



COMPARISON OF ANTIMICROBIAL ACTIVITY OF LEAF AND FLOWER EXTRACT OF *COUROUPITA GUIANENSIS* AGAINST GRAM POSITIVE BACTERIA (*STAPHYLOCOCCUS AUREUS*)

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ABSTRACT

Objective: This study aim's in dealing with the comparative study of Antimicrobial activity of leaf and flower extracts of *Couroupita guianensis* (family: Lecythidaceae) against *staphylococcus aureus*.

Methods: The Antimicrobial activity of leaf and flower extracts of *Couroupita guianensis* against *staphylococcus aureus* were determined by Agar well diffusion method.

Results: Outcome of the study suggest the plant as a good antimicrobial drug against gram positive bacteria (*Staphylococcus aureus*).

Conclusion: The antimicrobial activity of leaves and flower extract of *Couroupita guianensis* was assessed against human pathogenic bacteria like *S. aureus*. The result shows that both the extracts have shown satisfactory antimicrobial activity.

Keywords: *Couroupita guianensis*, Lecythidaceae, Agar well diffusion

INTRODUCTION

The evolution of human culture has depended greatly on the use of medicinal herbs. Traditional medicine plays an important role in improving and maintaining good health in developing countries and it also find applications in pharmaceutical, cosmetic, agricultural and food industry. Plants are valued as natural healers by the ancient people as it has an important position in their livelihood. Traditionally used medicinal plants have recently attracted the attention of scientific and pharmaceutical communities because of its effectiveness in managing multidrug resistant bacterial strains. Rich knowledge on medicinal plants have been observed after experimenting

through many centuries and this lead to the development of various indigenous system of medicines. Research is the systematic investigation and study of materials and sources in order to establish facts and reach new conclusion.It entails gathering, organising, and analysing data in order to better comprehend a subject.

Anti-microbial medications are crucial for lowering the incidence of infectious diseases. The rise of multidrug resistant (MDR) strains of pathogenic bacteria, however, has significantly increased the risk to the public's health. Numerous medicinal plants are now known to be excellent suppliers of organic antimicrobial agents. To find new antimicrobial compounds from plants, numerous efforts have been conducted.

Lecythydaceae family member *Couroupita guianensis*, Other names for it include Ayahuma, Nagalinga pushpam, and Cannonball Tree (Ayurveda). It is a deciduous tree that is native to tropical forests in Central and South America and is grown in many other tropical regions throughout the world. Different portions of *Couroupita guianensis* have a variety of medical purposes, and the tree is well-known in india for its cultural and religious significance. Native Amazonians from the Amazonian region and neighbouring states in Brazil's north use infusions or teas made from the *Couroupita guianensis* plant's leaves, flowers, and bark to cure hypertension, tumours, pain, and inflammatory processes.The tree has whorled leaves at the ends of its shoots and grows to a height of 30 to 35 m. Orange, crimson, or pink blooms with racemes up to 3 metres long are exclusively produced on specific stems on the main trunk. They develop into substantial fruits, which are where the common name "cannon ball tree" comes from. They are woody, spherical fruits with a diameter of 15–24 cm and 200–300 seeds per fruit. Due to the sulphur compounds in the fruits, the pulp of the fruits oxidises to a foul-smelling bluish-green when exposed to air. The fruit is covered in tiny seeds.

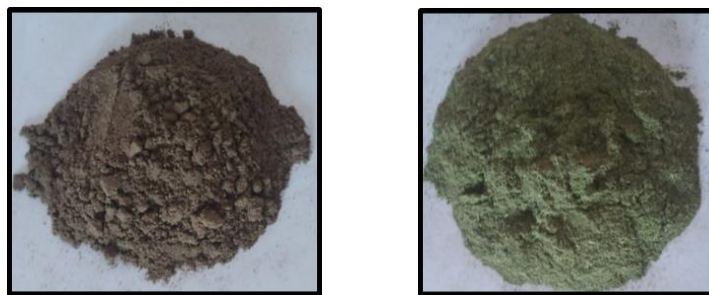


Couroupita guianensis

The Cannonball tree has analgesic, antibacterial, antifungal, and antibiotic properties. The trees are used to treat stomach aches and colds. It has been noted that the leaves, flowers, fruits, stem, roots, and seeds of *Couroupita guianensis* contain a variety of chemical components including isatin, alkaloids, saponins, phenol, and terpenes.

PLANT COLLECTION

The fresh leaf and flowers of *Couroupita guianensis* were collected from St. Thomas College, Kozhencherry, Kerala. They were washed separately to remove foreign matter and dried separately by shade drying method. The drying of fresh leaves were carried out under natural airflow, and surrounding temperature (25°C)for 240 hours(10 days) and the flowers were dried under natural airflow for 120 hours (5 day). After drying, the dried leaves and flowers were ground into fine powders by grinding machine separately and the powders are stored at room temperature.



Powdered sample of leaf and flower of *Couroupita guianensis*

EXTRACT PREPARATION

According to our analysis, we found Hydroalcoholic solvent is the most suitable solvent for extraction. About 350g of powdered leaf and 100g of powdered flower were macerated separately with 70% methanol and 30% water in a container. The container is then closed and kept for about three days. The content is stirred periodically. After three days filtration is done and the micelle is separated from the marc, the micelle is then separated from the menstrum by evaporation in an hot air oven. Both the extract leaf extract (CgL) and flower extract (CgF) of *Couroupita guianensis* were stored separately.



leaves and flower extracts of *Couroupita guianensis* [(CgL),(CgF)]

ANTIMICROBIAL ACTIVITY

Antimicrobial Activity of leaves extract of *Couroupita guianensis*

Agar well diffusion method

Preparation of media: Nutrient Agar media: Accurately weighed 28g of nutrient agar was dissolved in the 1000 ml of distilled water by heating with frequent agitation. The media was finally sterilized in autoclave at 121⁰ C for 15 min.

Microorganism: *Staphylococcus aureus*

Standard antibiotic: Ciprofloxacin

Microorganism like *Staphylococcus aureus* was selected to test the leaves extract of *Couroupita guianensis* ability to inhibit the growth of microorganism .

In order to assess the antimicrobial activity of plant or microbial extracts, the agar well diffusion method is frequently utilised. A volume of the microbial inoculum is dispersed throughout the entire agar surface to inoculate the agar plate. Then, a hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork borer

or a tip, and a volume (20–100 µl) of the CgL extract solution at desired concentration is introduced into the well. The test microorganism is then placed on an appropriate agar plate, and the incubation process is continued. The studied microbial strain's growth is inhibited by the antimicrobial agent as it diffuses in the agar media. The zone of inhibition of bacterial growth by the test solution was compared with the zone of inhibition by the standard ciprofloxacin.

Antimicrobial Activity of flowers extract of *Couroupita guianensis*

Agar well diffusion method

Preparation of media: Nutrient Agar media: Accurately weighed 28g of nutrient agar was dissolved in the 1000 ml of distilled water by heating with frequent agitation. The media was finally sterilized in autoclave at 121⁰ C for 15 min.

Microorganism: *Staphylococcus aureus*

Standard antibiotic: Ciprofloxacin

In order to assess the antimicrobial activity of plant or microbial extracts, the agar well diffusion method is frequently utilised. Microorganism like *Staphylococcus aureus* was selected to test the flowers extract of *Couroupita guianensis* ability to inhibit the growth of microorganism .

A volume of the microbial inoculum is dispersed throughout the entire agar surface to inoculate the agar plate. Then, a hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork borer or a tip, and a volume (20–100 µl) of the CgF extract solution at desired concentration is introduced into the well. The test microorganism is then placed on an appropriate agar plate, and the incubation process is continued. The studied microbial strain's growth is inhibited by the antimicrobial agent as it diffuses in the agar media. The zone of inhibition of bacterial growth by the test solution was compared with the zone of inhibition by the standard ciprofloxacin.

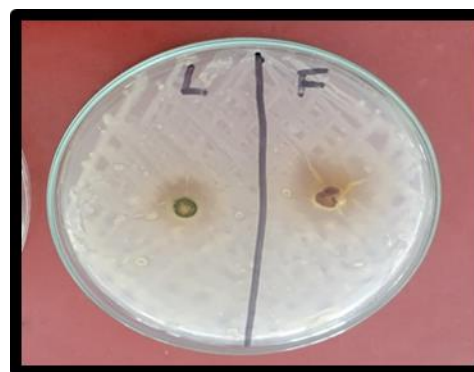
OBSERVATION AND RESULTS

The increase of microbial resistance to antibiotics threatens public health on a global scale as it reduces the effectiveness of treatments and increases morbidity, mortality and health care costs. The use of more recent generations of antibiotics has been hindered by the evolution of highly resistant bacterial strains. .

The methanolic extract of CgL and CgF extract were screened against standard antibiotic ciprofloxacin to check the antibacterial activity by well diffusion method which showed valuable zone of inhibition.



Zone of inhibition of standard and control



Zone of inhibition of leaf and flower extract of *Couroupita guianensis*

Microorganism	Zone of inhibition			
	Standard	control	leaves	flowers
Staphylococcus aureus	24mm	nil	16mm	20mm

Zone of inhibition of leaves and flower extract of *Couroupita guianensis*

Result: CgL and CgF were tested against *Staphylococcus aureus* using methanol as negative control and ciprofloxacin as positive control. Both the extracts have shown satisfactory antimicrobial activity.

CONCLUSION

The antimicrobial activity of leaves and flower extract was evaluated by well diffusion method against *Staphylococcus aureus*. The outcomes of the antimicrobial activities of leaves and flower extracts of *C. guianensis* suggest that the plant may have the potential for discovery of new antimicrobial components. The present study concludes that CgF has much prominent antibacterial property than CgL against standard.

Plant based antimicrobials have lesser side effects and are boon for the development of traditional medicinal system. Hence when the antimicrobial activity of leaves and flower extract of *Couroupita guianensis* was accessed against human pathogenic bacteria like *S. aureus*. The results exhibited the flower extract with more antimicrobial action than leaves extract when compared with the standard. The present attempt provides information which may generate interest among researchers to explore such natural resources.

ACKNOWLEDGMENTS

We are thankful to Department of Microbiology and Management of Nazareth College Of Pharmacy, Othara, Thiruvalla for the constant help and support.

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