

## PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF *BRYOPHYLLUM PINNATUM* (LAM.) KURZ.

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*Bryophyllum pinnatum* (Lam.) Kurz. is extensively used in Indian traditional and folklore medicine to cure various human ailments. The medicinal value of *B. pinnatum* plant is due to the presence of various active constituents in them like flavanoids, tannins, resins, saponins and proteins etc. Antibacterial activity of aqueous and methanol extracts of leaf were investigated by paper disc diffusion method against two gram negative bacteria *Pseudomonas aeruginosa* and *Bacillus subtilis*. This study depicts that methanol extract of leaves was more effective against gram negative bacteria and study scientifically validates the use of plant in traditional uses.

**Keywords :** Active constituents; Medicinal value.

The *Bryophyllum* (from the Greek bryon = sprout, phyllon = leaf) are a section in the plant genus Kalanchoe of the Crassulaceae family. *Bryophyllum pinnatum* is a rapid growing juicy herb. Leaves are thick, fleshy and simple or compound in pairs on reddish stems. Plantlets grow along the notches of the leaf margins which can develop while still attached to the plant or when detached, a fascinating characteristic that earns its name. Flowers are about 5 cm long, nodding, dangling and bell-shaped, greenish or yellowish, reddish by the stems.

In traditional medicine the leaves of *Bryophyllum pinnatum* plant have been reported to possess antimicrobial<sup>1-3</sup>, antifungal<sup>4</sup>, antiulcer<sup>5</sup>, analgesic and anti-inflammatory<sup>5</sup> and antihypertensive<sup>5</sup> activities. The methanol extract of the leaves of the plant has also been reported to have histamine receptor (H1) antagonism in the ileum peripheral vasculature and bronchial. Anti-inflammatory and antidiabetic effect of the plant extract was investigated in rats. Three main compounds are present in *Bryophyllum* which has their unique medicinal value. One of them is Bryophyllin which shows strong anti-tumor activity. Others are Bersaldegennin-3-acetate and Bryophyllin C which shows insecticidal properties. The objective of the study was to evaluate and screen the presence of primary and secondary metabolites of the selected plant species and also to judge its antimicrobial effect on various pathogens.

**Plant extraction**-Fresh leaves of *Bryophyllum pinnatum* were collected from the Payli region of Jabalpur. Some fresh leaves were grounded separately with 15 ml of

solvent in mortar & pestle and were filtered. The filtrate and the crude extract were used for phytochemical screening. Different extracts of fruits and leaves were prepared in acetone, ether, methanol and water as solvent. **Phytochemical screening**-Chemical tests were carried out on the aqueous extract of fresh leaves using standard procedures to identify the phytoconstituents. The filtrate and crude extract is used for phytochemical screening. Different extracts were prepared by grinding 8 gms of plant parts using the above solvents by the following method.

**Test Organism**-Bacterial culture of *Pseudomonas aeruginosa* and *Bacillus subtilis* were obtained from Aeroallergen and Immunology lab, Department of Biological Science, Rani Durgavati Vishwavidyalaya, Jabalpur, (M.P) and were used as antimicrobial test organism. The stock cultures were sub cultured in nutrient broth for 24 hours and maintained at 37°C.

**Antibacterial activity**-Sterile media was poured in to sterile Petri plate. The plates were allowed to set for one hour, a standardized inoculum was introduced on the surface of sterile agar plates and a sterile spreader evenly distributed the inoculum. A sterile paper disc previously soaked in a known concentration of extract was carefully placed at the labeled plate. The plates were incubated at 37°C for 24 hours, the presence of zone of inhibition was regarded as the measure of antimicrobial action and expressed in the terms of average zone of inhibition measure<sup>6</sup>.

The present investigation includes the phytochemical screening of *Bryophyllum pinnatum* leaves in aqueous, ether, acetone and methanol extract to detect

**Table 1.** Phytochemical screening of *Bryophyllum pinnatum*, Leaves:-

| S.No. | Phytochemical Tests      | Aqueous extract | Ether extract | Acetone extract | Methanol extract |
|-------|--------------------------|-----------------|---------------|-----------------|------------------|
| 1.    | ALKALOIDS                |                 |               |                 |                  |
| a.    | Mayer's Test             | +               | +             | +               | +                |
| b.    | Dragendroff reagent Test | +               | +             | +               | +                |
| c.    | Wagner's Test            | +               | +             | +               | +                |
| 2.    | CARBOHYDRATES            |                 |               |                 |                  |
| a.    | Benedict's Test          | +               | +             | -               | -                |
| b.    | Fehling's Test           | -               | -             | +               | -                |
| 3.    | PROTEINS                 |                 |               |                 |                  |
| a.    | Xanthoprotein Test       | +               | -             | -               | -                |
| b.    | Biuret Test              | +               | +             | +               | -                |
| 4.    | LIPIDS                   |                 |               |                 |                  |
|       | Glycerol Test            | +               | +             | +               | +                |
| 5.    | SAPONINS                 |                 |               |                 |                  |
|       | Foam Test                | -               | +             | +               | +                |
| 6.    | FLAVANOIDS               |                 |               |                 |                  |
|       | Test                     | +               | +             | +               | -                |
| 7.    | TANNIN                   |                 |               |                 |                  |
| a.    | Lead Acetate Test        | -               | -             | +               | +                |
| b.    | Ferric Chloride Test     | +               | +             | +               | +                |
| 8.    | RESIN                    |                 |               |                 |                  |
|       | Resin Test               | +               | -             | -               | +                |
| 9.    | STEROLS                  |                 |               |                 |                  |
|       | Salkowski Test           | -               | +             | +               | -                |

**Table 2.** Antimicrobial activity.

| S.No. | Microbial agent               | Sample           | Zone of inhibition (in mm) (Dilution in ml) |                  |                  |
|-------|-------------------------------|------------------|---|------------------|------------------|
|       |                               |                  | 10 <sup>-1</sup>                            | 10 <sup>-2</sup> | 10 <sup>-3</sup> |
| 1     | <i>Pseudomonas aeruginosa</i> | Aqueous extract  | 15  | -                | -                |
|       |                               | Methanol extract | 17  | 15               | 14               |
| 2     | <i>Bacillus subtilis</i>      | Aqueous extract  | -   | -                | -                |
|       |                               | Methanol extract | 12  | 11               | 11               |

the presence of active metabolites. The chemical tests were performed in the aqueous, acetone, methanol and ether extracts of leaves. Alkaloid, tannin, flavanoids, sterols showed positive results while saponin was absent (Table 1). The antibacterial activity of *Pseudomonas aeruginosa*

was observed with no zone of inhibition in aqueous extract at the dilution of 10<sup>-2</sup> and 10<sup>-3</sup> but 15 mm of zone of inhibition was observed at 10<sup>-1</sup> dilution. In methanolic extract 17 mm, 15 mm and 14 mm zone of inhibition was observed at the dilution of 10<sup>-1</sup>, 10<sup>-2</sup> dilution respectively.

In case of other bacteria; *Bacillus subtilis* gives better results in methanolic extract as compared to aqueous extract. Aqueous extract of *Bryophyllum pinnatum* show no zone of inhibition, whereas at  $10^{-1}$  dilution the methanolic extract of *Bryophyllum pinnatum* gave 12 mm zone of inhibition against *Bacillus subtilis* and as the dilution increases the zone of inhibition decreases.

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