OPEN ACCESS
Chemistry & Material Sciences Research Journal
Volume 3, Issue 1, P.No. 1-5, January, 2021
DOI: 10.51594/cmsrj.v3i1.193
Fair East Publishers
Journal Homepage: www.fepbl.com/index.php/cmsrj

ANTIMICROBIAL ACTIVITIES OF ARTABOTRYS ODORATISSIMUS R.Br.

Poonam Sethi[1] & Nandhagopal Karmegam[2]
[1,]Assistant Professor,
Guru Nanak College, Chennai, India.
[2] L.N.Government College, Ponneri, India

*Corresponding Author: Poonam Sethi

Article Received: 24-11-20 **Accepted:** 08-01-21 **Published:** 31-01-21

ABSTRACT

Artabotrys odoratissimus R.Br. (Annonaceae) a medium sizes shrub with hooks, sweet smelling flowers and aggregate fruits, was tested for activity against gram negative bacteria. The fruit of the experimental plant was extracted with water, methanol and toluene: methanol (2:1 v/v). Artabotrys fruits showed good antibacterial activity and produced zone of inhibition of 32mm. The methanolic extract of the fruit showed maximum zone of inhibition at 300 µg/ml against Pseudomonas fluorescens. The present study clearly indicates that A. odoratissimus had a profound antimicrobial activity and it may be useful in the treatment of various infectious caused by bacteria.

Keywords: Artabotrys, Gram Negative Bacteria, Pseudomonas, Zone Of Inhibition

INTRODUCTION

In India medicinal plants form the backbone of traditional systems of medicine in India, thousands of tribal communities still use folklore medicinal plants for the cure of various diseases. Indian medicinal plants have been studied for potential source of bioactive compounds. The great interest in the use and importance of medicinal plants in many countries has led to intensified efforts on the documentation of ethnomedical data of medicinal plants (Dhar *et al*.,1968). Earlier there were a few or no synthetic medicine and species of higher plants were the main sources of medicines for the world (Duke, 1990). Medicinal plants are the rich source of novel drugs that forms the ingredients in traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates, bioactive principles and lead compounds in synthetic drugs

(Ncube, Afolayan, & Okoh, 2008). The use of herbs to treat disease is almost universal among non-industrialized societies and is often more affordable than purchasing modern pharmaceuticals. The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently use herbal medicine for some aspect of primary health care.

MATERIALS AND METHOD

a) Experimental Plant

Artabotrys odoratissimus also known as *Artabotrys hexapetalus* (Linn. F.) Bhandari commonly called as manoranjini is a shrub found in India and its flowers are renowned for its exotic fragrance. The common names include Ylang Ylang Vine, Climbing lang-lang and Tail grape. Leaves are simple and alternate, without hairs. Bisexual flowers are borne singly or in clusters opposite the leaves. The hexapetalous flowers are scented, and the plant bears fleshy fruits. The yellow colored flowers of this plant are very fragrant.The flowers are greenish in the beginning and turn yellow with age and the flowers are long lasting with fruity pleasant smell. When young it is a shrub which turns into a climber once attains the height of about 2 meters. Fruits are long when ripe, ovoid and smooth, aggregate of berries. Seeds nearly 2cm in diameter.

***ARTABOTRYS HEXAPETALUS* (LINN. F.)BHANDARI**
Synonym
***ARTABOTRYS ODORATISSIMUS* R.Br.**
FAMILY: (ANNONACEAE)
(TWIG WITH FRUITS)

Figure 1: Experimental Plant

b) Microbes

In vitro antimicrobial activity was examined for the methanolic extracts of Artabotrys against four bacterial species, the gram-negative strains *Salmonella typhi* (ATCC 00215), *Pseudomonas fluorescens* (ATCC 06341), *Pseudomonas aeruginosa* (ATCC 02150) and *Escherichia coli* (ATCC 10263) were obtained from Regional Research Institute of Unani, Chennai.

c)Preparation of Extracts

The fruit of the experimental plant was shade dried and ten grams was extracted with 100 mL of the solvents: double distilled water, methanol and toluene: methanol, 2:1 v/v and later kept in a shaker for 48 hours. The three extracts were then filtered through Whatman No.1 filter paper and dried in an oven at 40^{o}C. The residues obtained were then weighed and stored at 4^{o}C and used for the assay.

d)Methodology

The testing of antibacterial activity of Artabotrys extracts was carried out *invitro* by Kirby-Bauer disc diffusion technique (Bauer *et al*. ,1996). Culture of bacteria was made on Muller Hinton agar plates. Sterile paper discs 5mm diameter (Himedia) were placed over the plate at an equidistant position. The discs were loaded with 10 µl of the drug at the concentration of 100 µl/ml, 150 µl/ml, 200 µl/ml, 250 µl/ml and 300 µl/ml. DMSO was used as solvent. Separate control disc was also included using the solvent. Ciprofloxacin was used as standard for comparison. The plates were incubated at 37°C for 24 hours. The microbial growth was determined by measuring the diameter of Zone of inhibition.

Minimum inhibitory concentration (MIC) is the lowest of concentration of an antimicrobial that will inhibit the visible growth of the microorganism after overnight incubation. The MIC is determined by agar dilution method (Bennet *et al*.,1996). The test were performed at four concentration 60 µg/ml, 70 µg/ml, 80 µg/ml, 90 µg/ml and 100µg/ml employing the methanolic extract of the plant.

Results were analysed for statistical significance using SPSS (Statistical Package for Scientific Studies) programme.

RESULTS AND DISCUSSION

The antibacterial activity of methanolic extract of Artabotrys against the four pathogenic bacteria *Salmonella typhi, Pseudomonas fluorescens, Pseudomonas aeruginosa* and *Escherichia coli* were assessed by zone of inhibition. The results are shown in Table-1. All the microbes used in the present study were sensitive ONLY to the methanolic extract of the plant and showed a potential activity. Maximum activity was seen in case of *Pseudomonas fluorescens* where the zone diameter was 32 mm (300µg/ml).

The minimum inhibitory concentration study revealed that the value for the bacteria *Salmonella typhi and Escherichia coli* as 80 µg/ml and 60 µg/ml for *Pseudomonas fluorescens* and *Pseudomonas aeruginosa*.

Table 1: Antibacterial Activity of Methanolic Extract of Artabotrys

Bacteria	Zone of inhibition (in mm)					Ciprofloxacin (50µg/ml)
	100µg/ml	150µg/ml	200µg/ml	250µg/ml	300µg/ml	
Salmonella typhi	8±0.1	11±0.1	12±0.2	13±0.1	18±0.1	38±0.1
Pseudomonas fluorescens	10±0.2	17±0.1	21±0.1	28±0.2	32±0.1	46±0.1
Pseudomonas aeruginosa	11±0.1	15±0.2	17±0.2	22±0.3	25±0.1	34±0.0
Escherichia coli	7±0.1	13±0.1	18±0.1	20±0.2	22±0.2	33±0.0

This *in vitro* study demonstrated that folk medicine can be as effective as modern medicine to combat pathogenic microorganism. The antibacterial activity of Artabotrys fruit would help for development of a new alternative medicine system which has no side effects. Earlier the ethanolic extract of fruits has cardiac depressant, cardiac stimulant, hypotensive and spasmogenic properties has been studied and the flower extract also possesses strong antifungal properties (Asolkar *et al*., 1992). Fruits are given for scrofula (Scrofula is a tuberculosis infection of the lymph nodes in the neck). The antimicrobial activity of the leaves and oil of seed of the experimental plant has also been reported (Srivastava *et al*.,2009). This study serves as a baseline in identification of new medicinal plant and further

investigation on the same may yield new compounds of medicinal importance for specific microbial disease.

Presently there is an increasing interest worldwide on herbal medicines accompanied by increased laboratory investigation and pharmacological properties of the bioactive ingredients and their ability to treat various diseases. Bacteria cause serious infection in humans as well as other animals. The rapid spread of bacteria expressing multidrug resistance (MDR) has necessitated the discovery of new antibacterials and resistance – modifying agents. There are many studies suggested that the necessity of developing alternative antimicrobial drugs (Evans *et al*., 2002). Antimicrobials from plant source would be an excellent choice due to no side effects. A number of infectious agents are becoming more resistant to commercial antimicrobial compounds. So, there is a needful to develop new drugs, which requires varied strategies among them the secondary metabolites produced by medicinal plants are more important. According to World Health Organization (WHO) medicinal plants would be the best source to obtain a variety of drugs in developed countries.

Compared with Gram-positive bacteria, Gram-negative bacteria are more resistant against antibiotics, because of their impenetrable wall. In the present study Artabotrys fruits extracts have showed effective inhibition against gram negative bacteria such as *Klebsiella pneumonia*, *Escherichia coli* and *Pseudomonas fluorescens* when compared to gram positive bacteria like *Bacillus subtilis* and *Streptococcus pyogenes*. In this study, the antibacterial activity clearly showed that the fruit extract of Artabotrys was specific in action against the growth of pathogenic bacteria.

Hence this experimental plant is a promising antimicrobial and further research on isolation of activated compounds can be further carried (Singh *et al*.,2005; Bordoloi *et al*.,2009).

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