PHARMACOLOGICAL AND PHARMACOGNOSTICAL STUDY OF FAGONIA INDICA: A REVIEW

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ABSTRACT

Fagonia indica belong to zygo phyllaceae family commonly known as dhamasa. It is a small spiny under-shrub, mostly found in the deserts of Asia and Africa. Many chemical constituents such as alkaloids, terpenoids, glycosides, flavonol, ursolic, saponins and oleanolic acids have been reported. Because of the presence of these active chemical constituents it possesses anti-inflammatory, anti-asthmatic, anti-diabetic, antibacterial, antifungal, astringent and analgesic.

KEYWORDS: Fagonia indica, Dhamasa, Pharmacology, Pharmacognosy.

INTRODUCTION

Herbal medicines have been the main source of primary health care in many nation. The plants as medicine are used in different system of medicine such as Ayurveda, Allopathy, Unani, Homeopathy and even in other system.[1] The genus fagonia belong to the family Zygophyllaceae in the major group Angiosperms. Fagonia indica is a small spiny under-shrub, mostly found in the desert of Asia and Africa.[2] It is reputed to be a medicinal plant in scientific and folkloric literature and its medicinal values are well documented. The medicinal properties of the plant were attributed due to its variety of active phytochemical constituents.[1]

Fagonia indica have been found to contain saponins, alkaloids, terpenoids, sterols, Flavonoids, proteins, amino acids, coumarins and trace elements.[1]

CLASSIFICATION

Phylum: Tracheophyta
Subphylum: Euphyllophytina
Infraphylum: Radiatopsetes
Class: Magnoliopsida
Subclass: Rosidae
Superorder: Geraniae
Order: Zygophyllales
Suborder: Zygophyllicaenae
Family: Zygophyllaceae
Kingdom = Plantae
Subkingdom = Viridaeplantaee

Vernacular Names

| Table 1: Data showing synonyms of Fagonia indica in different languages. |
|------------------------|---------------------|
| English                | Khorasan thorn      |
| Hindi                  | Damhar, Dhamasa     |
| Punjabi                | Damanh, Damiya, Dhama |
| Sanskrit               | Dhanayavasana       |
| Telgu                  | Chittigara          |
| Marathi                | Dhamasa             |
| Urdu                   | Dhamas              |
| Gujarati               | Dhamaso             |
| Rajasthan              | Dhamasa             |
| Kannada                | Nela ingali         |

Fig. 1: Whole plant of Fagonia indica.
**Botanical Description**

**Fagonia indica** is a plant distributed in the deserts and dry areas of India, Tropical Africa, Chile, Pakistan, Mid East, Saudi Arabia, Cyprus, Tunisia, Morocco, Egypt, Algeria, and South West USA.

This species grows on dry and desert areas of Rajasthan, Haryana, Punjab, Maharashtra, Madhya pradesh and Gujarat. **Fagonia indica** is distributed in Jodhpur, Bhilwara, Barmer districts of Rajasthan.

**Habitat**

**Fagonia indica** is a small spiny under – shrub, mostly distributed in the deserts of Asia and Africa. It is reported to be a medicinal plant in scientific and folkloric literature and its medicinal values are well documented. The medicinal properties of the plant were attributed due to its variety of active phytochemical constituents.

**Geographical Source**

**Fagonia indica** is a plant distributed in the deserts and dry areas of India, Tropical Africa, Chile, Pakistan, Mid East, Saudi Arabia, Cyprus, Tunisia, Morocco, Egypt, Algeria, and South West USA.

Several saponins or triterpenoid glycosides have been isolated from **Fagonia indica**. They characterized as 23,28-di-o-β-D- glucopyranosyltaraxer-20-en-28-oic acid, 3β,28-di-o-β-D-glucopyr acid,21,22a-epoxy-23-o-β-D-glucopyranosyl-nahagenin, 3-o- [[β-d- glucopyranosyl(1-2)-[α-l-arabinopyranosyl(1-3)-α-l- arabinopyranosyl] -urusolic acid-28-o-[[β-d-glucopyranosyl]ester (indicasaponin A) and 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). Four flavonoidal compounds identified as quercetin, isorhamnetin-α-3-o rhamnose, quercatin 3-o-β-D-glycopyranosyl-(1 -6')-β-D-glucopyranoside and quercetin 3-o-β-D-galactopyranosyl-(6 -1'')-α-L-2' acetyl rhamnose-(3 -1') β-D-glucopyranoside were isolated from the alcoholic extract of **Fagonia indica**.

**Constituent Percent (wt basis)**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Percent (wet basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>11.13 ± 0.03</td>
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<tr>
<td>Total ash</td>
<td>15.68 ± 0.08</td>
</tr>
<tr>
<td>Crude fibre</td>
<td>18.69 ± 0.10</td>
</tr>
<tr>
<td>Total proteins</td>
<td>6.48 ± 0.15</td>
</tr>
<tr>
<td>Total carbohydrate</td>
<td>64.25 ± 0.30</td>
</tr>
<tr>
<td>Fat</td>
<td>2.46 ± 0.01</td>
</tr>
</tbody>
</table>

**Pharmacological Uses**

**Anti-inflammatory and analgesic activity**

The in vitro anti-inflammatory activity observed in their study support the utilization of the plants in traditional medicine as crude anti-inflammatory agent. Ethanolic extract of aerial parts exhibited anti-inflammatory and analgesic activity. Analgesic activity of ethanolic and aqueous extract of **Fagonia indica** was studies by tail flick method in rats. Acute and sub-acute anti-inflammatory activities of the 10% ethanolic extract of **Fagonia indica** were also assessed in rats.

Powdered sample of shoot of **Fagonia indica** was estimated for antioxidant activity using Electron Spin Resonance instrument. The extract **Fagonia indica**
effectively reduced free radical levels by mechanisms involving increased expression of Cu-Zn SOD, decreased expression of iNOS and simultaneous scavenging of the free radicals such as $\mathrm{O}_2^-$, OH, NO and ONOO$^-$.\textsuperscript{[1]}

**Anti-bacterial activity**

The ethanolic extract of *Fagonia indica* showed antimicrobial activity against some bacterial and fungal strains.\textsuperscript{[1]} Antimicrobial study of ethanol extract of *Fagonia indica* leaves extracts was recorded against Gram-negative and Gram-positive bacterial strains by observing zone of inhibition.\textsuperscript{[4-5]}

**Hepatoprotective-activity**

The Methanolic extract of *Fagonia indica* on CCl$_4$ induced hepatotoxicity in albino rats was examined. MEFI in different doses have significant Hepatoprotective activity against CCl$_4$ induced hepatotoxicity and this might be linked with presence of Flavonoids and tannins in this plant.\textsuperscript{[4]}

**Anti-diabetic activity**

Phenolic and Flavonoids contents and scavenging capability by DPPH assay of whole plant of *Fagonia indica*. The Antidiabetic activity of various fractions at different concentrations was determined by inhibition of alpha amylase enzyme assay.\textsuperscript{[1-6]}

**Anti-pyretic activity**

Antipyretic potential of hydro-alcoholic extract of *Fagonia indica* revealed significant antipyretic effect and reducing E.coli induced pyrexia in rabbits. After the drug administration, the decrease in body temperature of rabbits with the dose of 25mg/kg during the next four hours ranged from 2.2-3.0 $^\circ$F as compared to the negative control.\textsuperscript{[7]}

**REFERENCES**