

## Comparison of Antimicrobial potential of local herbs of Shahpur Hills, Pakistan

### Abstract:

Plants produce chemicals having much significance in treatment of different diseases of people and animals. Epidemics and ailments are not new to man. Over the years a huge number of individuals have been wiped out in light of various irresistible infections. The aim of current research work was to compare the antimicrobial activities of *Fagonia indica* and *Taraxacum officinale* leaves against hospitally acquired *S.aureus* strains. The plants were collected from the area of shahpur hills. The research was carried out in the bio lab, department of Biosciences, University of Wah, Wah cantt Pakistan during October 2015 to March 2016. Four different extracts of *Fagonia indica* and *Taraxacum officinale* including (methanolic, ethanolic, chloroform, aqueous) were tested for their antimicrobial activities against 150 *S.aureus* strains. Agar well diffusion assay was used to evaluate antimicrobial activity. Phytochemical analysis was also carried out which confirmed that different secondary metabolites including tannins, saponinns, terpinoids were present. Results indicate that the ethanolic and chloroform extracts of *Fagonia indica* and chloroform extract of *Taraxacum officinale* have ability to combat against bacterial pathogens like *S.aureus*.

**Key words:** Antimicrobial activities ,*Fagonia indica*, *Taraxacum officinale*, extracts, *S aureus*, well diffusion assay

### Introduction:

Medicinal plants are utilized to cure diverse infections globally<sup>[1]</sup>. The restorative plants contain huge number of compounds, these compounds incorporate alkaloids, tannins, phenolic compounds<sup>[2]</sup>. Plants as healing agents is as old as 4000-5000 BC and first herbal remedy was used by Chinese. According to WHO 80% of world people depends on these medicinal plants for health care<sup>[3]</sup>. In Pakistan these plants are used to treat almost any kind of disease from headache to stomachic to cut and wounds<sup>[4]</sup>. In Pakistan common people use these plants as a source of medicines for treating different diseases including different infectious diseases<sup>[4]</sup>. Many bacterial species can bring about various sicknesses in people and animals as well<sup>[5]</sup>. *S.aureus* is a type of gram positive bacteria. *S.aureus* are small round shaped bacterial strains.

*S. aureus* is one of the biggest source of community and hospital acquired infections<sup>[6]</sup>.

Hospitalized patients are exposed to *S. aureus* due to weak immune system<sup>[7]</sup>. The *Fagonia indica* is very important herb. It belongs to family *Asteraceae*. It is distributed through out the Asia, Europe, North America<sup>[8]</sup>. It is distributed at an altitude of 1000-4000m<sup>[9]</sup>. The leaves of this plant are used for fermentation in swollen parts, boils, sprains<sup>[10]</sup>. The medicinal activities of this spiny plant are because of phytochemical constituent. This plant is widely used for its activities against different pathogens<sup>[11]</sup>.

Current research was carried out in order to find out the relative potential of *Fagonia indica* and *Taraxacum officinale* extracts against hospitally acquired *S.aureus* strains.

### Materials and Methods:

Almost 200 bacterial strains were collected in collaboration with Dr. M Ali Assistant Professor, Department of Microbiology, University of Haripur (Khyberpakhtunkhwa) Pakistan. These strains were collected from different Government Hospitals of District Hazara (Haripur).

#### 2.2.1 Growth media for bacterial isolates:

For the growth of isolated strains of *Staphylococcus aureus* Mannitol salt agar medium was used. For the growth of bacterial colonies the mannitol salt agar media was prepared. The chemical mentioned in table 2.2 were added in sterile conical flasks

and mixed with 1000ml of water pH was adjusted to 7.4 +/- . This was later on autoclaved for 15 minutes at 121°C, and allowed to cooled down for 45 minutes.

#### **Isolation of Pure colonies:**

In order to get pure colonies the streak plate method was used. The colony was picked up from growth plates with the help of sterilized inoculating loop. This was done by rotating the angle of plates. The plates were placed in incubator for 24 hours.

#### **Identification and Confirmation of Bacterial Strains:**

To confirm that the bacterial strains are *S. aureus*, Gram staining and different biochemical tests were performed.

#### **Plants Extracts Formation:**

Plants of three different families were collected from different places of Shahpur Hills area and were identified. The protocol that was used to form extracts was given by (Ashraf *et al.*, 2014). For this purpose 20 gram of leaves of each plant were cut into small pieces (FI, TO) and added in 200ml of each of the solvent in a sterilized conical flask. The flasks were later on placed in shaking incubator at 37°C and at 80 rpm for 48 hours.

#### **Antimicrobial Assay:**

The extracts of two plants (*F.indica*, *T.officinale*) were used to check their antibacterial activity. Agar well diffusion method was used for this purpose. Bacterial colonies were grown in nutrient broth medium for four hours, later on (OD) Optical density was noted at 0.6 to 1.0. For Antimicrobial assay Muller Hinton agar media was used. Media was autoclaved at 121°C for 15 minutes and allowed to cooled down for 45 minutes. After that media was poured in sterilized petri plates and then allowed to solidified in laminar flow. After that wells were being made with the help of 4mm borer. And then plant extracts were poured with the help of micropipette. 25ul of plant extract of every plant was used for this purpose. After incubation at 37°C for 24 hours results were taken, with the help of caliper in millimeters. (NCCLS, 1997).

The antimicrobial activity of four extracts of *Fagonia indica* against 150 *S.aureus* strains was determined by agar well diffusion method. The zone of inhibition was divided into three categories e.g (0-10mm, 11-20, >20mm). The maximum activity was showed by chloroform and ethanolic extracts as they showed results in all three ranges.

In case of *Taraxacum officinale* the most activity was showed by chloroform extract due to its activity in all three ranges. The Antimicrobial activity of *Fagonia indica* is due to presence of different phytochemical agents<sup>[11]</sup>. Previously research on methanol and hexane extracts of *Fagonia* on *E. coli*, *Klebsiella pneumoniae*, *Paerugionosa*, *Salmonella typhi* and *S.aureus* proved that this plant has Antibacterial activity<sup>[12]</sup>. Earlier on it was reported that the *Fagonia indica* leaves have good Antimicrobial activity<sup>[13]</sup>. In current research work out of four *Fagonia indica* extracts the ethanolic and chloroform were most active against *S. aureus*.

The phytochemical analysis of (TO) plant suggested that this plant is active against *S.aureus* and *E.coli*<sup>[14]</sup>. In another study it is reported that different volatile compounds from *Taraxacum officinale* are responsible for its antibacterial activities<sup>[15]</sup>. Previously reported that the aqueous extract of *Taraxacum officinale* was not active as it did not showed any activity<sup>[16]</sup>. But in present study the aqueous extract also showed activity, that was mostly in the range of 0-10mm.

It is convincing that the plant crude extract also have the antibacterial activity against *S.aureus* strains. As *S.aureus* is a pathogenic bacteria it can cause different diseases so further analysis of these plants specially *Taraxacum officinale* will be of great interest.

When the antimicrobial activities of these both plants are compared, it was noticed that the *Taraxacum officinale* chloroform extract was most active. So further studies can be carried out to find out more potential of these herbs.

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**Figure:1** growth of bacterial colonies



**Figure:2** Shahpur Hills

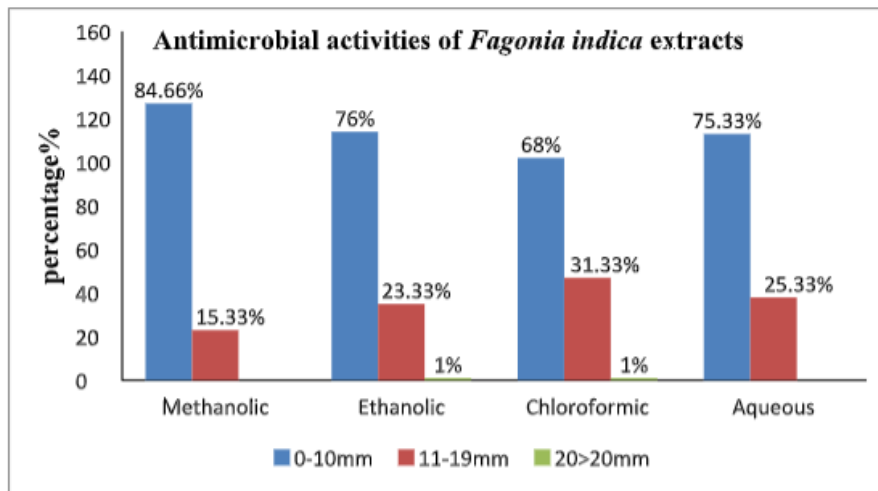


Figure:3 *Fagonia indica* extracts activity

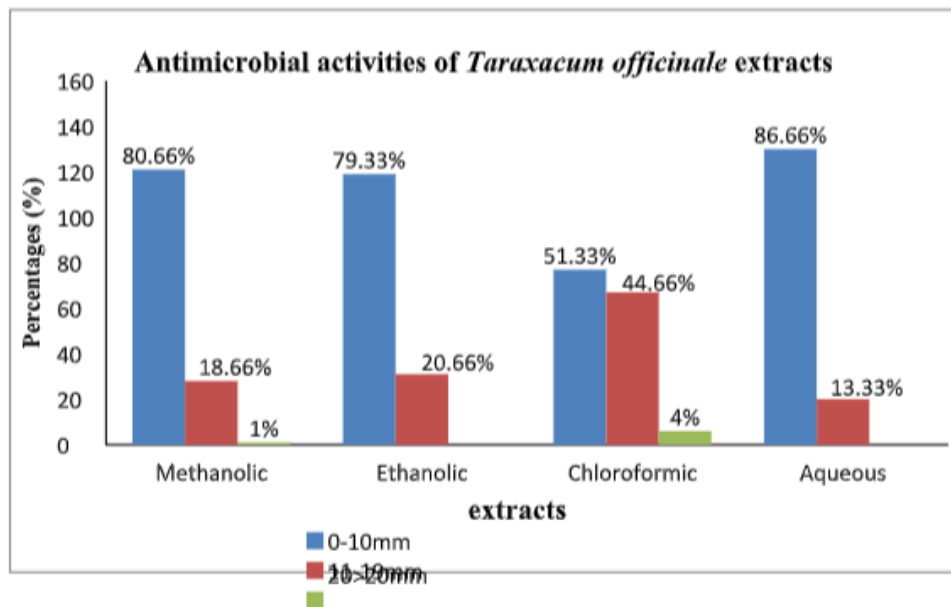


Figure:4 *Taraxacum officinale* extracts activity

**Authors and Affiliation**

**M Waqar ul konain abu bakr<sup>\*1</sup>, Dr Muhammad Idrees<sup>2</sup>, Dr Shumaila Naz<sup>3</sup> Zeenat Haq<sup>4</sup>, Hira Gul<sup>5</sup>**

1 Department of Biosciences, University of Wah, Pakistan

2 Department of Biosciences, University of Wah, Pakistan

3 Department of Biosciences, University of Wah, Pakistan

4 Department of Biosciences, University of Wah, Pakistan

5 Department of Biosciences, University of Wah, Pakistan