

# Evaluation Of Antibacterial Activity Of *Moringa Oleifera* Lam. (Shigru)

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## Abstract:

**Background:** *Moringa Oleifera* Lam. (Shigru) is a well-known drug in Ayurveda used for its Krimighna activity (ability to kill the pathogens). Acharya Charaka had mentioned Shigru in Krimighna Mahakashaya<sup>1</sup>. Nighantus had specifically mentioned Krimighna activity of Shigru Patra viz. Kaiyadeva Nighantu<sup>2</sup>, Raj Nighantu<sup>3</sup> and Shaligram<sup>4</sup> Nighantu. Therefore Patra churna (powder of leaves) is selected for evaluation of anti bacterial activity on the strains which affects a large number of population.

**Methods :** Shigru Patra churna at different concentrations viz. 5µl, 10µl, 25µl, 50µl and 75µl were tested for anti bacterial activity by Disc Diffusion method for 2 strains of Gram positive and 2 strains of Gram negative bacteria each, with DMSO (Dimethyl Sulphoxide) a neutral solvent. Zone of Inhibition was calculated.

**Result:** Shigru Patra inhibits growth of *Staphylococcus aureus*, *Pseudomonas auriginosa* and *Escheria coli* at higher concentrations of 50µl and 75µl and is resistant to *Streptococcus mutans* at all concentrations. Zone of inhibition was 13mm for *Staphylococcus aureus*, 12mm for *Pseudomonas auriginosa* and 15mm for *Escheria coli* and activity index were 0.86, 0.40 and 0.50 respectively.

**Conclusion:** Shigru Patra possess well anti-bacterial activity against *Staphylococcus aureus*, *Pseudomonas auriginosa* and *Escheria coli*.

**Index Terms** - Shigru, *Moringa oleifera* Lam, Zone of Inhibition, Anti bacterial, Activity Index, Bacteria

## INTRODUCTION

*Moringa Oleifera* Lam is slender and fast growing plant belonging to family moringaceae. Plant is indigenous in sub Himalayan tract. It is commonly cultivated throughout the country and grows almost throughout India<sup>5</sup>.

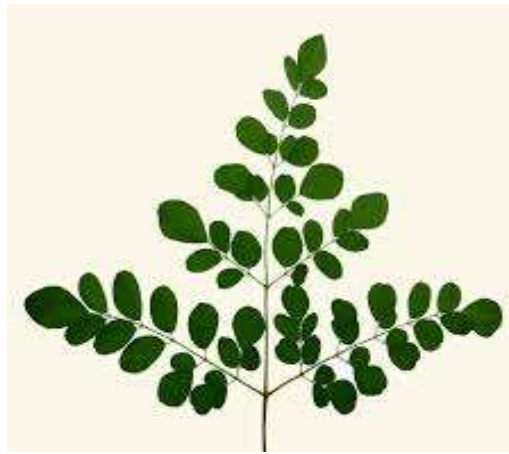
It has corky bark; soft, white and spongy wood. Leaves are about 30-75 cms long, tripinnate in structure with petiole sheathing at base. Pinnate are 4-6 in pairs in which uppermost pinnate are opposite to each other. Foliate glands are present between each pair of pinnate and pinnulae. Ultimate leaflets are opposite to each other and about 0.85 to 1.7cms long entirely obovate or elliptical in nature, membranous and pale from beneath<sup>6</sup>.

In Ayurveda plant is popularly known as Shigru (Sanskrit), Drum stick plant, Horse raddish tree (English), Sahijana (Hindi), Saint, Sajjina (Bengali), Murunga (Tamil), Munuga (telagu), Shevaga, Sagata (Marathi).

The plant contains 4- hydroxymellein, vanillin, moringine, moringinine, bayrenol, indole acetic acid, indole acetonitrile, benzyliothiocyanate, pterogospemine exhibits antibiotic activity.

It has hypotensive, antibacterial, antifungal, antiviral, depressant, hepatoprotective, anti-inflammatory, anti-cancer, antibiotic, stimulant, anti tubercular, anti fertility action. Leaves are anti-inflammatory, anodyne, anti-helminthic, ophthalmic rich in vitamin A and C<sup>7</sup>.

Therefore plant is selected for anti bacterial activity.



Picture showing Shigru Leaves

## MATERIALS & METHODS:

### Plant Material:

Leaves of Shigru were collected from Inchal village, Soundatti tehsil, Belgavi and were authenticated at Central Research Facility, Analytical Laboratory, Belgavi with authentication number CRF/79/2015.

### Preparation of Churna:

Leaves were dried in a shade for 7 days and powered with help of grinder passes through 120 mesh.

### Anti-bacterial activity:

The bacterial strains selected were

Gram Positive

- ❖ Staphylococcus aureus
- ❖ Streptococcus mutans

Gram Negative

- ❖ Pseudomonas auringinosa
- ❖ Escheria col

The pathogenic strains of above bacteria were produced and anti-bacterial study was done at Microbiology Department, Nathajirao G. Halgekar Institute of Dental Sciences and Research Centre Belgaum.

### Revival of microbial cultures:

Microbes collected from Institute of Microbial Technology were in dried form. It needed to be revived. Like all other living forms, micro-organisms need suitable nutrients and favourable environments for growth. A simple way to obtain bacteria is to grow them in a flask in broth medium.

100 ml Nutrient broth medium were transferred in conical flasks (of quantity 100ml) 20ml each. The flasks were capped with cotton plug and autoclaved at 121°C for 20 minutes at 15 lb pressure per square inch. Dried & frozen bacteria were transferred to conical flasks with nutrient broth media, kept at 37°C to get cultures.

### Preparation of Media and Media plates:

Brain Heart infusion agar was taken for all pathogens. 38 Gms of agar was dissolved in 1 litre of distilled water. The sterilized media was poured in to sterile petri dishes aseptically. Agar acts a solidifying agent, when solidifies the cups (holes) of 8mm diameter were boared using cork borer. After solidifying plates are kept inverted at 37°C overnight for checking any contamination. Bacterial cultures were applied to discs and spreaded with cotton swab stick. Prepared plates were incubated at 37°C for 24 hours.

### Preparation of Test solution

Test compound was dissolved in dimethyl sulphoxide each 2 ml to give following concentrations.

- 1) 10 mg test compound dissolved in 2 ml of DMSO to get 5 µl. concentration
- 2) 20 mg test compound dissolved in 2 ml of DMSO to get 10 µl concentration
- 3) 50 mg test compound dissolved in 2 ml of DMSO to get 25 µl concentration
- 4) 100 mg test compound dissolved in 2 ml of DMSO to get 50 µl. concentration
- 5) 150 mg test compound dissolved in 2 ml of DMSO to get 75 µl. Concentration

#### Disc Diffusion method:

For evaluation of anti-bacterial activity Disc Diffusion method was adopted.

Test solutions in 5 different concentrations viz. 5µl, 10µl, 25µl, 50µl and 75µl were placed in cups using sterilized pipettes with control and negative group.

Petri plates were kept in a refrigerator for 2 hours to allow uniform diffusion of the solution then taken out from refrigerator and incubated for 48 hours at 37°C.

After incubation period was over, plates were observed for zone of inhibition and measured using transparent scale and readings were taken.

#### Group Design:

Test group: 5µl, 10µl, 25µl, 50µl and 75µl concentrations of Shigru Patra Churna in DMSO.

Standard Group: 5% w/v ofloxacin.

Negative Group: Distilled water

#### Determination of activity index

Activity index of crude plant was calculated as<sup>8</sup>

Activity Index = Zone of inhibition of test drug / Zone of inhibition of standard drug.

#### Results:

Si. No.	Micro organism	Shigru Patra concentration ( Test Drug )					Ofloxacin (Standard Drug)	D/W (Negative Group)
		75 µl	50 µl	25 µl	10 µl	5 µl		
1.	Staphylococcus aureus	13 mm	10 mm	R	R	R	15 mm	R
2.	Streptococcus mutans	R	R	R	R	R	32 mm	R
3.	Psuedomonas auriginosa	12 mm	10 mm	R	R	R	30 mm	R
4.	Escheria coli	15 mm	12 mm	R	R	R	30 mm	R

Note: - R – Resistant

Table of Test drugs, Standard and Negative control group



Pictures showing Zone of Inhibition *Staphylococcus aureus*



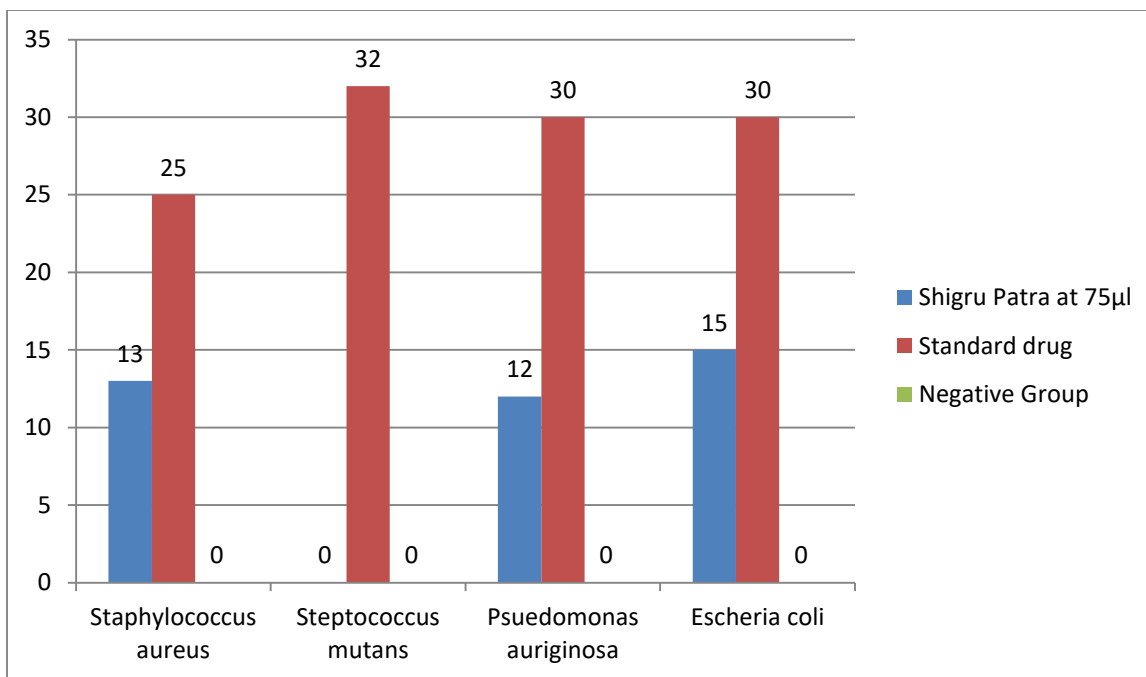
Pictures showing Zone of Inhibition *Streptococcus mutans*



Pictures showing Zone of Inhibition *Pseudomonas auruginosa*



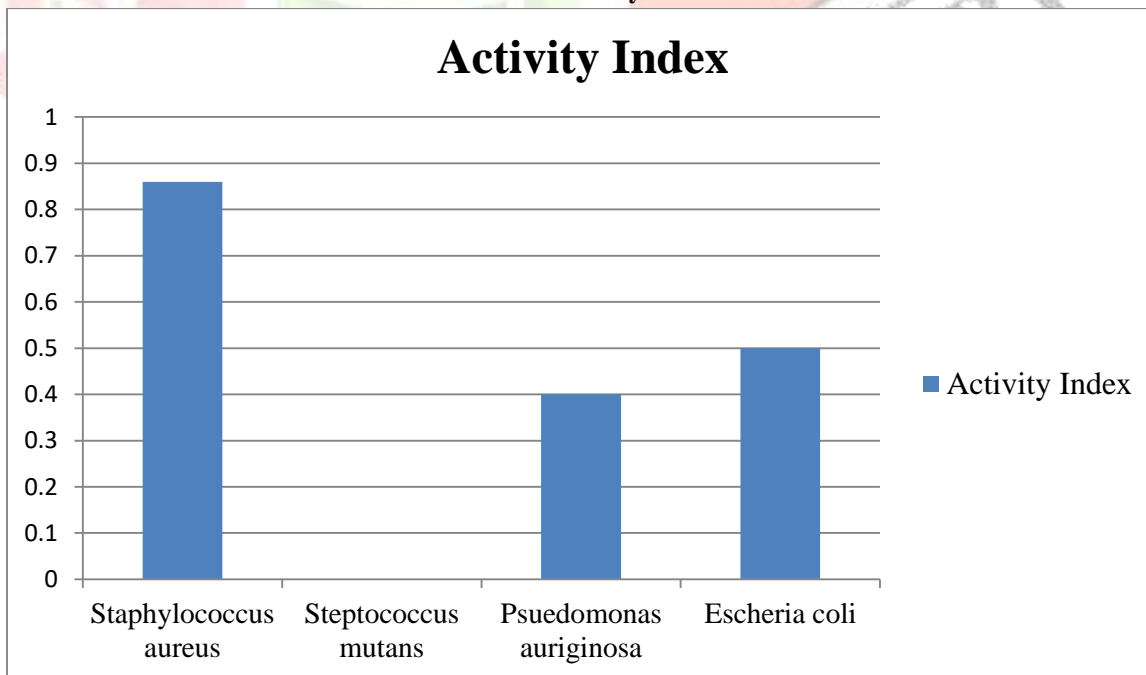
Pictures showing Zone of Inhibition *Escheria coli*



Graph of Test drugs, Standard and Negative control group

Si. No.	Micro organism	Shigru Patra zone of inhibition in mm at 75 µl	Ofloxacillin zone of inhibition in mm	Activity Index
1.	Staphylococcus aureus	13 mm	15 mm	0.86
2.	Steptococcus mutans	R	32 mm	0.00
3.	Psuedomonas auriginosa	12 mm	30 mm	0.0
4.	Escheria coli	15 mm	30 mm	0.50

Table of Activity Index



Graph of Activity Index

**Discussion:**

The Shigru Patra shows zone of inhibition of 13 mm for 75 µl, 10 mm for 50 µl and become resistant for 25 µl, 10 µl, and 5 µl for *Staphylococcus aureus*.

The Shigru Patra shows total resistance for *Streptococcus mutans*.

The Shigru Patra shows zone of inhibition of 12 mm for 75 µl, 10 mm for 50 µl and become resistant for 25 µl, 10 µl, and 5 µl for *Psuedomonas auriginosa*.

The Shigru Patra shows zone of inhibition of 12 mm for 75 µl, 10 mm for 50 µl, and become resistant for 25 µl, 10 µl, and 5 µl for *Escherichia coli*.

The study shows higher zone of inhibition at 75 µl and the zone of inhibition lowers with the concentration and become resistant at 25 µl, 10 µl, and 5 µl of the test drug.

**Conclusion :**

The difference in activity at different concentrations may be due to concentrations of phytoconstituents in the test drug sample. This indicates that the proper concentrations of phytoconstituents in other words the proper dose of the drug is essential for antibacterial activity, as the higher concentrations are giving more promising results.

75 µl concentration of test drug gives significantly good results as compared to 50 µl, 25 µl, 10 µl, and 5 µl concentration of the test drug.

Out of four bacterias tested *Staphylococcus aureus*, *Psuedomonas auriginosa* and *Escheria coli* are inhibited by Shigru Patra but *Streptococcus mutans* was resistant.

Activity index for *Staphylococcus aureus* (0.86) was significantly higher than *Psuedomonas auriginosa* and *Escheria coli*.

This study concludes that Shigru Patra Churna possess good anti bacterial effect.

**References:**

- 1) Agnivesa revised by Charaka & Dridhabala, Charaka Samhita. 2006. Ed. Vidyadhar Shukla, Prof. Ravidatta Tripathi, Vol I. Revised ed. Delhi:Chaukhambha Sanskrit Pratisthan: 73
- 2) Kaiyadeva, Kaiyadeva nighantu. 1979. Ed. Acharya Priyavat Sharma & Guruprasad Sharma, 1<sup>st</sup> ed. Varanasi:Chaukhambha Vishwabharati: 138
- 3) Acharya Narahari Pandit, 2003. Raj nighantu. Ed. Indradeva Tripathi, 3<sup>rd</sup> ed. Varansi: Chaukhambha Krishnadas Academy: 193.
- 4) Lala Shaligramagi Vaishya, 1981. Shaligrama nighantu. 1st ed. Mumbai: Khemraj Shrikrishnadas Prakashan: 658.
- 5) Dr. Gyanendra Pandey,2001. Dravyaguna vijana.Vol.III, 1st ed. Varanasi: Krishnadas Academy: 451.
- 6) Dr. Gyanendra Pandey,2001. Dravyaguna vijana.Vol.III, 1<sup>st</sup> ed. Varanasi: Krishnadas Academy: 451.
- 7) Sharma P. C.,2004. Yelne M.B.et.al., Database on Medicinal Plants, Published By CCRAS, New Delhi: 431.
- 8) Shrinivasan D., Sangeetha Nathan, Suresh T., Lakshmanaperumalsamy P.,2001. Antimicrobial activity of certain Indian medicinal plants used in folklore medicine. J. Ethnopharmacol: 217-220.