



## Antibacterial activity of *Memecylon capitellatum* L. (Memecylaceae)

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### Abstract

In the present study, investigation of phytochemical constituents of *Cymbopogon citratus* (DC.) The aim of the present study, to investigation of phytochemical analysis and antibacterial activity of methanolic extract of *Memecylon capitellatum* L. leaves active against seven bacterial species. The bacterial species are *Pseudomonas aeruginosa*, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Klebsiella pneumonia*, *Escherichia coli*, *Salmonella typhi*, and *Staphylococcus aureus* were cultured in nutrient broth and maintained in nutrient agar. The antibacterial activity of *M. capitellatum* L. leaf extracts was measured by agar well diffusion method. The results of the present study of *M. capitellatum* leaf showed the largest zone of inhibition active against *Salmonella typhi* and followed by *V. parahaemolyticus* and *S. aureus*, respectively. The conclusion of the results from the study suggests that the leaves of *M. capitellatum* showed that good antibacterial activity against the selected bacterial species. Our results suggested that *M. capitellatum* could be used as alternatives antimicrobial agents for treatment of bacterial infections of human being.

**Keywords:** *Memecylon capitellatum* L. Memecylaceae, antibacterial activity, leaf extract, bacteria, phytochemicals

### 1 INTRODUCTION

Today, many pharmaceutical industries have produced a large number of antimicrobial drugs. The majority of synthetic drugs are highly toxic at their optimum dosage level [-4]. Synthetic drugs are not only expensive and inadequate for the treatment of bacterial disease, but also often with adulterations and side effects. Therefore, there is a need to search new infection-fighting strategies to control microbial diseases [5]. This shows that there is a continuous and an urgent need to discover new antimicrobial compounds with diverse chemical structures and novel mechanisms of action. Among many proposed strategies, a good understanding of plants offers the potential of developing potent broad-spectrum antibiotics. There are several reports in the literature regarding the antimicrobial activity of crude extracts of medicinal plants [4,6-9].

The genus *Memecylon* L., belonging to the family Melastomataceae, is represented world over by around 250 species of shrubs and trees in the paleotropical regions[10]. It is mainly distributed from tropical Africa, Madagascar, Southeastern Asia and Northern Australia to the Fiji Islands [11]. They are distributed in all types of habitats ranging from deciduous, semi evergreen, evergreen and montane forests with a wide range of altitude from sea level to 2000 m. In India the genus *Memecylon* is represented by 39 species, of which 21 are endemic to the country and the Western Ghats is reported to host 29 species [12-16].

*Memecylon capitellatum* L. is an evergreen shrub or small tree that can grow up to 5m tall. The plant is harvested from the wild for local use as a medicine and a dye. The leaf juice of *M. capitellatum* is taken internally for a month to treat diabetes [17]. A literature survey of these plants is no work. Hence, in the present study, to investigation of phytochemical



analysis and antibacterial activity of methanolic extract of *Memecylon capitellatum* L. Leaves.

## 2 MATERIALS AND METHODS

### 2.1 Plant materials

The collection of plants materials of *Memecylon capitellatum* L. were collected from Tirunelveli hills, Southern Western Ghats, Tirunelveli, Tamil Nadu. The leaves of *Memecylon capitellatum* L. were air dried at room temperature and powdered in a mechanical mill.

### 2.2 Preparation of plant extracts

The powdered plant materials were extracted with successively in methanol for 4hr in Soxhlet apparatus. Solvents were evaporated under reduced pressure and stored at °C for use. Preliminary phytochemical analysis tests were carried out on the powdered materials for using the methods [18-19].

### 2.3 Antibacterial Activity

#### 2.3.1 Subculturing of bacterial strains

The bacterial media were prepared by standard method for used. Nutrient broth was used for sub culturing of bacterial strains. Bacterial cultures were inoculated on nutrient broth and incubated at overnight at 37 °C. Nutrient agar media (Difco laboratories) pH 7.2 and nutrient broth media (Difco laboratories) pH 6.8 were used. The antibacterial activity of *M. capitellatum* L. leaf extract was measured by agar well diffusion method. Control as petroleum ether without plant extract was incorporated as negative control.

### 2.4 Data analysis

All the experiments were independently repeated three times, and average zone of inhibition of test extracts relative to negative control was calculated using Microsoft Excel 2019 software.

## 3 RESULTS AND DISCUSSION

In the present study, preliminary phytochemical analysis of leaves of *M. capitellatum* L. revealed the presence of alkaloids, flavonoids, tannins, saponin and triterpenoids seen in table-1. Previously reported that the active constituents of alkaloids, flavonoids, tannins, triterpenoids and sterols in both leaf and fruit extracts of *Milax zeylanica* L. [20].

The antibacterial activity of the *Memecylon capitellatum* L. leaves possess the largest zone of inhibition active against *Salmonella typhi* and followed by *V. parahaemolyticus* and *S. aureus* respectively (Table-2).

Earlier studies, four plant species exhibited antimicrobial properties of *Achillea millefolium*, *Ipomoea pandurata*, *Hieracium pilosella*, and *Solidago canadensis* strong effectiveness against *S. typhi* [21]. According to Nitha et al.,(2012) reported that the well diffusion method studied the plant extract such as *Embelia ribes*, *Jasminum angustifolia*, *Terminalia chebula* and *Vitex negundo* were inhibited the growth of *E.coli* and *K. pneumoniae* respectively[22]. The methanolic extract of *M. umbellatum* showed broad spectrum antibacterial activity with remarkable activity against *Klebsiella pneumonia*, *Pseudomonas aeruginosa*, and *Salmonella typhi* [23]. Recent report on the antimicrobial activity of the petroleum ether, chloroform and ethanolic leaf extracts of *M. umbellatum* also showed concentration dependent activity against all the tested bacteria [24]. The conclusion of the present study was rich contents of phytochemicals in the essential oils found in leaf of *M. capitellatum* L. and their active constituents may be acted as antibacterial activity.

Table-1: The preliminary phytochemical investigation of *Memecylon capitellatum* L. leaves

Sl.No.	Active compounds	Results
1.	Alkaloids	+
2.	Flavonoids / Phenolic Compounds	++
3.	Essential oils /Terpenoids	++++
4.	Tannin	+
5.	Sapannin	+

Table-2: Investigation of antibacterial activity of *Memecylon capitellatum* L. leaves

Sl.No.	Pathogen	Zone of Inhibition
1	<i>Escherichia coli</i>	10
2	<i>Klebsiella pneumonia</i>	11
3	<i>Pseudomonas auruginosa</i>	13
4	<i>Salmonella typhi</i>	18
5	<i>Staphylococcus aureus</i>	15
6	<i>Vibrio cholerae</i>	12
7	<i>Vibrio parahaemolyticus</i>	17

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