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EXTRACTION, PHYTOCHEMICAL SCREENING AND *IN VITRO* ANTI-MICROBIAL ACTIVITY OF *CINNAMOMUM TAMALA* EXTRACT

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ABSTRACT

Medicinal plants have been used in healthcare since ancient time. Medicinal plants play dynamic roles in their promotion disease prevention and use fit into all prevailing prevention strategies. There are even more studies and applications of herbal medicine in the treatment of diseases. This study deals with Extraction, Phytochemical screening and in vitro anti-microbial activity of medicinal plant *Cinnamomum tamala*. The plant material was collected & subjected to extraction. Further qualitative, quantitative studies along anti -microbial efficacy of plant extract was checked. The antimicrobial activity of extract was checked by using ciprofloxacin as standard. Results showed that plant extract have % yield of 9.24% Phytochemical tests revealed presence of alkaloids, carbohydrates, flavonoids, phenols, diterpenes, proteins & amino acids while saponins was observed to be absent. The zone of inhibition for ciprofloxacin at 30 µg/ml for *S. aureus* & *C. albicans* was observed to be 35±2.69mm & 26±0.45mm. In case of plant extract zone of inhibition for *S. aureus* & *C. albicans* at 100mg/ml estimated to be 24± 0.95mm, 15± 0.86mm. From the results it can be interpreted that *Cinnamomum tamala* can act as anti-microbial agent with more efficacy against bacteria in comparison to fungus.

Keywords: Herbal Medicine, Extraction, *Cinnamomum tamala*, anti-microbial, Phytochemical.

INTRODUCTION

Despite the fact that pharmaceutical corporations have developed a number of novel antibiotics during the last three decades, microorganism resistance to these medications has increased. Bacteria, in general, have the genetic potential to transmit and acquire resistance to medications used as therapeutic agents. This is cause for concern, given the number of patients in hospitals who have reduced immunity, as well as new multi-resistant bacterial strains. As a result, new infections might emerge in hospitals, resulting in high mortality. Microbial resistance is on the rise, and the future utility of antimicrobial medications remains unknown. As a result, steps must be done to address this issue, such as limiting antibiotic use, conducting research to better understand the genetic underpinnings of resistance, and continuing studies to create new antibiotics, both synthetic and natural. The ultimate goal is to provide patients with appropriate and efficient antibacterial medicines (Hart and Kariuki, 1998; Acar and Rostel, 2001). Plants and other natural sources can supply a vast array of complex and structurally diverse chemicals.

Many researchers have recently concentrated on the study of plant and microbial extracts, essential oils, pure secondary metabolites, and newly synthesised compounds as possible antibacterial agents. Human cultures have been in intimate contact with their environs since their inception, and have utilised environmental components to get food and medicine. Through trial and error, humans learned to recognise and use plants to create food and medicine, and they gradually learned to meet their requirements from their surroundings. With the construction of civilizations and the supply of more facilities, human understanding has gradually grown complete with the transmission of information about medicinal plants from generation to generation (Chanda, 2014; Farnsworth and Soejarto 1991).

Medicinal plants are employed as a source of medicine in practically every culture. Assuring the safety, purity, and efficacy of medicinal plants and herbal medications has only recently emerged as a critical concern in both developed and developing countries. Herbal medications can aid the creation of a new age of the healthcare system to cure human ailments in the future by standardising and evaluating the health of active plant-derived chemicals. Traditional knowledge and medicinal plants awareness can play an important role in the exploitation and discovery of natural plant resources (Hammer *et al.*, 1999; Sen and Batra, 2012).

Cinnamomum tamala is one such plant. Yunani, the ancient Ayurvedic text, reveals therapeutic use of this herb in the first century A.D. Cinnamomum, cinnamon bark, essential oils, and bark powder demonstrated antioxidant, anti-diabetic, anti-inflammatory, anticancer, and antibacterial potential. Mosquito larvae and fire ants have been proven to be poisonous to *C. tamala* essential oil. It has also been shown to be effective in the treatment of Alzheimer's disease, diabetes, arthritis, arteriosclerosis, cancer, and inflammatory, cardioprotective, and neurological illnesses. Thus this study aims at analyzing antimicrobial activity of *Cinnamomum tamala* (Shah and Panchal, 2010; Sharma and Nautiyal, 2011).

MATERIALS AND METHODS

Collection of Plants

The leaves of *Cinnamomum tamala* were collected from Akshat nursery Karond, Bhopal in the period of March 2022,

Method

Extraction (By Maceration Method)

Powdered plant drugs were weighed (28 gm) and packed in (1 liter) air tight glass Bottle. The plant drugs were subjected to extraction by Methanol as solvents for about 24 hrs. The liquid extract was collected in a tarred conical flask. The solvent removed from the extracts by evaporation method using hot plate (Yahya *et al*., 2018).

Preliminary Phytochemical Screening

In order to detect the various constituents present in the methanolic extracts of leaves of *Cinnamomum tamala,* were subjected to the phytochemical tests as per standard methods.

In vitro antimicrobial activity of *Cinnamomum tamala*

The agar medium was dissolved in distilled water and boiled in conical flask of sufficient capacity. Dry ingredients are transferred to flask containing required quantity of distilled

water and heat to dissolve the medium completely.

Sterilization culture media

The flask containing medium was cotton plugged and was placed in autoclave for sterilization at 15 lbs /inch^2 (121^{o}C) for 15 minutes.

Preparation of plates

After sterilization, the media in flask was immediately poured (20 ml/ plate) into sterile Petri dishes on plane surface. The poured plates were left at room temperature to solidify and incubate at 37^{o}C overnight to check the sterility of plates. The plates were dried at 50^{o}C for 30 minutes before use (Baskaran *et al*., 2012).

Table 1: Extractive values obtained from *Cinnamomum tamala*

S.N.	Solvent	% Yield
1.	Water	9.24%

Table 2: Preliminary phytochemical screening of *Cinnamomum tamala*

S.N.	Phytoconstituents	Test Name	Methanolic extract
1	Alkaloids	Mayer's Test	**+ve**
		Dragendorff's Test	**+ve**
2	Carbohydrates	Molisch's Test	**+ve**
		Fehling's Test	**+ve**
3	Flavonoids	Lead acetate	**+ve**
		Shinoda Test	**+ve**
4	Proteins & Amino acids	Biuret Test	**+ve**
		Precipitation test	**+ve**
5	Phenols	Ellagic Acid Test	**+ve**
6	Diterpenes	Copper acetate test	**+ve**
7	Saponins	Foam test	**-ve**

+ve=Positive; -ve= Negative

Table 3: Antimicrobial activity of standard drug against selected microbes

S. No.	Name of drug	Microbes	Zone of Inhibition		
			10 µg/ml	20 µg/ml	30 µg/ml
1.	Ciprofloxacin	*S. aureus*	18±3.71	26±1.24	35±2.699
		Candida albicans	15±0.86	20±0.36	26±0.45

Table 4: Antimicrobial activity of *Cinnamomum tamala* against selected microbes

S. No.	Name of microbes	Zone of inhibition		
		25mg/ml	50 mg/ml	100mg/ml
1.	**Methanolic extract**			
	S. aureus	10± 0.86	21± 1.24	24± 0.95
	Candida albicans	8± 0.86	12± 1.28	15± 0.86

RESULTS AND DISCUSSION

The yields were found to be (9.24 % w/w of crude drug) of methanolic extract *Cinnamomum tamala* leaves. The methanolic extract of *Cinnamomum tamala* revealed the presence of alkaloids, carbohydrates, flavonoids, phenols, diterpenes, proteins & amino acids and saponins were absent. The results of anti-microbial activity showed that the methanolic extract of *Cinnamomum tamala* was found to be active against *Staphylococcus aureus* and *Candida albicans* and all were compared with controls.

CONCLUSION

The phytochemical study of methanolic extract of *Cinnamomum tamala* plant extract was studied, and it was discovered that the extract included a number of phytoconstituents. The results of the study indicated that *Cinnamomum tamala* leaf extracts have a strong antibacterial capability against gramme negative bacteria, gramme positive bacteria, and a fungus. The findings show that the plant could be regarded as a promising alternative for the creation of efficient and effective drugs from natural sources for the treatment of infectious disorders. The most effective extracts could be subjected to further pharmacological evaluation by isolating therapeutic antimicrobials, and additional research on this plant could specify its pharmaceutical application.

DECLARATION OF INTEREST

The authors declare no conflicts of interests. The authors alone are responsible for the content and writing of this article.

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