

# POTENTIAL HEALTH BENEFITS AND PHARMACOLOGICAL ACTIVITIES OF FAGONIA CRETICA

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**ABSTRACT:** *Fagoniacretica* is a woodland tiny thorny herb that belongs to the *Zygophyllaceae* family. (1)*fagonia-cretica*, *fagonia- indica*, *fagonia- Arabica*, *fagonia-glutinosa*, *fagonia-californica* and *fagonia- scabra* are some of the 35 species. the inclusion of unique chemical ingredients such as sterols, alkaloids, sapogenins, terpenoids, flavonoids, proteins, amino acids, coumarins, vitamins, and trace elements attracted worldwide attention to the species. (2) they have a long history of using internal and external conventional formulations to treat hemorrhoids, inflammation, ulcers, open wounds, leprosy, and fever. (1) researchers have discovered that this plant contains anticancer, antipyretic, analgesics, anti-inflammatory, wound healing, anti-tumor, anti-allergic, Renoprotective antibacterial, anti-diabetic, (2) antimicrobial, antiseptic, liver cancer, anti-viral, and thrombolytic characteristics.

## I. INTRODUCTION

*Fagonia* is a flowering plant genus in the *Zygophyllaceae* family that grows in the wild. (2) it is a creeping plant with violet flowers this plant has expanded throughout the world's barren and hot regions. (1) it may be found in the deserts of Pakistan, India, Africa, and portions of Europe. (3) it is commonly referred to as *dhamasain* Pakistan. The fact that it is antipyretic and preventative, as opposed to smallpox, has raised demand.

### Properties

The plant has sweet, bitter, sharp, and sour tastes according to different stages of growth and parts. The color of the flowers is purple; the plant has large numbers of small fruits near thorns. other components have been identified, including docosyl docosanoate from hexane extract and water-soluble proteins from an aqueous extract of hair air-dried *fagonia cretica* plants. nahagenin. (hederagnin, ursolic acid, and separated and characterized its flavonoid the nutritive anti-microbial action has previously been investigated. While the nutritional benefits of its and other wild species in India's Rajasthan region have been assessed. (2)

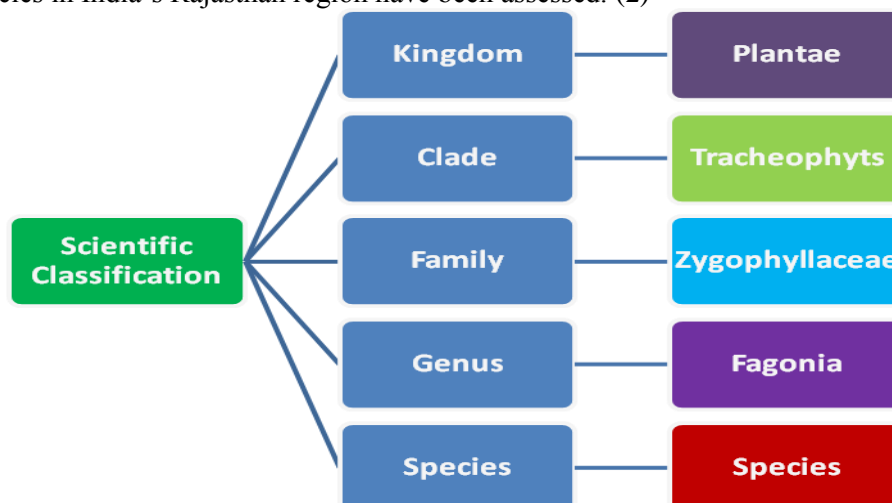


Fig.1. Scientific classification of *fagonia cretica*

### Medicinal Use

Medicinal plants are nature’s gift to humans, assisting them in living a disease-free and healthy life (Wikipedia). *Fagonia cretica* is a traditional medicine with anti-bilious, anti-septic, and blood-purifying properties. (4) And it is also used for skin diseases, smallpox, and endothermic reactions in the body (Wikipedia). Internally, it is used as a decoction and as a gargle for stomatitis and other mouth diseases; topically, it is administered as a paste to boils, lesions, and scrofulous glands. This plant is used to cure typhoid, scabies, fever, asthma, urinary discharges, bronchitis, tumors, liver difficulties, piles, and digestive diseases in the indo-Pak subcontinent region. (4) Many ayurvedic formulations, such as chitrakadivati, duralabhadikwath, and Hirasawa, have it as one of the key constituents. (5) The twigs of the plant are used as a remedy for snakebite and applied externally as a paste on tumors and for the swelling of the neck. anti-hemorrhage, anti-tumor, anti-inflammatory, and neuroprotective properties have been observed in rough phytochemical extracts and isolated chemicals from *fagonia cretica*. And methanolic extracts of *fagonia cretica* have been shown to have acceptable anti-microbial potential, as well as high free radical scavenging activities against reactive oxygen and nitrogen species, as well as anti-diabetic action. (6)



Fig.2. *Fagonia cretica*

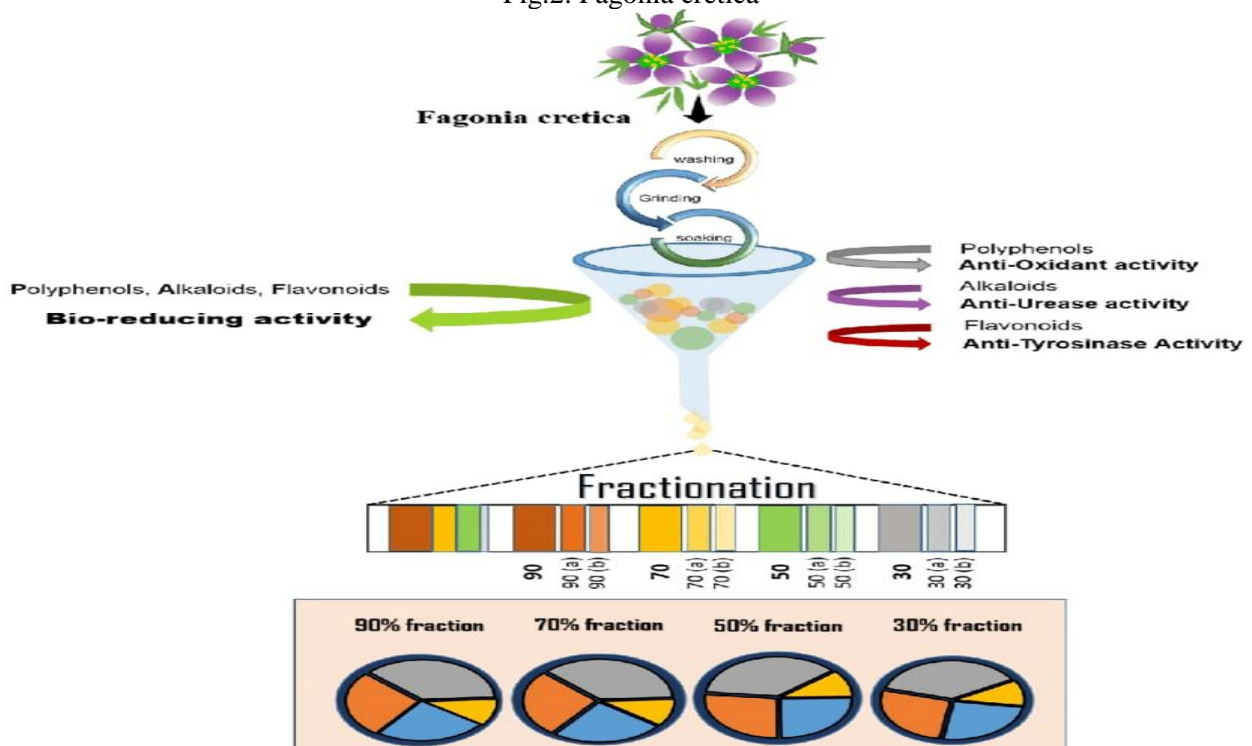


Fig.3. Fractionation process of *fagonia cretica*

## II. PHARMACOLOGICAL ACTIVITIES

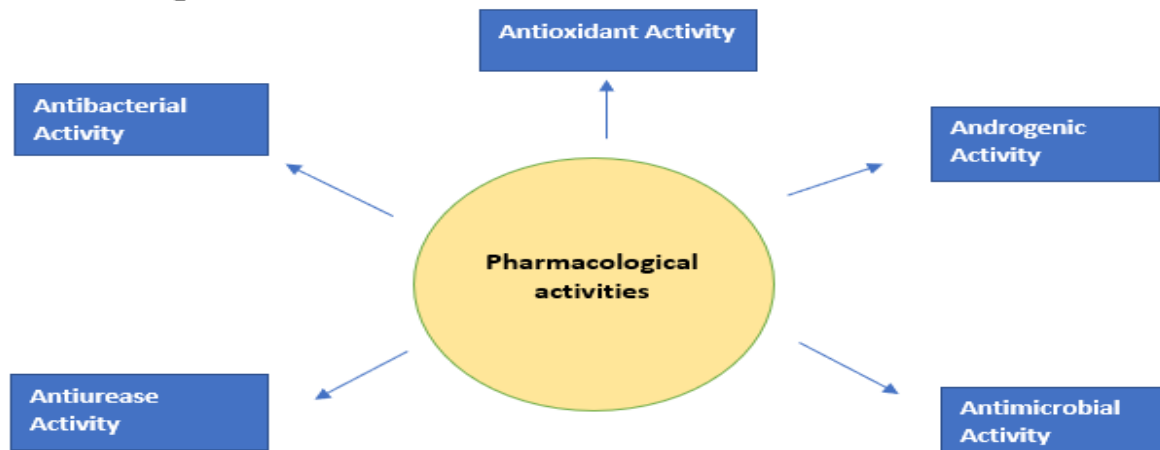


Fig.5. Different pharmacological activities of fagonia cretica

### Antioxidant Activity

It includes flavonoids and triterpenoids which have antioxidant properties and can help with diseases involving reacting oxygen species. Antioxidant activity is present in the intrinsic bio- enhancer entities of fagonia cretica for the creation of silver nanoparticles. NO radical scavenging assay was utilized to investigate the antioxidant properties of fagonia cretica. Although NO is biologically useful, its chemistry is quite complex. In each of the 96 well plates that needed weels, 175ml sodium phosphate buffer with a pH of 7.4 was added, followed by 20ml sodium nitroprusside and a 5 ml sample. Before adding the Griess reagent, thoroughly mix all of the ingredients and incubate for 3 hours at 37c. Following the incubation, each well-received 20 ml of Griess reagent. After another hour of incubation at room temperature, the absorbance of all samples was measured using the spectrophotometer at 528nm, and all samples were analyzed three times. The following formula was used to calculate nitric oxide scavenging activity:

Percentage of NO scavenging activity =  $[(A_{528} \text{ of control} - A_{528} \text{ of sample}) / A_{528} \text{ of ethanol}] \times 100.$ (7)

### Androgenic Activity

The impact of alcoholic extracts of the areal section of fagonia cretica on the estrous cycle and implantation in female albino rats was explored by v. Abhirami et al. During the investigation, it was observed that fagonia cretica distorts the regularity of the rats' estrous cycle, as well as the random omission of the heat period. It has a disappearance index of +53.33, which indicates a decline in females' desire to mate with males. Furthermore, at a dose of 250 mg/kg p.o, it has a considerable anti-inflammatory effect. When the weights of both seminal vesicles and the ventral prostate are compared to the control value, the weight appears to be higher. It was established that the medication suspension had strong androgenic properties. It does not appear to have an anti-androgenic effect, as the results achieved with testosterone propionate were not significantly altered when the two were taken together. (2)

Androgenic\ Anti androgenic activities:

These were tested in immature male rats (40-50g) that were placed into four groups of six rats each and given the fallow treatment.

Group 1 : 0.05ml groundnut oil,s.c.

Group 2: Received 150 mg\rat\day of testosterone propionate s.c. in groundnut oil.

Group 3: 250mg\kg p.o suspension of the sample.

Group 4 : Received testosterone propionate 150 mg\rst\day s.c. in groundnut oil and sample suspension 250mg\kg p.o.

The treatment lasted for seven days. After the last dose, the rats were slaughtered 24 hours later. Ventral prostate and Seminole vesicles were carefully removed from the animals and weighed; the results are shown in the table.

(8)

Esrogenic\ anti-estrogenic activities:

These were determined on immature female rats (40-50 mg) that were separated into four groups of five animals each. As follows, the different groups were treated.

Group 1 : 0.1 mg\rat\day s.c oestriodiol valerate in groundnut oil (0.05ml).

Group 2 : 0.05 ml groundnut oil s.c.

Group 3: suspension of medication sample In group.

Group 4: 0.1 mg\rat oestradiol valerate in groundnut oil and sample suspension 250 mg\kg p.o.

The rats were given the treatment for three days and then slaughtered 24 hours following the last treatment. The uteri were removed and weighed after being freed of adherent tissues. (8)

Dipeptidyl peptidase-4 (DPP-4) inhibitory activity :

Fagonia cretica line has previously been described as a natural folk medicine for the treatment of diabetics, but there has been no scientific examination of potential anti-diabetic effects.

Materials and methods :

For the assessment of anti-diabetic activity, in vitro inhibitory effects of the tested plant and its five spate components on dipeptidyl peptidase 4 (DPP-4) were investigated.

Results :

The crude extracts of fagonia cretica had good inhibitory activity ( IC<sub>50</sub> values: 38.1 mg/ml), which was also evident in the fractions of n-hexane (FCN), and aqueous (FCA). from fagonia cretica, four known compounds were isolated: quinovic acid(1) quinovic acid-3-beta-0-beta-D glycopyranosyn- (28-1)- beta-D-glycopyranosyn-ester(3), and stigmasterol(4), all of which inhibited DPP-4 activity(IC<sub>50</sub>: 30.7, 57.9, 2.35).

The results of the experiment demonstrated that fagonia cretica has a molecule with high DPP-4 inhibitory activity, which should be explored further for its anti-diabetic potential. (9)

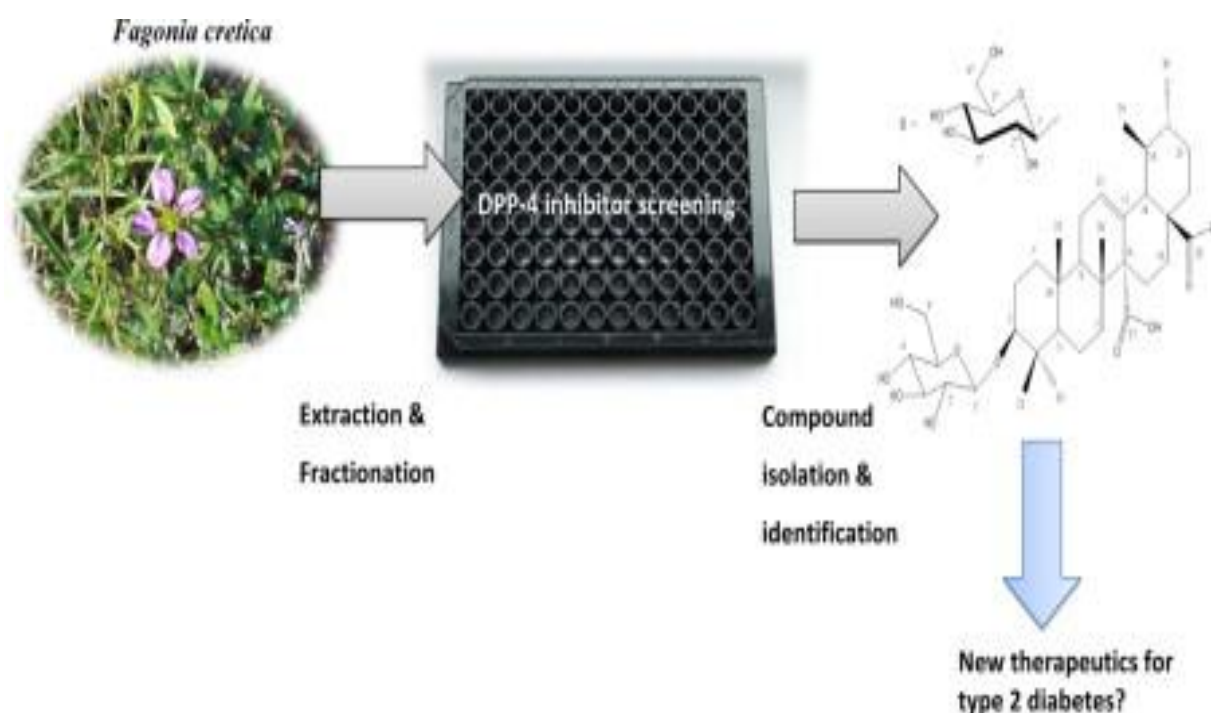


Fig.5. DPP-4 inhibitor screening of fagonia cretica

### Antimicrobial Activity

#### Microorganisms Used

Staphylococcus aureus was used as attest organism. ATCC27853 bacillus subtilis, escheria coli ATCC25923, pseudomonas aeruginosa ATCC25922, staphylococcus epidermidis ATCC6633.

Bacterial inoculums and culture medium:

Mueller bacterial growth was performed using Hinton agar media (oxid LTD England). Inoculums were made by transferring a high number of bacterial cells from abacterial cell culture to attest tube containing 10 ml nutrient broth and incubating at 37c for 24 hours. To spend up growth the test tubes were shaken several times.

#### Antimicrobial Assay

The disk diffusion method was used to test the antimicrobial activity of plant extracts against various bacterial strains. Mueller Hinton agar plates 0.1ml of inoculum with turbidity adjusted were used to test antibacterial activity in vitro. According to mc farmlands, the standard was evenly distributed between plates.

Plant extracts at various quantities (1 mg, 2 mg) were placed into a 6mm disk of Whatman no.1 filter paper. The loaded disk was placed on top of the medium, and the plates were incubated at 37c for 24 hours. Positive controls included commercial anti-biotics such as gentamycin and ciprofloxacin. At the end of the incubation period, incubation zones a measured in mm, using a DMSO (15ml) filled disk as a negative control. These tests were carried out three times.



### Minimum Inhibitory Concentration

The methanolic extracts showed good action, thus the disk diffusion method was used to determine the minimal inhibitory concentration. (10)

### Anti-Urease Activity

Fagoniacretica fraction was tested for anti- urease activity. Solutions of urease enzymes 20 ml of the mixture were combined with 55 ml of phosphate buffer (0.2m) with a ph. of 7.4 and incubated at 3c for 10 minutes. after that, add 15 ml of urea and keep it at the same time and temperature for incubation. Following incubation, a known volume of fagonia was added to each extract (10 ml) in 96 wells. Followed by 10 microliters of thiourea (standard solution). After the appropriate mixing, incubate for another 10 minutes at 37 c. Then, in each well, add 40 microliters alkali reagent and 60ml phenol reagent, and set aside for 10 minutes at room temperature. At 625 nm, the absorbance was determined spectrophotometrically.

% incubation =  $[(1 - A_{625} \text{ of samples}) / A_{625} \text{ of control}] \times 100.$ (7)

Was used to compute urease inhibition percentage.

### Antibacterial Activity

(Methanol extract was utilized in the anti-bacterial activity) and bacterial strains were isolated and subcultured on nutrient agar. The prepared nutrient agar plates were set aside to solidify. A sterile cork borer was then used to create the wells. Using sterile swabs, the plates were infected with bacterial cultures. Plant extracts (10 microliters in each well) were poured into the wells. Chloramphenicol was placed in the center of the nutrient agar plate as appositve control. After a 24 hours incubation period at 37 c, the Petri plates were examined for various zones of inhibition created by plant extracts. (11)

### CONCLUSION

Fagonia is a genus comprising 34 species found in practically every country's war zones. It has been reported to have a variety of phytochemical ingredients and pharmacological actions that play an essential rolling the prevention of a variety of ailments. The current research is the first to look into the antioxidant properties of fagonia cretica, fruit, root, and aerial parts. (12)

Traditional knowledge and research by numerous researchers have led to the conclusion that the fagonia plant has medicinal potential and can be used for a variety of pharmacological effects. (1)

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