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AQUATIC EXTRACT OF ACACIA CONCINA LINN HAS ANTIBACTERIAL AND ANTHELMINTIC PROPERTIES.

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Abstract:

Herbal shampoo made from shikakai fruit is used to heal skin conditions including jaundice and constipation. Research quality is low, as seen by this plant's literature review, making it difficult to find novel therapeutics. Acacia concinna leaf aqueous extract showed considerable antibacterial activity against both gram-positive and gram-negative bacteria in an antibacterial screening. Greatest inhibition was shown with the gram-positive bacterium *Micrococcus luteus*, while maximum antibacterial activity was shown against *E. coli*. When compared to piperazine citrate at a dosage of 5mg/ml, the aqueous extract of *Acacia concinna* demonstrated considerable anthelmintic action. The plant extract, in addition to having inert chemical elements, also has multiple of active therapeutically active ingredients accountable for more therapeutic action than the single active constituent of synthetic medication in the event of resistant microbial strains.

Keywords: *Acacia concinna*, Shikakai, Effectiveness as an anthelmintic and as a bactericidal

INTRODUCTION:

Current efforts are being made to combat the rising issue of antibiotic-resistant bacterial strains and the development of resistance in gastro-intestinal helminthes to anthelmintic medications. This has resulted in a worldwide appeal for the development of novel antimicrobial medications, especially those derived from nature. Since their biological origin means they are less likely to cause harm, medications produced from natural sources tend to have less adverse effects than their synthetic counterparts. New antibacterial and anthelmintic drugs derived from plants were the inspiration for this study.

Shikakai (*Acacia concinna*, Fabaceae) (*Acacia concinna*, Fabaceae)

Saponins, which are found in abundance in the plant's fruit, are what cause lather to form when the fruit is used to wash hair. The shikakai shrub might be mistaken for a little tree. South India's dry, hot climate is ideal for these trees and shrubs with tree-like leaves. The leaves taste sour, like Tamarind pulp[1]. A widespread shrub in India's forests. The

naturally gentle pH of shikakai fruit cleans hair without stripping it of its natural oils, earning shikakai the nickname "fruit for the hair" [2, 3]. As an anti-dandruff treatment, shikakai also speeds up hair development and fortifies the follicles at their base.

To clean hair, use either the powder or an extract made from the bark, leaves, or pods. Cleaning oil and grime from hair is a breeze with this. When using Shikakai, it is not necessary to follow up with a rinse or conditioner since it also aids in detangling the hair.

- Oxalic acid, tartaric acid, citric acid, succinic acid, ascorbic acid, and two alkaloids (calyctomine and nicotine) give the leaves their acidic flavor, making them ideal for use in chutneys. Other than that, an infusion of the leaves is utilized in anti-dandruff products.

The roasted and pulverized pods have been used to treat a number of skin disorders.

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Traditional medicine uses an extract of Shikakai leaves to treat malarial fever, while a decoction of the pods alleviates biliousness and functions as a purgative. Additionally, a saponin found in the bark has been shown to have spermicidal effect against human semen. The astringent properties of the leaves and pods make them an effective first aid remedy for minor cuts, wounds, and dental issues [4].

MATERIALS AND METHODS:

Herbarium specimen validated by Prof B. Sujatha, College of Science and Technology, Andhra University, Visakhapatnam; voucher number BS-00125; collection location: Yeleswaram (at 17.2833°N 82.1000°E), East Godavari district, Andhra Pradesh, India; collection of *Acacia concinna* leaves.

Plant material was extracted by placing 100 grams of dried powdered leaf material in a water bath with distilled water as a solvent for 6 hours, and then filtering the extract through a vacuum filter. Repeated extraction with hot water for 3 hours was used to remove the residual stain. The same filtering process was used for the second extract. This extraction process was carried out three times and then merged. The combined extract filtrate was heated to 60 degrees Celsius in a water bath until it became a semisolid dark brown color. A desiccator was used to preserve the extract. Chemical analyses on the dried extract revealed that it was high in carbs, tannins, and flavonoids.

Antibacterial activity The medication Ciprofloxacin, supplied by Suvarna Scientific Chemicals and Equipments, was utilized as the reference standard drug in this investigation.

Usually, pharmaceuticals are administered at a concentration of 20 g/ml.

Test organisms: The total of six bacteria was chosen for this investigation. To name a few, gram-positive bacteria include *Bacillus subtilis* MCC 2049, *Staphylococcus aureus* MCC2043, *Micrococcus luteus* MCC 2155, and *Streptococcus aeruginosa* MCC 2081. *Escherichia coli* MCC 2079 and *Proteus vulgaris* MCC 2543 are examples of gram-negative bacteria.

Three test extract solutions, T1, T2, and T3, were prepared at concentrations of 100mg/l, 50mg/l, and 25mg/l, respectively. Control vehicle: Sterile water for injection Procedure:

Under aseptic circumstances in the laminar air flow chamber, 30 ml of sterile nutrient agar medium was transferred to test tubes and inoculated with the fresh stock cultures of test organisms; the inoculated medium was then put onto sterile Petri plates and allowed to harden.

Antibacterial activity was tested using the cup plate agar diffusion technique against six different bacterial strains. A sterile aluminum borer was used to create five wells (cups/holes) of the same diameter (6mm) in the solidified agar medium. After that, in a laminar air flow cabinet, 30 l of each test extract concentration, standard drug concentration, and vehicle control (sterile water for injection) were pipetted and placed directly into the appropriate wells.

A place where fluid may move easily and quickly. It took 15 minutes of careful refrigeration of the Petri plates for the solution in the wells to diffuse into the medium. After that, we placed all of the Petri plates in an incubator at 37°1°C for 24 hours. Next, we looked for the existence of growth inhibition zones in the petri dishes and assessed their widths around each disc.

measures in millimeters [Including the well's diameter, which is 6mm]. The diameter of every inhibitory zone was measured twice in opposite directions to get an average value. Three separate runs of the experiment were conducted, with the average results shown in table-1[7, 8

RESULTS:

Table 1: Antibacterial activity of Aqueous extracts of fruits of the *Acacia concinna*

| S.No. | Bacterial strains used | Diameter of inhibition zone (mm) | | | | | |
|-------|---------------------------------|----------------------------------|--------------|--------------|---------|--------------|------------------------------|
| | | Aqueous extract (mg/ml) | | | | Control | Positive control 20 µg/ml |
| | | 100 | 50 | 25 | Control | | |
| 1. | <i>Staphylococcus aureus</i> | 18.05 ± 2.11 | 13.09 ± 2.45 | 9.50 ± 4.10 | --- | 30.10 ± 1.59 | |
| 2. | <i>Bacillus subtilis</i> | 14.50 ± 1.28 | 11.50 ± 3.43 | 9.50 ± 3.63 | --- | 29.21 ± 2.15 | |
| 3. | <i>Escherichia coli</i> | 23.50 ± 3.15 | 18.05 ± 1.85 | 15.05 ± 3.81 | --- | 36.50 ± 3.18 | |
| 4. | <i>Proteus vulgaris</i> | 20.01 ± 1.89 | 16.50 ± 3.51 | 11.50 ± 2.56 | --- | 26.10 ± 2.13 | |
| 5. | <i>Micrococcus luteus</i> | 23.12 ± 2.65 | 18.15 ± 2.89 | 14.10 ± 2.89 | --- | 27.50 ± 3.43 | |
| 6. | <i>Streptococcus aeruginosa</i> | 21.50 ± 3.41 | 19.11 ± 1.62 | 13.20 ± 3.56 | --- | 25.50 ± 2.15 | |

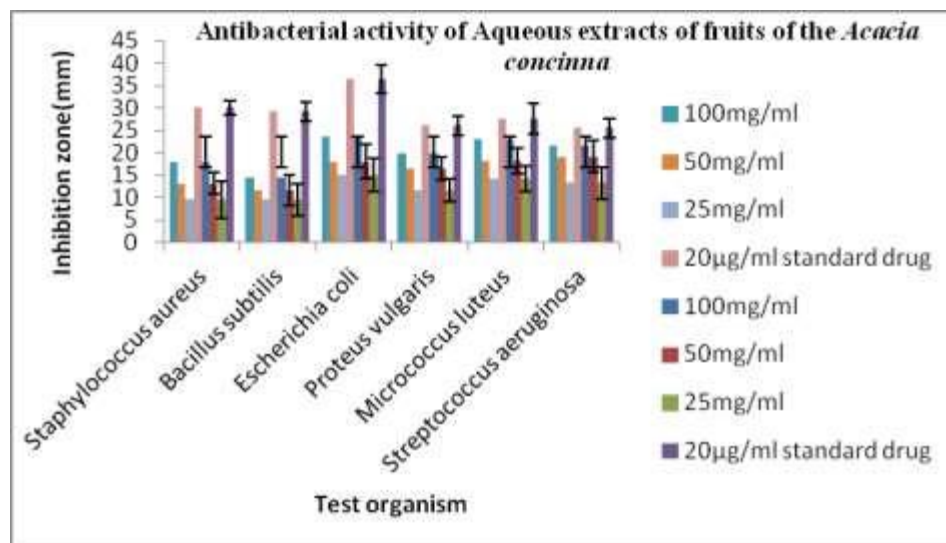


Fig 1: Graphical presentation of antibacterial activity of aqueous extract of leaves of *Acacia concinna* Linn.



Pictures of antibacterial activity of aqueous extract of *Acacia concinna* Linn.

DISCUSSION:

Acacia concinna aqueous extract showed considerable antibacterial activity against both gram-positive and gram-negative bacterial strains in an antibacterial screening. Increasing the concentration also boosted the antibacterial effect. Aqueous extract showed the most antibacterial action against *Escherichia coli*, followed by the greatest suppression against *Micrococcus luteus* and *Streptococcus aeruginosa* (all gram-positive organisms). Repetition of the experiments showed that the examined organisms' zone of inhibition findings were within the range of -5 to +5 standard deviations. The aqueous extract of *Acacia concinna* showed more activity against gram-negative bacteria than it did against gram-positive bacteria. The uninhibited group showed no signs of slowing down.

Antihelmintic activity: most currently available anthelmintics have unwanted side effects as nausea, vomiting, dizziness, and constipation. Natural anthelmintics show promise as a potential therapy for parasite infestations. Common Medicine: valfred Pharmaceuticals Limited's Piperazine Citrate Syrup, USP, 30ml.

Indian adult earthworms (*Pheretima posthuma*) were gathered from damp soil close to the Aditya College campus, washed with normal saline to remove soil particles, and then stored in normal saline. The 0.2-0.3-centimeter-thick earthworms may grow to a length of 6-8 centimeters. thickness were

used for the analysis. Because of their physiological and anatomical similarities to human intestinal roundworm parasites, *Pheretima posthuma* were utilized in the current work.

Generally, a drug's concentration is set at 5mg/l.

T1, 100mg/ml; T2, 50mg/ml; T3, 25mg/ml; these are the test extract concentrations.

The adult *Pheretima posthuma* was subjected to several quantities of test extract and standard medication to determine its anthelmintic activity [9-12]. In two different 10-milliliter Petri plates, we tested both the test extract and the standard concentration. The standard of care was normal saline. The earthworms used in all of the Petri dishes were carefully chosen to be around the same size. Each Petri plate was stored at ambient temperature.

The duration of paralysis and death of individual worms was tracked. If the worms were still alive, they would have been subjected to external stimuli designed to get them moving. Paralysis set in when no worm activity could be seen, even when violently shook. Worms were considered dead if they stopped responding to a strong shaking or a dip in warm water (50°C). The test was repeated three times, and the averages were recorded. In table-2 below, you'll see the results of the anthelmintic activity.

RESULTS:

Table 2: Antihelmintic activity of aqueous extract of the fruits of the *Acacia concinna*

| Substance tested | Concentration(mg/ml) | Time taken for paralysis (min) | Time taken for death (min) |
|--|----------------------|--------------------------------|----------------------------|
| Control (normal saline) | ... | ... | ... |
| Piperazine citrate (standard) | 5 mg/ml | 2.50 ± 1.05 | 5.25 ± 1.56 |
| Aqueous Extract (<i>Acacia concinna</i>) | 100 mg/ml | 8.05 ± 0.98 | 13.45 ± 1.85 |
| | 50 mg/ml | 11.30 ± 1.76 | 18.05 ± 1.95 |
| | 25 mg/ml | 17.5 ± 2.10 | 23.40 ± 1.85 |

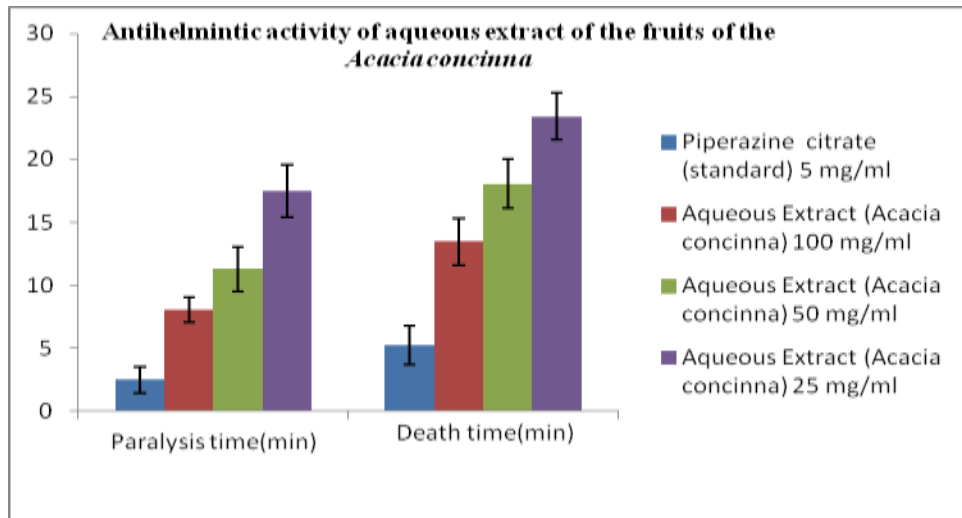


Fig 2: Graphical representation of anthelmintic activity of aqueous extract of the leaves of *Acacia concinna*



Pictures of anthelmintic activity of aqueous extract of the *Acacia concinna*.

DISCUSSION:

When compared to piperazine citrate at a dosage of 5mg/ml, the aqueous extract of *Acacia concinna* demonstrated considerable anthelmintic action. The anthelmintic activity of *Acacia concinna* aqueous extract increased with increasing concentration. The plant extract, in addition to having inert chemical elements, also has multiple of active therapeutically active ingredients accountable for more therapeutic action than the single active constituent of synthetic medication in the event of resistant microbial strains. Repeated experiments showed that the examined organism had anthelmintic activity, with values within 5 standard deviations of the mean.

CONCLUSION:

At a concentration of 5mg/ml, the aqueous extract of *Acacia concinna* leaves exhibited much higher anthelmintic activity than piperazine citrate. We need to extract the active ingredients in shikakai leaves so that we may use them to create new therapies to treat infections caused by bacteria, viruses, and fungi that have developed resistance to existing treatments.

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