

A Study on the Antimicrobial Activity of the Different Stages of Leaves of *Camellia sinensis* of Assam against *Staphylococcus aureus*

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Abstract: A large number of plant species are potential sources of secondary metabolites and antimicrobial activity. From the ancient time plant extracts has been using for treating various infections and as we know that the state Assam is one of the most popular states in India for its tea plantation, lots of efforts are made to investigate the presence of secondary metabolites and antimicrobial activity of *Camellia sinensis* (Tea) of Assam in the current study. In this study we have taken two stages of tea leaves, mature and immature. First we have evaluated the presence of secondary metabolites by qualitative test method for both the tea samples. For this test we have prepared water extract and tested for the presence of Tannins, Phlobatannin, Saponins, flavonoids, Terpenoids and Cardiac glycosides. Here we have found positive results for all the secondary metabolites of given samples. This result has encouraged us to further investigate for the antimicrobial activity of given samples. Then methanolic extracts have been prepared using soxhlet apparatus and analyzed for antimicrobial activity against *Staphylococcus aureus* by agar well diffusion method. *Staphylococcus aureus* is a gram positive bacterium found in human respiratory tract and on the skin. The result has showed that both the samples having promising antimicrobial activities against *Staphylococcus aureus*. The antimicrobial activities of samples were determined by measuring the zone of inhibition in millimeter. The mature leaves showed maximum zone of inhibition (9mm) followed by immature leaf (6mm). This study has revealed the anti microbial potentiality of both mature and immature tea leaves. As tea is easily available in Assam, so this idea could be adopted by the pharmaceutical and medicinal industry of Assam and we believe it would be beneficial for our society.

1. INTRODUCTION

Plant extract has been used as herbal medicine from the ancient times. In India there are lots of plants which have high potential sources of secondary metabolites and antimicrobial activity [1]. As we know that the state Assam is

one of the most popular states in India for its tea plantation. [2] That is why we have chosen *Camellia sinensis* (Tea) of Assam as our sample plant and we put our effort to investigate the presence of secondary metabolites and antimicrobial activity of different stages of *Camellia sinensis* (Tea) of Assam. From the previous studies it was found that the Tea was most widely used beverages and it contains large number of phytochemicals which were very potential for human health[3-5]. In this study we have focused on the qualitative estimation of the phytochemicals and antimicrobial activity against *Staphylococcus aureus* by agar well diffusion method [6]. *Staphylococcus aureus* is a gram positive bacterium found in human respiratory tract and on the skin causes various infections. [14] So our aim of this study was to evaluate antimicrobial activity of tea leaves *Staphylococcus aureus*.

2. MATERIALS AND METHODS

Tea samples

Mature leaves, immature leaves were collected from Hathikuli Tea Estate of Assam. The leaves were then washed properly under running tap water and then rinsed in distilled water. Then we dried the leaves under shade for up to fifteen days and grinded to powdered form using a sterile electric grinder. The powered samples were stored in airtight glass container for further use.

Preparation of Methanolic Extract

Methanolic extracts were prepared by dissolving 20 gm of each powered samples in 100 ml methanol by using Soxlet apparatus for 10 hrs. The extracts were filtered and then solvent was evaporated by rotary evaporator.

Preparation of Aqueous extract of different plant parts

The aqueous extract of each plant sample was prepared by soaking 20g of powdered samples in 100ml of distilled water for 12 hrs in a sterile conical flask. The extracts were filtered using Whatman filter paper No. 1 and dried in oven.

Inoculums Preparation

Staphylococcus aureus species were collected from local hospital of Guwahati. The culture was maintained on agar slant and kept in refrigerators for further use. Then the culture was maintained in nutrient broth for 24hr.

Qualitative test

Phytochemical test were conducted on the aqueous extract as well as powder extract of plant samples described by Krishnaiah et.al. (2009). [10]

Agar well diffusion method

Antimicrobial activity was screened by agar well diffusion method. 15ml of Muller Hinton (sterilised) agar was poured into the sterilised petriplates. 100 µl of 24 hr broth culture pour into each of the petriplates and then spread the inoculums using glass spreader. Then small well of 3-5 mm diameter was cut in the middle of the each petriplates and filled the each well with 100µl methanolic plant extract. Then we kept in incubator for 24- 48 hrs. [11-13]

3. RESULT

Qualitative test

For result of qualitative test (see table 1).

Antimicrobial activity

Many plants have potential antimicrobial activity. Among those tea is one of them. Here we evaluated antimicrobial activity of two samples viz: mature leaves and immature leaves. The antimicrobial activities of samples were determined by measuring the zone of inhibition in mm. The mature leaves showed maximum zone of inhibition (9mm) followed by immature leaf (6mm) (see figure 1).

“Table: 1 Qualitative Test”

TESTS	IMMATURE LEAF	MATURE LEAF
Tannins	Positive	Positive
Phlobatannin	Positive	Positive
Saponins	Positive	Positive
Flavonoids	Positive	Positive
Terpenoids	Positive	Positive
Cardiac glycosides	Positive	Positive



Figure1. Zone of inhibition showing mature leaf extract against *Staphylococcus aureus*

4. CONCLUSION

Plants have been used for medicinal purpose from ancient time. Previous studies also said that tea extracts were beneficial for our health [3-5]. The aim of the present study was to find out potentiality of tea leaves. Here we took two stages of tea leaves, mature and immature leaves. Here first we found the presence of different phytochemicals in both the samples. Then we evaluated the antimicrobial activity of tea leaves against *Staphylococcus aureus*. We know that *Staphylococcus aureus* causes some major infection in human body [14]. Our result was that the mature leaves showed maximum zone of inhibition (9mm) followed by immature leaf (6mm). Since both the samples showed good potentialities against microorganism, so we can conclude that mature and immature leaves could be use in future for medicinal preparation. We hope that this idea would be beneficial for pharmaceutical industry of Assam and with this idea we want to help our society. We would try to find out antimicrobial activity against other microbes also.

5. REFERENCE

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