

Antimicrobial Activity of alcoholic and ethral stalk extract of plant *Murraya koenigii*

Shiba Morris^{1*}, Arvind Kumar Jha¹, Yashwant Swarnakar¹, Alok Thakur¹
¹Faculty of Pharmaceutical Sciences, Shri Shankaracharya Technical Campus, Bhilai(C.G.), INDIA.

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ABSTRACT

Antimicrobial activity in alcoholic and ethral stalk extract of plant *Murraya koenigii* was tested against various gram positive and gram negative bacteria and fungus such as *Staphylococcus aureus*, *Escherichia coli*, *Aspergillus niger*, *Bacillus subtilis*, *Salmonella typhi* and *Candida albicans*. The result were found that alcoholic extract show more pronounce antimicrobial activity than Pet. Ether extract. Tetracycline (10µg/ml), Streptomycin (2µg/ml) and Fluconazole (2µg/ml) were used as standard drug. Muller Hinton and Saboured Dextrose Broth were used as medium for bacterial and fungal strains respectively and the results were obtained by disc diffusion method [inhibitory zone and activity index].

Key Words: *Murraya koenigii*, *Staphylococcus aureus*, *Escherichia coli*, *Aspergillus niger*, *Bacillus subtilis*, *Salmonella typhi*, *Candida albicans*.

INTRODUCTION

The *Murraya koenigii* plant has been used in traditional Indian medicine for a range of ailments. The whole plant is considered to be a tonic and stomachic. Roots and bark are stimulant and are applied externally for skin eruptions and poisonous bites. Green leaves are febrifuge and used in dysentery [1]. Various parts of *Murraya koenigii* have been used in traditional or folk medicine for the treatment of rheumatism, traumatic injury and snake bite [2]. The plant has anti-inflammatory, anti-asthmatic, antidiabetic and hypocholesterolemic activity. It also possesses anticancer property. It treats diarrhoea and improved gastrointestinal motility. It is a radio protective and chemo protective plant. It can be used in cosmetic formulations as it is an important ingredient in promoting hair growth and acts as natural skin pigment. It has significant antioxidant, cardio protective, hepatoprotective, immunomodulating property [3].

An antimicrobial is a substance that kills or inhibits the growth of microorganisms such as bacteria, fungi, or protozoans. Antimicrobial drugs either kill microbes (microbiocidal) or prevent the growth of microbes (microbiostatic) [4].

The purpose of the present study was to investigate the antimicrobial activity of alcoholic and ethral stalk extract of plant *Murraya koenigii* against human pathogenic bacteria, including *Escherichia coli*, *Staphylococcus aureus*, *Aspergillus niger*, *Bacillus subtilis*, *Salmonella typhi* and *Candida albicans*.

MATERIALS AND METHODS

Selection and extraction of plant:

The plant *Murraya koenigii* was selected for study. Its stalk were collected from local gardens of Bhilai, Chhattisgarh. The collected stalks were identified and authenticated by Dr. A.K.Jha. The completely shade dried material was coarsely powdered and allowed soxhlet for extraction with methanol and petroleum ether (60-80). The obtained liquid extracts were subjected to Rotary evaporator and subsequently concentrated under reduced pressure (in vacuum at 40°C) and evaporated to dryness and stored at 4°C in air tight bottle.

Microorganism:

Various gram positive and gram negative bacteria and

fungus such as *Staphylococcus aureus*, *Escherichia coli*, *Aspergillus niger*, *Bacillus subtilis*, *Salmonella typhi* and *Candida albicans* were used. The microorganisms were obtained from the Department of Microbiology, Shri Shankaracharya Institute of Pharmaceutical Sciences, Bhilai, Chhattisgarh.

Antimicrobial Assay:

Antimicrobial activity was determined by Disc Diffusion method [5]. Muller Hinton and Saboured Dextrose Broth were used as medium for bacterial and fungal strains respectively. [6, 7] Muller Hinton and Saboured Dextrose Broth were seeded with 10⁶ CFU/ml of the bacteria stain respectively.

The standardize Wattmann no. 1 filter paper disc 6mm were impregnated with extract dried and placed aseptically on seeded plate with the help of sterilize forceps latter on these plate were kept at room temperature for pre-diffusion time. The petridishes with the bacterial and fungal cultures were incubated at 37°C for 24 hour and 25°C for 48 hour respectively.

The standard disc 6mm impregnated with antibiotic tetracycline 10µg/ml (as it is the broad spectrum antibiotic used effectively for bacteria and fungus), streptomycin 2µg/ml and fluconazole 2µg/ml used as control.

The diameter of the inhibition zone (mm) is measured and activity index was calculated. The experiment was repeated thrice and the results were taken as mean of three readings [8, 9].

Activity Index:

The activity of Stalk extract of *Murraya Koenigii* was measure by following formula

$$\text{Activity Index} = \frac{\text{Inhibition area of sample}}{\text{Inhibition area of the standard}}$$

RESULT

The Antimicrobial activity of the extracts of *Murraya koenigii* stalk were studied on the basis of Inhibitory zone and Activity index [Table 1 & 2] and was found that alcoholic extract show more pronounce antimicrobial activity than Pet. Ether extract. Among tested bacterial most susceptible stain is *Staphylococcus aureus* which is known to play significant role in skin infection.

In Antibacterial screening, the alcoholic extract show maximum inhibitory effect against Gram positive bacteria *Staphylococcus aureus* [IZ = 17, AI = 0.85, Std. Streptomycin 2µg/ml, IZ = 22, AI = 0.91 Std. Tetracycline 10 µg/ml, MIC = 0.233] and Gram negative bacteria *Escherichia coli* [IZ = 16, AI = 0.66, Std. Streptomycin 2µg/ml, IZ = 21, AI = 0.84 Std. Tetracycline 10µg/ml, MIC = 0.333].

*Corresponding author:

Shiba Morris

Faculty of Pharmaceutical Sciences,
Shri Shankaracharya Technical Campus,
Bhilai(C.G.), INDIA. Mobile No.-09669038816.

*E-Mail: sheeba010606@gmail.com

Antifungal screening the alcoholic extract show max inhibitory effect against *Asperigillus niger*. Fungus *Asperigillus niger*

[IZ = 13, AI = 0.65, Std. Fluconazole 2µg/ml, IZ = 23, AI = 0.76, Std. Tetracycline 10µg/ml, MIC = 0.316].

Table No. 1: Antimicrobial Activity of various extract of *Murraya Koenigii* Stalk using Reference drug Tetracycline

| Treatment | Concentration | Diameter of zone of inhibition [mm] | | | | | |
|---|--------------------------|-------------------------------------|------------------|----------------|-----------------|--------------------|-----------------|
| | | Bacteria | | | | Fungus | |
| | | <i>B. substilius</i> | <i>S. aurius</i> | <i>E. coli</i> | <i>S. typhi</i> | <i>C. calbican</i> | <i>A. niger</i> |
| <i>Murraya Koenigii</i> Pet. Ether extract | 5mg/ml Activity Index | 16 0.72 | 18 0.75 | 17 0.68 | 16 0.64 | 19 0.67 | 21 0.70 |
| <i>Murraya Koenigii</i> Alcoholic Extract | 5mg/ml Activity Index | 18 0.81 | 22 0.91 | 21 0.84 | 20 0.80 | 21 0.75 | 23 0.76 |
| Standard Tetracycline | 10µg/ml | 22 | 24 | 25 | 25 | 28 | 30 |

Table No. 2: Antimicrobial Activity of various extract of *Murraya Koenigii* Stalk using Reference drug Streptomycin and Fluconazole

| Treatment | Concentration 1mg/ml | Bacteria | | | | fungi | |
|---|---|----------------------|------------------|----------------|-----------------|--------------------|-----------------|
| | | <i>B. substilius</i> | <i>S. aurius</i> | <i>E. coli</i> | <i>S. typhi</i> | <i>C. calbican</i> | <i>A. niger</i> |
| <i>Murraya Koenigii</i> Alcoholic Extract | Diameter of zone of inhibition [mm] Activity Index | 11 0.50 | 17 0.85 | 16 0.66 | 15 0.65 | 11 0.57 | 13 0.65 |
| <i>Murraya Koenigii</i> Pet. Ether Extract | Diameter of zone of inhibition [mm] Activity Index | 10 0.45 | 12 0.60 | 13 0.54 | 12 0.52 | 09 0.47 | 10 0.50 |
| Standard Streptomycin | 2µg/ml | 22 | 20 | 24 | 23 | - | - |
| Standard Fluconazole | 2µg/ml | - | - | - | - | 19 | 20 |

DISCUSSION

Many of the existing synthetic drugs cause various side effects. Hence, drug development plant based compounds could be useful in meeting this demand for newer drugs with minimal side effects (Srivastava et al., 2000). The stalk of the plant *Murraya koenigii* possessed good anti microbial activity, confirming the great potential of bioactive compounds and other parts of this plant have been used in traditional or folk medicine for the treatment of various disorders confirming the great potential of bioactive compounds and is useful for rationalizing the use of this plant in primary health care (Parmar et al., 2010).

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