EFFECT OF HINGU (FERULA FOETIDA) ON PYOGENIC BACTERIA BY CULTURE AND SENSITIVITY METHOD.
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ABSTRACT
Antibiotics are one of the most important weapons in fighting bacterial infections and have greatly benefited the health related to human life, these health benefited are under threat as many commonly used antibiotics have become less effective against certain illness not only because many of them produce toxic reactions, but also due to emergence of drug resistant bacteria. Plants generally produce many secondary metabolites which constitute an important source of microbicides. Today, needs of find such ayurvedic antibacterial drugs to overcome this drug resistance problem. Ferula foetida Regel, Classical name -Hingu, it is one of the Ayurvedic antibacterial drug. Present study is carried out with an objective to investigate the antibacterial potential of Hingu. For which pus sample of 30 patients were studied. Out of 30 patients, 6 patients were found to have Streptococcus haemolyticus infection, 21 patients were having Staphylococcus aureus infection and from 3 patients culture Escherichia coli organism was isolated. Finally, it was concluded that Hingu shows antibacterial activity against Gram positive bacteria Staphylococcus aureus, Steptococcus haemolyticus, but it did not shows antibacterial activity against Gram negative bacteria Escherichia coli.

Keywords – Antibacterial activity, Hingu (Ferula Foetida), Gram positive, Gram negative, In vitro.

1. INTRODUCTION
Antibiotics are one of the most important weapons in fighting bacterial infections and have greatly benefited the health related quality of human life since their introduction. However, over the past few decades, these health benefited are under threat as many commonly used antibiotics have become less effective against certain illness not only because many of them produce toxic reactions, but also due to emergence of drug resistant bacteria. According to the ayurvedic approach, anyone who has developed an imbalance in their bodily elements or “Doshas”, has thereby weakened their immune system and may be subject to a microbial infection which is a symptom of that imbalance. Infections in Ayurveda are called Raktadushti (blood aggravation) or Pittadushti (Vitiation of Pitta). They ascribed infection to imbalance of pitta, primarily toxified blood. Infections always start with inflammation and low fever. These are pitta conditions. Drugs derived from natural sources play a significant role in the prevention and treatment of human disease. Infectious diseases are second leading cause of death world-wide. The emergence of multidrug-resistant bacteria has created a situation in which there are few or no treatment options for infectious with certain organisms. Plants generally produce many secondary metabolites which constitute an important source of microbicides, pesticides and many pharmaceutical drugs.1 Plant products still remain the principal source of pharmaceutical agents used in traditional medicine.

The effect of plant extracts on bacteria have been studied by a very large number of researchers in different parts of the plant.2 Historically, plants have provided a good source of anti-infective agent e.g. emetine, quinine and berberine remain highly effective instruments in the fight against microbial infections. Phyto medicines have shown great promise in the treatment of intractable infectious disease including opportunistic HIV infections.3 Medicines are described in various Samhitas (Classical texts) since an-
cient time with their well known diseases caring properties. And their have change minimally over the years with constant changes in morphological and pathogenic properties of bacteria and ayurvedic drugs which heals disease by working root cause is best choice. In this modern era, we see many patients suffering from various injuries due to many causes such as accidents, burn and many others negligence of such wounds. Results in suppuration of wound. In ayurvedic medicines there are several Dravyas which also posses Krimighna and Puyoshohan qualities. There are some others factors like underlying diseases e.g. Diabetes mellitus, infected wound, Abscesses in which we see pus collection. This pus formation is done by bacteria which are known as pyogenic bacteria. Hingu\(^4\) (Ferula Foetida) is one of the Krimighna dravya mentioned in various Ayurvedic Samhita and Nighantu. Which have narrated that Hingu is having Krimighna, Pachak, Rochak, Tikshna, Shulaghna etc. Guna and Karma.\(^5,6,7,8\) So, it may have activity against Pyogenic bacteria. Culture and Sensitivity method generally proves activity of certain drug against certain micro–organism. sensitivity is decided by seeing zone of inhabitation surrounding disc, it indicates susceptibility of micro-organism.

### 2.METHODS

#### 2.1. Types of study design

It was an Experimental study. Pus sample and those samples were observed by Culture and Sensitivity method.

#### 2.2. Place of study

Pus sample collected from OPD and IPD patients of S.V.N.H.T. Ayurved College and Hospital, Rahuri Factory.

#### 2.3. Duration of study

Total duration of study was 3 months. Each sample took 3-5 days to do Culture and Sensitivity.

#### 2.4. Objectives

- To study Hingu in detail.
- To study its antibacterial properties of Hingu.
- To study pyogenic bacteria.
- To study culture and sensitivity.
- To review modern literature related to concerned topics.

#### 2.5. Method of selection of patients

**2.5.1. Sampling Technique**

30 patients were selected randomly by using Simple Random Sampling Technique (Table of Random number). Patient were selected Randomly on the basis of inclusion and exclusion criteria.

#### 2.5.2. Inclusion Criteria

- Sex-Both sexes male and female are included.
- Age- all age of group.
- Pus collection from diagnosed patients of abscess, infected wound, chronic diabetic wound etc.

#### 2.5.3. Exclusion Criteria

- Diagnosed patient with HIV and HBsAg positive
- Patients with fresh wound.

#### 2.7. Methods for data collection relevant to objectives

Specially designed Case Paper with informed written consent.

**2.7.1. Pus collected from**

Pus sample from infected site of selected cases / patients.

- Abscess
- Infected wound
- Chronic diabetic wound.

**2.7.2. Direct Smear Preparation**

Direct smear was prepared to detect particular pyogenic organism.

**2.7.3. Preparation Of Disc Of Agar**

Agar plates for pyogenic organism will be prepared to cultivate those particular bacteria.

**2.7.4. Isolation Of Microbes**
Isolation of microbes will be done according to the technique described in various concerned books and in use.

2.7.5. Culture-Sensitivity

Culture and sensitivity of the pyogenic bacteria’s to *Hingu* which have been taken for the study will be seen by using disc prepared from *Hingu* by method in practice.

2.7.6. Research Tool

- *Hingu*
- Agar media for culture of pyogenic bacteria
- Glass slides for making direct smear of collected pus samples.
- Microscope, Glass slides cover slips.
- Crystal violet stain, Gram iodine stain
- Absolute alcohol and acetone, safranin solution.
- Petri dishes, discs, pH paper, dropper, test tubes, Bunsen burner etc.
- Incubator, autoclave, hot air oven.

2.8. Drug Review\(^9,10,11,12\)

**Drug: Hingu**

**Botanical name:** Ferula Foetida Regel.

**Family:** Umbellifere (*Shatpushapa kul*)

**Classical name:** Hingu

**Sanskrit Names:** Hingu, Jatuka, Bahlika, Ramatha, Sahasravedhi.

**Regional Names:** Hing (Hindi, Punjabi, Marathi, Gujarati), Baghrani (Gujrati), Peruangayam (Tamil), Ingu (Talgu), Angajad, Asafoetida (English), Anoj (Persian) Hietitil, Hilatil (Arabic).

**Pharmacodynamics of drug (Hingu)**

Pharmacodynamics of Hingu are mentioned in Table No. 1.

3. RESULTS AND DISCUSSION

For the present study 30 patients were selected from the indoor patient and outdoor patient from department. All the details of the patients were noted down on specially prepared case proforma for present study. After selecting the patient pus samples from infected site were collected. These samples are used to culture by streaking method and observed the colony character. Gram staining is done to identify gram positive and gram negative bacteria. Diffusion method is used for sensitivity. *Hingu* disc were kept on nutrient agar plate and pick up the colony from culture plate i.e. *MacConkeys* agar and spread on nutrient agar. Observe the zone of inhibition determined for sensitivity and resistance. The observations made during the clinical study were noted in case papers. The data was represented graphically and in tabular form. The statistical analysis involves the use of “Chi square test.”

Out of 30 patients included in this study, 20 (66.7\%) were males and 10 (33.3\%) were female patients; 9 were from age group 16 to 30, 10 were from age group 31 to 45 and 11 were from age group 46 to 60. From that we can conclude that Incidence of pyogenic bacterial infection is more in late age (Table No. 2). Out of 30 patients included in this study, 20 patients of Vrana, 2 patients were of Vranashotha and 8 patients were of Vidradhi. From that we can conclude that Incidence of pyogenic bacterial infection is more in Vrana (Table No. 3). Out of 30 patients included in this study, 6 patients were found to have Streptococcus haemolyticus infection, 21 patients were having Staphylococcus aureus infection and from 3 patients culture Escherichia coli organism was isolated. From culture of maximum 21 patients Staphylococcus aureus was isolated. It can be said that Staphylococcus aureus infection is common in Vrana, Vranashotha and Vidradhi (Table No. 4). Out of 6 patients of Streptococcus haemolyticus, in 2 patients organism is found sensitive to *Hingu* and in 4 patient organisms found resistant to *Hingu* (Table No. 5). Out of 21 patients of Staphylococcus aureus, in 18 patients organism is found sensitive to *Hingu* and in 3 patient organisms found resistant to *Hingu* (Table No. 5). Out of 3 patients of Escherichia coli, in 2 patients organism is found sensitive to *Hingu* and in 1 patient organism found resistant to *Hingu* (Table No. 5).

It is clearly observed from above collected data that *Hingu* shows sensitivity to Pyogenic infections. Chi square test was applied to test the association between *Hingu* and Pyogenic bacteria (Table...
No 9). The Chi-square value ($X^2$) obtained was 6.623 at 2 degrees of freedom and $P<0.05$. Hence it is significant at 5% level $P<0.05$ (Table No. 6). Therefore null hypothesis is rejected and alternative hypothesis is accepted. It was hence concluded that *Hingu* shows sensitivity to Pyogenic infections.

4. CONCLUSION

- Staphylococcus aureus bacterial infections in pyogenic infection were found more as compared to streptococcus haemolyticus & Escherichia coli.
- Staphylococcus aureus infection is more sensitive than resistant to *Hingu*.
- Streptococcus haemolyticus infection is more sensitive than resistant to *Hingu*.
- Escherichia coli infection is more resistant than sensitive to *Hingu*.
- *Hingu* shows antibacterial activity against Staphylococcus aureus, Streptococcus haemolyticus.
- *Hingu* does not show antibacterial activity against Escherichia coli.

5. REFERENCES


6. TABLES AND FIGURES

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<th>31 to 45</th>
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Figure No 1 Age

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<th>Vidradhi</th>
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<td>67%</td>
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Figure No 2 Disease
**Figure No 3** Change in Srava of Vrana

<table>
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<tr>
<th>Rasa</th>
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<th>Vipaka</th>
<th>Guna</th>
<th>Doshkarma</th>
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<tr>
<td>Katu</td>
<td>Ushna</td>
<td>Katu</td>
<td>Laghu, Snighda, Tikata, Sara</td>
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**Table No 1.** Pharmacodynamics of drug (Hingu)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Age (yrs.)</th>
<th>No. of Pt.</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1</td>
<td>16 to 30</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td>2</td>
<td>31 to 45</td>
<td>10</td>
<td>33.3</td>
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<td>46 to 60</td>
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**Table No 2 Age**

<table>
<thead>
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<th>No. of Patients</th>
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<td>2</td>
<td>Vranashotha</td>
<td>2</td>
<td>6.67</td>
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<td>Vidradhi</td>
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<td>26.67</td>
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**Table No 3 Disease**

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<td>6</td>
<td>20</td>
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<td>Staphylococcus aureus</td>
<td>21</td>
<td>70</td>
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**Table No 4 Isolated Micro-organisms**
Effect of Hingu (Ferula Foetida) on pyogenic bacteria by culture and sensitivity method.

### Table No 5 Sensitivity result of all 30 patients

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<td>%</td>
<td>No. of pts.</td>
<td>%</td>
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<tr>
<td>3</td>
<td>Escherichia coli</td>
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<td>12.5</td>
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### Table No 6 Chi square Test

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<th>Sensitivity to Hingu</th>
<th>Total</th>
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<th>P</th>
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<tr>
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<td>O</td>
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<td>Streptococcus haemolyticus</td>
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