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EVALUATION OF ANTIMICROBIAL ACTIVITY OF CINNAMOMUM TAMALA LEAVES

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ABSTRACT

Indian spices are good source of drug and also show antimicrobial activity due to presence of phytochemicals. The present study was performed to study in vitro antimicrobial activity of methanolic extract of Cinnamomum tamala leaves against selected microbes like Pseudomonas aeruginosa, Staphylococcus aureus, and Escherichia coli. For Pseudomonas aeruginosa (18 mm), the maximum zone of inhibition was observed at 100µg/ml concentration by methanol extract, and for Staphylococcus aureus, (17 mm), the concentration was 100 µg/ml by methanol extract. According to the current research, C. tamala (Tejpat) may be a useful source of herbal medicines, which might help investigate an antibacterial lead that could help fight against diseases caused by harmful bacterial and fungal species.

Key words: Antimicrobial activity C. tamala, Pseudomonas aeruginosa, Staphylococcus aureus, tejpat.

1. INTRODUCTION

The tree of the Lauraceae family, Cinnamomum tamala, also called Indian bay leaf, tejpat, tejapatta, Malabar leaf, Indian bark, Indian cassia, or malabathrum, is indigenous to China, Bangladesh, Nepal, Bhutan, and India. Its maximum height is 20 meters (66 feet) **(Tamsang, 1980).** Its leaves are used in cooking and medicine; they smell like cloves and taste somewhat like pepper. It is believed to have been one of the main sources of the leaves of the medicinal plant known as malabathrum (or malobathrum) in classical and medieval periods. Because of the presence of major phytoconstituents, all parts of the plant contain a number of important bioactive constituents that can be used to treat a variety of illnesses and conditions, including cancer, heart disease, diabetes, anxiety, depression, ulcers, gastrointestinal disorders, and more. They also have a wide range of pharmacological activity, including anti-oxidant, anti-hypercholesterolemia, anti-diarrheal, anti-inflammatory, anti-fungal, and antibacterial properties **(Yadav et al., 1999; Srivastava et al., 2011; Tiwari and Talreja, 2020).** The plant was utilized in ancient times for its therapeutic properties as well as its fragrant qualities. Because of these qualities, it is employed in the pharmaceutical and perfumery industries as a mouth refresher and to help get rid of unpleasant body and mouth odors. The plant's leaves have the ability to provide flavor to food; they are used as a spice and as a flavoring element in pickles, curries, and fast food. Promoting and improving understanding about the utilization of this versatile evergreen plant was the primary goal of this review/study. The antidermatophyte, antibacterial, antifungal, antihyperglycemic, and antihypercholestrolanemic properties of C. tamala essential oil are demonstrated **(Goyal et al., 2009; Yeh et al., 2009).** The following study was performed to study in vitro antimicrobial activity of methanolic extract of C. tamala leaves against selected microbes.

2. MATERIALS AND METHODS

Collection of Sample

The dried leaves of Cinnammum tamala were gathered from Shahjahanpur, Uttar Pradesh, India's local market. It was identified by the head of the department of biotechnology, and it was stored for later use.

Bacterial Cultures

Escherechia coli (NCIM2064), Staphylococcus aureus (NCIM-2079), Pseudomonas aeruginosa (NCIM-5210).

Solvents and Media

Methanol for extraction, Nutrient Agar Nutrient Broth.

Extraction

The dried leaves of Cinnammum tamala were ground into a fine powder and sealed in a bottle. Six grams of powder was finely powdered and put through the conventional Soxhlet apparatus solvent extraction procedure. Following the entire procedure, the extracted materials were allowed to evaporate at room temperature. For later analysis, the dried extracts were kept in storage at 4°C.

Agar Well Diffusion method

Using the Agar well diffusion method, extracts' antibacterial potential was evaluated. First, autoclaved nutrient media were added to Petri plates with laminar airflow. A day later, the media solidified, and a 24-hour-old bacterial suspension was swabbed over the media. The cork borer was used to prepare the wells. The test sample was loaded into the wells and incubated for 24 hours at 37°C after being dissolved in DMSO at various concentrations, including

25, 50, 100, and 40 µg/ml. A positive control was an antibiotic amoxicillin disc containing 10µg of amoxicillin, while DMSO (dimethyl sulfoxide) was used as a negative control.

3. RESULTS AND DISCUSSION

The antimicrobial activity of Cinnamomum tamala was investigated in this study. The antimicrobial activity of the spice extracted in methanol solvents against Pseudomonas aeruginosa, Staphylococcus aureus, and Escherichia coli is displayed in Table 1. For Pseudomonas aeruginosa (18 mm), the maximum zone of inhibition was observed at 100µg/ml concentration by methanol extract, and for Staphylococcus aureus, (17 mm), the concentration was 100 µg/ml by methanol extract. The methanol extract significantly increased the antimicrobial activity of C. tamala against Pseudomonas aeruginosa and Staphylococcus aureus, in the current study. Minimal activity was observed by Escherichia coli against methanol extracts. The findings imply that C. tamala exhibited strong antibacterial activity. As concentration rises, extracts' antimicrobial activity does too. After incubating the tested bacteria for 24 hours, the C. tamala extract demonstrated an inhibition zone diameter ranging from 25 to 15 mm when a higher concentration of methanol extract was used. According to the current research, C. tamala (Tejpat) may be a useful source of herbal medicines, which might help investigate an antibacterial lead that could help fight against diseases caused by harmful bacterial and fungal species.

Table 1: Effect of Cinnamomum tamala leaf extract on growth of bacteria in vitro.

S.No.	Bacterial Strains	Concentration of plant extracts in µg/ml			DMSO Negative Control	Amoxycillin Positive Control
		25	50	100		
		Zone of inhibition in mm				
1	Pseudomonas aeuriginosa	-	12	18	-	25
2	Escherichia coli	-	8	11	-	18
3	Staphylococcus aureus	-	11	17	-	13

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