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# Phytochemical Screening and Evaluation of Antibacterial Activity of Argyreia Cuneata Leaf Extract

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***Abstract:*** ***Argyreia cuneata (Willd.) Ker Gawl. belonging to family Convolvulaceae. Despite its traditional uses, systematic phytochemical and antibacterial validation is limited. So, this study of Phytochemical screening revealed presence of alkaloids, steroids, tannins, terpenoids, glycosides, flavonoids, proteins and carbohydrates in ethanol and methanol extracts. Chloroform extract showed positive for alkaloids, steroids, glycosides and flavonoids, but negative for tannins. Benedict's and Molisch's tests were negative in ethanol and methanol extracts while positive in chloroform. All extracts exhibited significant antibacterial activity. The highest inhibition was observed with chloroform extract against.***
***Keywords: Argyreia cuneata, Phytochemical screening, Antibacterial activity.***

## I. INTRODUCTION

The term medicinal plants include various types of plants used in herbalism and some of these plants have medicinal properties. These medicinal plants are considered as rich resources of ingredients which can be used in drug development and synthesis. Medicinal plants are frequently used as raw materials for extraction of active ingredients which were used in the synthesis of different drugs, like in case of laxatives, blood thinners, antibiotics and malarial medications, as ingredients in plants [(1)]. *Argyreia cuneata* (Willd.) Ker Gawl. is a sub-erect silky shrub belonging to Convolvulaceae, distributed in Western Ghats of India. Traditionally used to treat diabetes, skin cuts, to initiate labour pain, retention of fatal membrane and swelling of throat in ethno-veterinary practice [(2)]. The plant is reported to contain alkaloids and flavonoids and exhibits analgesic, antibacterial, antifungal, antioxidant, wound healing, antipyretic and antidiabetic activities. With increasing antibiotic resistance, exploration of plant-based antimicrobials is crucial. Hence, the present study was undertaken to systematically screen phytochemical constituents and evaluate antibacterial potential of leaf extracts.

## II. MATERIALS AND METHODS

### *A. Plant Collection and Extraction*

Leaves of *A. cuneata* were collected from Mysuru region, authenticated, washed, shade dried and powdered using mortar and pestle. 20g powder was macerated in 100 ml each of ethanol, methanol and chloroform for 72h, filtered through Whatman No.1 filter paper and muslin cloth, and concentrated.



Figure 1: *Argyreia cuneate* plant

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*B. Phytochemical analysis*

Phytochemical examination was carried out for the extract as per the standard methods described [3] to check the presence of Alkaloids, Steroids, Terpenoids, Saponins, Tannins, Flavonoids, Carbohydrates, Glycosides and Proteins. Phytochemical analysis of crude extract of leaves in different solvents (Ethanol, Methanol and Chloroform) confirm the presence of various phytochemical constituents.

*C. Antibacterial assay*

Bacterial strains such as *Escherichia coli* (Gram-negative) and *Lactobacillus* sp. (Gram-positive) were used for antibacterial activity against the extract. Agar well diffusion method is used to perform the activity with different extract concentrations (50 and 100 mg/ml). Streptomycin disc as positive control, distilled water as negative control. Further, the culture bacterial plates were incubated at 37°Cfor about 24 hours. After incubation the zone of inhibition around the disk of all the isolate endophytes extracts were measured [4].

## III. RESULTS

*A. Phytochemical Analysis*

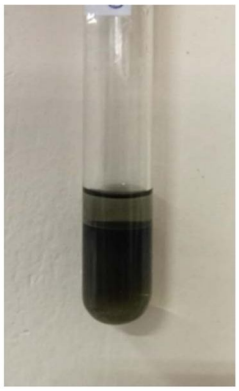
The results of Phytochemical screening showed the presence of alkaloids steroids, tannins, terpenoids, cardiac glycosides, proteins, carbohydrates in the ethanol, methanol, chloroform, solvents.

Table 1: Phytochemical analysis of extract ethanol, methanol, Chloroform

| Sl. No. | Name of the test | Ethanol | Methanol | Chloroform |
|---|---|---|---|---|
| 1 | Benedict's | - | - | + |
| 2 | Mayer's | + | + | + |
| 3 | Dragondruff's | + | + | + |
| 4 | Ferric chloride | + | + | - |
| 5 | Salkowski's | + | + | + |
| 6 | Molish's | - | - | - |
| 7 | Glycosides | + | + | + |
| 8 | HCl | - | - | - |
| 9 | Lead acetate | + | + | + |

Note: (+) indicates positive result
(-) indicates negative result

Table 2: Phytochemical analysis of extract ethanol, methanol, chloroform.

| Sl. No. | Test conducted | Positive results |
|---|---|---|
| 1 | Presence of Flavonoids |  |

| | | |
|---|---|---|
| 2 | Presence of Alkaloids |  |
| 3 | Presence of glycosides |  |
| 4 | Presence of Steroids |  |
| 5 | Presence of Phenols |  |
| 6 | Presence of Protein |  |

| | | |
|---|---|---|
| 7 | Presence of Saponins |  |
| 8 | Presence of Carbohydrates |  |

*B. Antibacterial Assay*

The antibacterial activity of *Argyreia cuneata* was assayed in vitro by well diffusion method against *Lactobacillus* sp. and *E. coli*. In the study, it was reported that ethanol and chloroform extracts of *A. cuneata* exhibited significant antibacterial activity against both *Lactobacillus* sp. and *E. coli*. The effect of leaf ethanol extract on *Lactobacillus* sp. shows increased zone of inhibition from 20mm to 26mm, showing higher antibacterial activity at the higher concentration and in chloroform extract zone of inhibition increased from 23mm to 27mm, indicating a stronger antibacterial effect at 100mg/ml. Ethanol extract against E. coli decreased zone of inhibition from 19mm to 15mm, indicating lower effectiveness at higher concentration. The zone of inhibition dropped sharply from 17mm to 10mm in chloroform extract showing significantly reduced activity at 100mg/ml. The standard antibiotic control showed stable, strong activity across both tests, maintain a zone of 28-29mm for *Lactobacillus* sp. and exactly 26mm for *E. coli*.

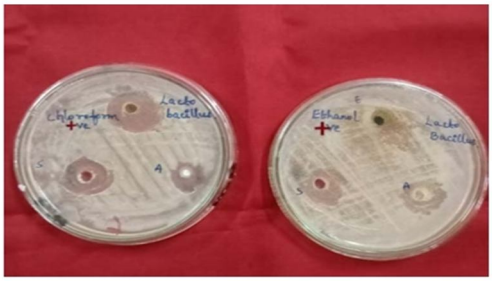



Figure 2: Inhibition zone against *Lactobacillus* sp.




Figure 3: Inhibition zone against *E. coli*

Table 3: Antibacterial activity against the extract (50 mg/ml) of ethanol and chloroform.

| Sl. No | Bacterial strain | Zone of inhibition in ethanol extract in mm | Zone of inhibition in chloroform extract in mm | Zone of inhibition against Streptomycin in mm |
|---|---|---|---|---|
| 1 | *Lactobacillus* sp. | 20 | 23 | 28 |
| 2 | *E. coli* | 19 | 17 | 26 |

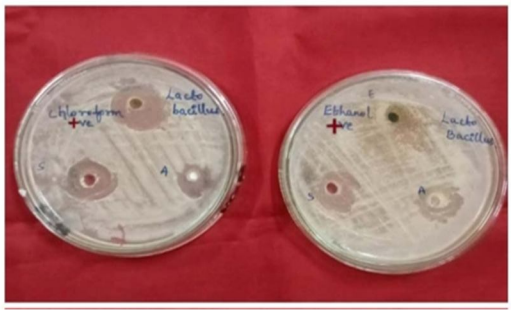



Figure 4: Inhibition zone against *Lactobacillus* sp.




Figure 5: Inhibition zone against *E. coli*

Table 4: Antibacterial activity against the extract (100 mg/ml) of ethanol and methanol.

| Sl. No. | Bacterial strain | Zone of inhibition in ethanol extract in mm | Zone of inhibition in chloroform extract in mm | Zone of inhibition against Streptomycin in mm |
|---|---|---|---|---|
| 1 | *Lactobacillus* sp. | 26 | 27 | 29 |
| 2 | *E. coli* | 15 | 10 | 26 |

## IV. DISCUSSION

Presence of flavonoids, cardiac glycosides, alkaloids, phenols, steroids corroborates earlier reports by [(2)]. These metabolites exert toxic effects against foreign cells and are responsible for broad-spectrum antibacterial activity. The higher activity against Gram-positive *Lactobacillus* sp. than Gram-negative *E. coli* may be due to difference in cell wall composition. The results align with [(2)] who reported leaf extract exhibited highest antibacterial activity among plant parts in order *Bacillus cereus* > *Shigella flexneri* > *E. coli* > *Salmonella typhimurium*.

## V. CONCLUSION

The present study demonstrates that ethanol, methanol and chloroform leaf extracts of *Argyreia cuneata* possess important phytochemicals and significant antibacterial activity against *E. coli* and *Lactobacillus* sp. Although standard antibiotic showed higher zone, plant extracts justify traditional use for respiratory, urinary tract and gastrointestinal infections. Further studies are needed to isolate pure compounds, determine MIC/MBC, antioxidant activity, and elucidate mechanism of action.

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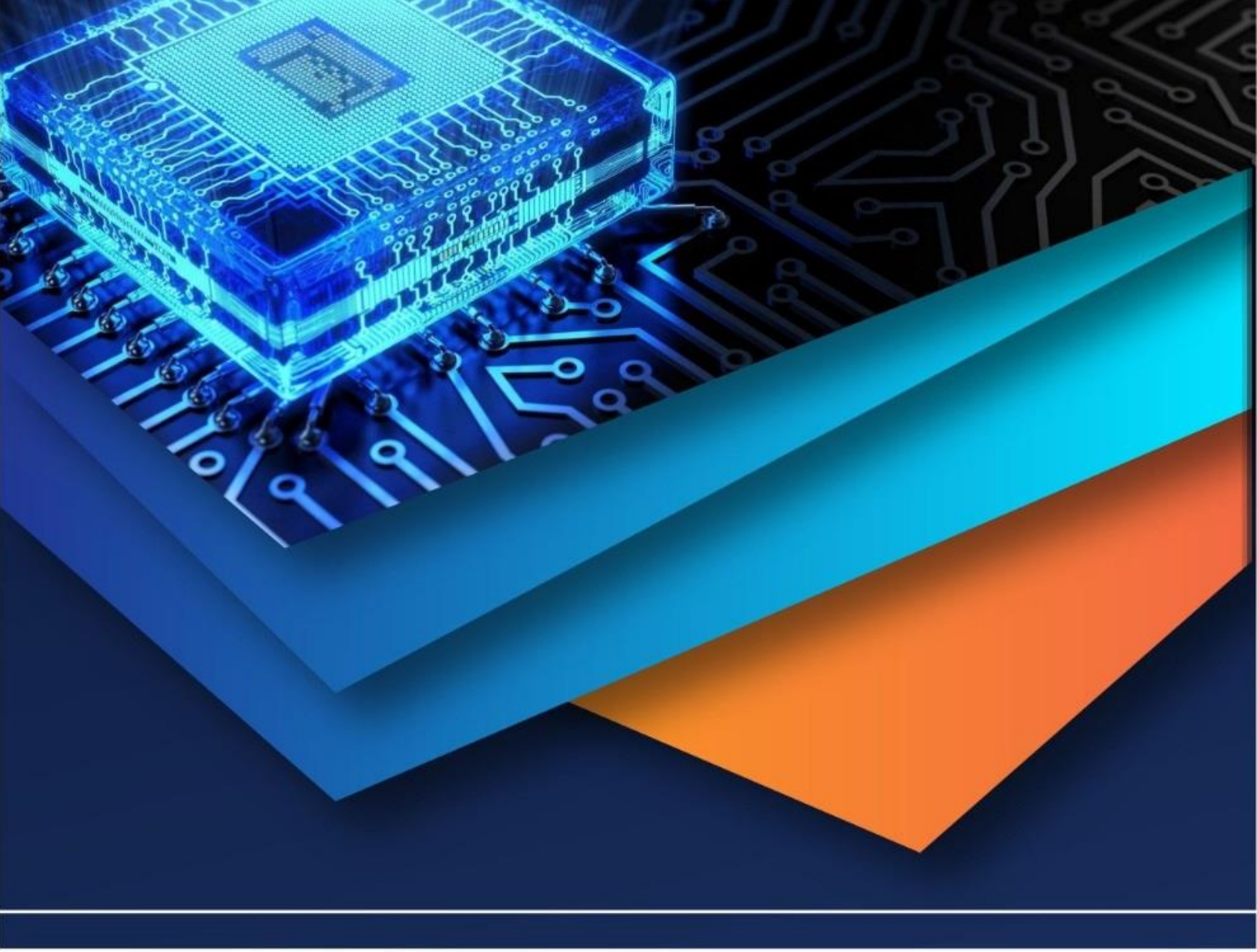
## VI. ACKNOWLEDGEMENT

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