flower | The flowers are small pale pink or purple, with long peduncles 6-12mm long. ovoidal, elongated. The petals are twice as long as the sepals, spatulate and claw like in length. Ovary hairy, tapered in style[52], [54]. |

Table 2 Plant parts and chemical groups

| Plant Parts | Chemical Groups |
|---|---|
| Stems | Saponins |
| Leaves | Tannins and Glycosides |
| Flowers | Tannins and Glycosides |
| Fruits | Saponins and Glycosides |

Table 3 Traditional uses of species *fagonia* in different parts of the world

| Country | Traditional uses |
|---|---|
| India | Whole plant of *Fagonia arabica* in dried form is used as a diuretic activity |
| | Used in skin diseases, wound healing, vertigo, foul, abscesses, scabies, infected ulcers, scrofulous glands wounds and for dermatosis |
| | Twigs of plants are used to treat snake bite and also applied externally as paste on tumours and for swelling of neck |
| | Used for many inflammatory disorders |
| | Used for sore mouth |
| | Dermatological, analgesic, antipyretic effects |
| | Used for liver cancer |
| | It is also used for skin diseases, smallpox and for endothermic reaction in the body and as diuretic |
| Libya | Used as analgesic, antihypertensive and anti-inflammatory |

Table 4 Medicinal indications

| Plant Parts | Effect |
|---|---|
| **Leaves** | Fever, thrust, vomiting, boils, leucoedema, biliousness[48]. |
| **Bark** | Dermatitis, hepatoprotective[55]. |
| **Extract of aerial part** | Antiviral, endocrinological, antiamphetaminic, spasmogenic effect[56]. |
| **Plant ash** | Anaemia, diuretic, analgesic, antiemetic, anticarcinogenic, stimulant[55], [56]. |

Fig. 1 *F. cretica* shrub

Fig. 2 Flowers of *F. cretica*

Fig. 3 Bud of *F. cretica*

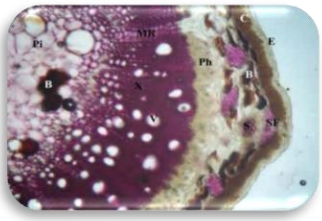


Figure 4: T.S. of stem at 10X [E: epidermis, C: collenchyma, B: brownish matter, SF: scerencymatous fibers, S: Sclerenchymatous cells, Ph: phloem, X: xylem, V: vessels, MR: medullary rays, Pi: pith]

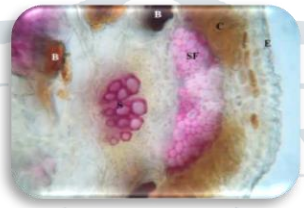


Figure 5: T.S. of stem at 40X [E: epidermis, C: collenchyma, B: brownish matter, SF: scerencymatous fibers, S: Sclerenchymatous cells]

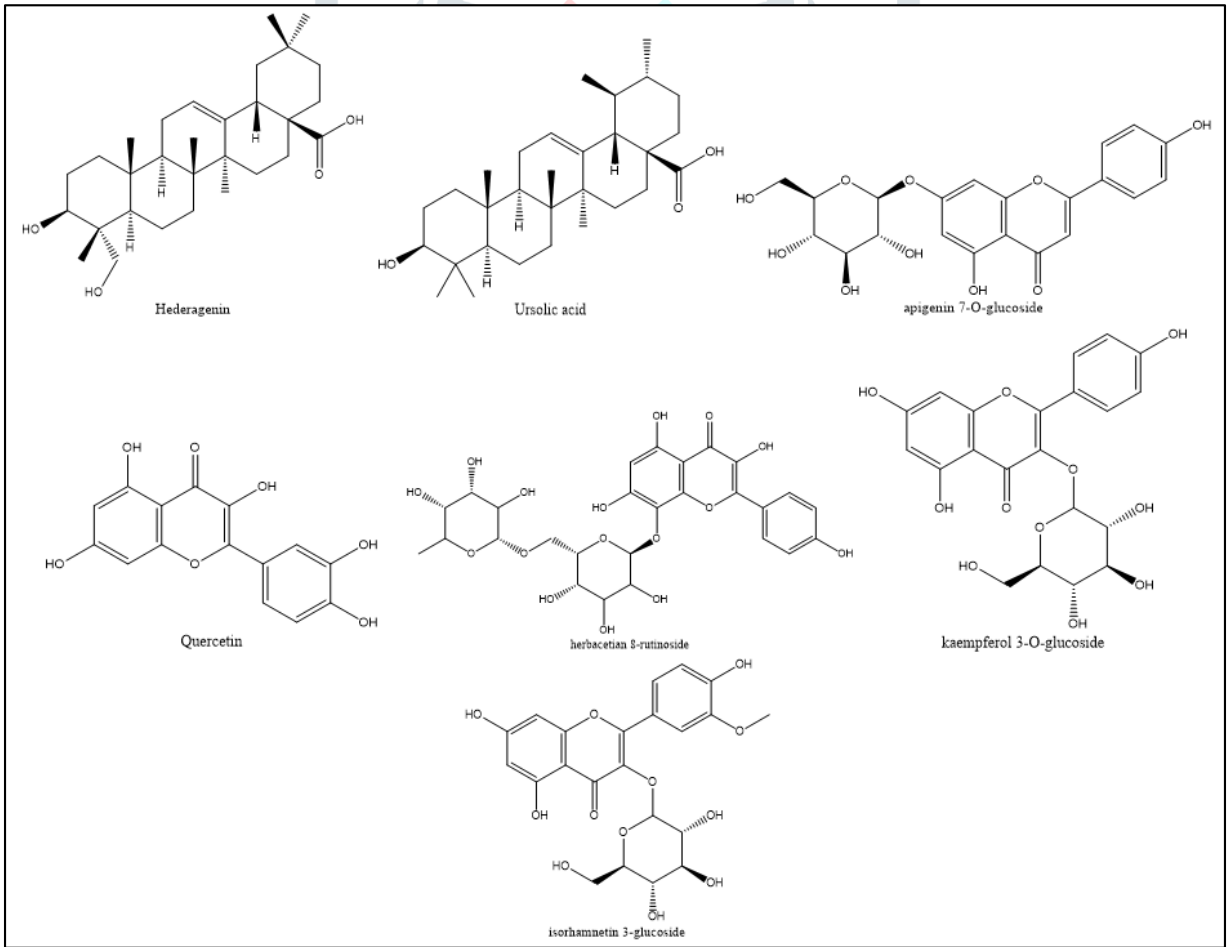


Fig 6 Chemical Structures

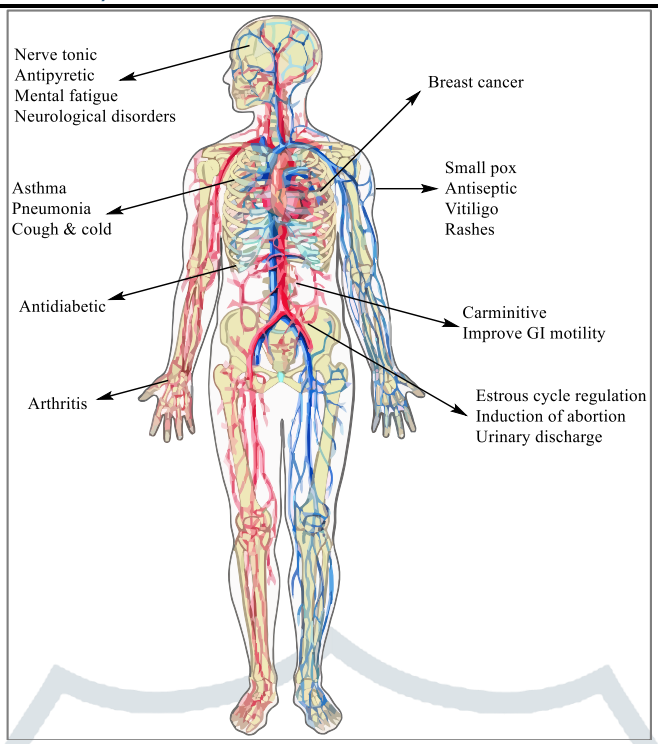


Fig 7 Human diagram of pharmacological action

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