



Extraction of phytochemicals from *Fagonia arabica* and their antimicrobial activity

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Abstract

Plants contain useful phytochemicals that remained most easily accessible, affordable and beneficial for human being. The local people are using them for a long historical period for medicine, food and vegetable purposes. In current study *Fagonia arabica* was used. Phytochemicals were extracted by using four different solvents ethanol, methanol, chloroform and water. Concentration of total phenolics, photosynthetic pigments and carotenoids was calculated. Effectiveness of these phytochemicals was determined by antimicrobial activity on four bacterial strains (*E.coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus pyogenes*, and one fungal strain *Candida albicans*). *E.coli* has maximum zone of inhibition (ZOI) in ethanol extract (11.66mm), medium zone of inhibition in methanol and chloroform (9.76mm and 9.56mm) and least in water (7.56mm). *Pseudomonas* showed more zone of inhibition in methanol (13.1mm), medium zone in Chloroform (12.43mm), less ZOI in ethanol (11.34 mm) and least in water (10.66mm). *Staphylococcus* showed maximum ZOI in ethanol (13.68mm), medium in chloroform (12.69mm) and less in methanol (7.30mm) and least in water (7.29mm). *Streptococcus* showed maximum in ethanol (12.11mm), medium in methanol (11.65mm), less in chloroform (7.65mm) and least in water (7.35, mm). In case of *Candida* methanol extract showed maximum value of (7.69mm) and other extracts showed ZOI ranging from 7.00mm-7.34mm. Phytochemicals from plants can be proved useful natural sources.

Key words: Antibacterial Activity and Antifungal Activity

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1. Introduction

Medicinal plants provide alternative remedies and opportunity to those who cannot access or afford medicine. In medicinal plants research, a lot of progress has been made in recent decades. Its main focus is on isolation of new compounds which are source for many potent drugs. The plants are mostly used for herbal preparations and about 80% of the world population depends upon these medications for their healthcare needs [1]. Many researchers have reported the antibacterial and antimicrobial activities in various medicinal plants [2]. The use of medicinal plants by indigenous people in rural areas of many developing countries is very common [3-5]. Traditional knowledge about medicinal plants and their usage by local people and drug preparation in now a day is not only important for conservation of traditional culture and animal and plants but also for healthcare of the community and for the development of drug. The indigenous knowledge appears

when people started learning the use of medicinal plants [6].

Recent researches have started to reveal impressive knowledge about the scale of development and dependence of world on medicinal plants [7]. Herbalists observed that wild herbs are more infectious than cultivated one [8]. *Fagonia Arabica* belongs to the family Zygophyllaceae which is known for the family of medicinally important plants. *F. arabica* is a tropical herb found in the entire Indian subcontinent and it is commonly known as Dhamasa, Suchi boti, dhamanian kunda, Damoo, Shaukat-e-Albeefa and Shokat-e-albaiza. It is a green herb of about 1 to 3 feet in height often grown on calcareous rocks mostly in Africa, Afghanistan, India and Pakistan. *Fagonia* species are widely studied due to their antitumor, antioxidant, analgesic, astringen febrifuges and prophactic against small pox agents. They are also known traditionally for treatment of cancer, fever, asthma, toothaches, urinary diseases, stomach problems and kidney diseases. It is also considered as family of antibacterial and antifungal potent. The crude extract of

Fagonia Arabica from Sinai showed spectra against gram positive and gram negative bacteria [9]. *Fagonia Arabica* is an ethno-pharmacologically ayurvedic herb known for many medicinally important properties. It has anti-inflammatory, analgesic and antipyretic effect. Different parts of *F. arabica* are used to treat different ailments like hematological, neurological, endocrine and inflammatory disorders. Its twigs are used as treatment for snake bite and its paste is applied on tumors and swollen portions of neck [10]. *F. arabica* is traditionally used for treatment of inflammation, open wounds, boils, skin diseases and various allergies [11]. Dhamasa is found to be thrombolytic agent for the treatment of Atherthrombotic disease [12]. *Fagonia arabica* is used as alcoholic and hydroalcoholic extract for the treatment of microbial infections [13].

2. Study area

Chenab Nagar area was chosen for this study. Two sites were selected for this purpose, Degree college road and Karana hills to collect the sample. Rabwah, Chenab Nagar is located at latitude 31 degree NORTH and longitude 72 degree EAST.

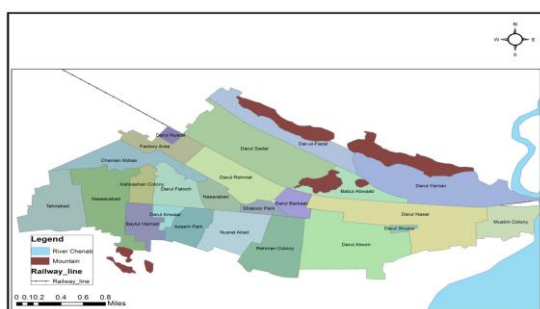


Fig1. Map of study area

3. Methodology

The study was done in two phases. In 1st phase questionnaires were filled by interviewing the local people like Hawkins, household, persons and different people having knowledge about medicinal plants. Interviewing was also conducted from plant experts and Hakims. In 2nd phase laboratory work was done to analyze the plant for proximal analysis.

4. Results and Discussion

According to the data collected by survey showed that local people and Hakeem use *Fagonia Arabica* for pain (80%), health tonic (20%), appetizer (70%), swelling (19%), skin diseases (20%), toothaches (10%), anemia (30%), diarrhea (9%), urinary discharge (50%), eye tonic (5%), weakness tonic (18%), stop vomiting (10%), tuber closes (60%), veterinary medicine (15%), intestinal pain (65%),

malaria (45%), cancer (90%), sabies (20%), asthma (17.2%) and arthritis (15%).

Antimicrobial activity of different extracts showed that *E. coli* has maximum zone of inhibition in ethanol extract (11.66 mm), medium zone of inhibition in methanol and chloroform (9.76 mm and 9.66 mm) and least in water (7.66 mm) (Fig.2). *Pseudomonas* showed more zone of inhibition in methanol (13.1 mm), medium zone in Chloroform (12.43 mm), less ZOI in ethanol (11.34 mm) and least in water (10.66 mm) (Fig. 3). *Staphylococcus* showed maximum ZOI in ethanol (13.68 mm), medium in chloroform (12.69 mm) and less in methanol (7.30 mm) and least in water (7.29 mm) (Fig.4). *Streptococcus* showed maximum ZOI in ethanol (12.11 mm), medium in methanol (11.65 mm), less in chloroform (7.65 mm) and least in water (7.35 mm) (Fig. 5). In case of *Candida* methanol extract showed maximum value of (7.69 mm) and other extracts showed ZOI ranging from 7.00 mm -7.34 mm (Fig.).

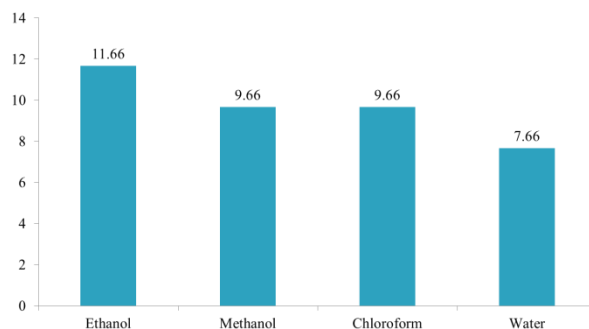


Fig. 2 Antimicrobial activity of *Fagonia* extracts on *E. coli*

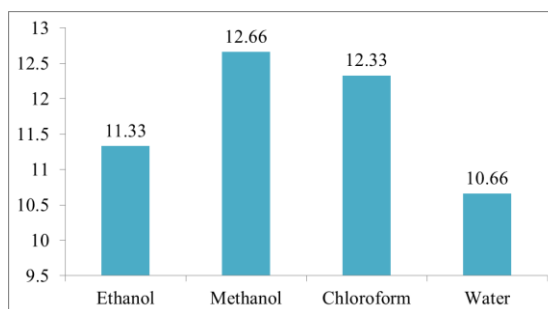


Fig. 3 Antimicrobial activity of *Fagonia* extracts on *Pseudomonas aeruginosa*

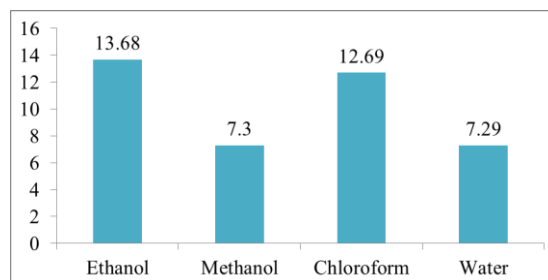


Fig. 4 Antimicrobial activity of *Fagonia* extracts on *Staphylococcus aureus*

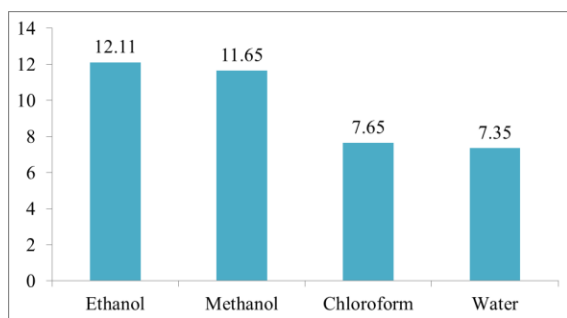


Fig. 5 Antimicrobial activity of *Fagonia* extracts on *Streptococcus pyogenes*

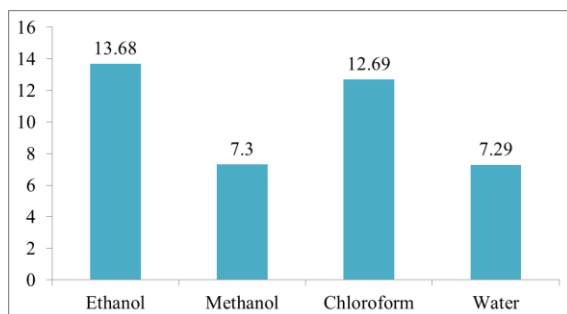
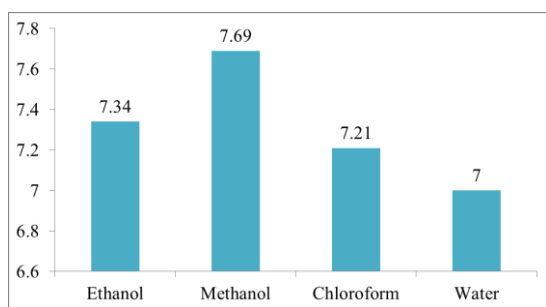


Fig. 6 Antimicrobial activity of *Fagonia* extracts on *Candida albicans*



5. Conclusion

It is concluded from the up taken research that a correlation exists between indigenous knowledge and currently studied antimicrobial activity findings. *Fagonia* can be used for the extraction of important compounds that have antimicrobial activity. This study can be helpful to revolutionize the pharmaceutical industry.

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