



PRELIMINARY PHYTOCHEMICAL ANALYSIS AND ANTIMICROBIAL ACTIVITY OF PLECTRANTHUSAMBOINICUS

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ABSTRACT

Aim: To determine the anti-bacterial activity of Coleus ambonicus on selected oral microbes.

Objective: The objective of this study was to find the efficiency of extract of Coleus ambonicus when tested on selected oral microbes.

Background: Due to its inherent botanical and biochemical complexity, standardization of the active components of Coleus ambonicus so far is very complex. Different parts of Coleus ambonicus e.g. leaves, flowers, stem, root, seeds etc. are known to possess therapeutic potentials and have been used, by traditional medical practitioners, as expectorant, analgesic, anticancer, antiasthmatic, antiemetic, diaphoretic, antidiabetic, antifertility etc.

Reason: As Coleus ambonicus has a widespread uses like anti bacterial, anti fungal, anti oxidant properties it appears to be a suitable alternative to manage conditions affecting the oral cavity.

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INTRODUCTION

Since ages, plants have been an embryonic source of medicine that has continued to play a dominant role in the maintenance of human health. It is estimated that 70% to 80% of the people world wide rely chiefly on traditional health care system and largely on herbal medicines[1-4]. They have been used from time immemorial to heal various ailments. A renewed interest in developing an alternate therapy was spurred by a variety of bioactive compounds that are present in different parts of a plant. The traditional herbal medical system has been practiced globally from ancient times; consequently, a great volume of literature is available on the antimicrobial activity of a variety of plant species. A world wide great concern has been the multidrug resistance among the microbial pathogens. Phytochemicals from plants have shown great promise in the treatment of intractable infectious human diseases including viral infections (Cowan, 1999) [5]. Plants are rich in a variety of secondary metabolites such as tannins, terpenoids, alkaloids, flavonoids, phenols, steroids, glycosides and volatile oils.[6] Medicinal plants represent a rich source of antimicrobial agents. Plectranthusamboinicus is one amongst them. It was once identified as Coleus amboinicus [mine], belonging to the family Lamiaceae with

an oregano-like flavor and odor. This herb is native to East Indies and is widely cultivated in Africa and almost all tropical countries. [7] These leaves have many traditional medicinal uses, especially for the treatment of coughs, sore throats and nasal congestion, but also for a range of other problems such as infections, rheumatism and flatulence. The plant is also being used to treat malarial fever, hepatopathy, renal and vesical calculi, cough, chronic asthma, hiccup, bronchitis, helminthiasis, colic, convulsions, and epilepsy, [8] Shenoy and others like skin ulcerations, scorpion bite, skin allergy, wounds, diarrhoea, with emphasis on the leaves being used as a hepatoprotective, to promote liver health. It has been reported to exhibit antilithiotic [9], chemopreventive [10], antiepileptic [11] and antioxidant properties [12].

Methanolic leaf extract of Coleus amboinicus leaves showed remarkable antibacterial activity against methicillin resistant Staphylococcus aureus (MRSA) (Sahgal *et al.*, 2009). It is presumed that drugs developed from plant sources may have minimal and very slow to induce drug resistance among the pathogens. From this perspective, it is imperative to screen a variety of plants with potential antimicrobial activity for periodical introduction to manage the drug resistance among the human pathogens[5]. Therefore, the aim of the present study was to screen the most important antimicrobial activity of extracts of coleus amboinicus against some selected microorganisms and its phytochemical analysis.

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MATERIALS AND METHOD

Preliminary phytochemical screening

Materials: Crude extract of *Plectranthusambonicus* was obtained. The Bacterial strains used were *E. coli*, *Pseudomonas aeruginosa*, *Klebsiellapneumoniae* and *Staphylococcus aureus*. The organisms were obtained from Department of Microbiology, Saveetha Dental College and Hospitals. Preliminary phytochemical screening and quantification of pholobatannins, treponoids, flavonoids, alkaloids and reducing sugar were evaluated using standard method.

METHODOLOGY

Agar well diffusion method

Broth culture of the test organisms compared to Mac Farland's standard 0.5 were prepared. Lawn culture of the test organisms were made on the Muller-Hinton agar [MHA-M1084] plates using sterile cotton swab and the plates were dried for 15 minutes. Well measuring 4 mm depth was made on the agar with sterile cork borer. 100µl of the extract were added to the wells. 0.2% of Chlorohexidine was used on the positive control. The plates were incubated overnight and the zone of inhibition of growth was measured in mm diameter. All the test were done in triplicate to minimize the test error. [13]

RESULTS

The investigation on antimicrobial activity of *Plectranthusambonicus* against one gram positive cocci, *Staphylococcus aureus* (Fig1) and another three gram negative bacilli, *E. coli* (Fig2) *Klebsiellapneumoniae* and *Pseudomonas aeruginosa* (Fig3) was done by agar well diffusion technique. The zone of inhibition of the four bacterial strains along with control is recorded and tabulated in Table 1 [13]. The extract showed maximum activity against *klebsiella pneumonia* with a zone of inhibition measuring 26mm diameter. A Preliminary phytochemical screening and quantification of pholobatannins, treponoids, flavonoids, alkaloids and reducing sugars were evaluated using standard method. The result of the



Fig1 zone of inhibition in *staphylococcus aureus*



Fig 2 zone of inhibition in *E.coli*

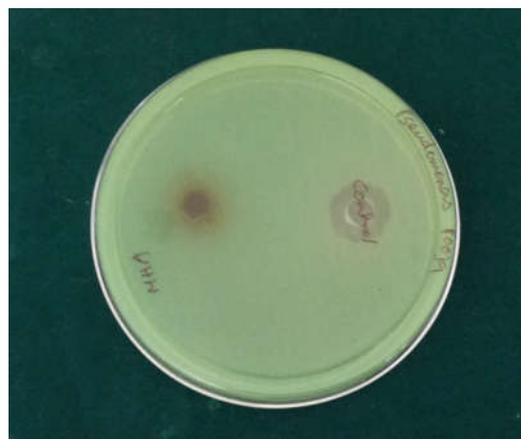


Fig 3 zone of inhibition in *Pseudomonas aeruginosa*

Table 1 Zone of inhibition in mm diameter

	E1	E2	E3	E4
<i>Plectranthusambonicus</i>	18mm	22mm	20mm	26mm
Chlorohexhidine	19mm	21mm	20mm	25mm

Table 2 Preliminary phytochemical screening

Preliminary phytochemical screening	Results
Pholobatannins	Negative
Treponoids	+++
Flavonoids	++
Alkaloids	++
Reducing sugar	++

DISCUSSION

In the present investigation, crud extracts of *Plectranthusambonicus* was evaluated for exploration of their antibacterial activity against certain Gram-positive and Gram-negative bacteria, which was regarded as human pathogenic microorganism. A significant proportion of pharmaceutical products in current use are designed from plants [14,15]. The medicinal properties of the plant could be attributed to the presence of one or more of the detected plant natural products [16, 17]. The Phytochemical screening and quantitative estimation of the crude yields of chemical constituents of the plants showed that the leaves were rich in alkaloids, flavonoids, trepenoids and reducing sugar [7]. But terpenoids are considered to be the significant compound for the antimicrobial and antioxidant activities observed by many *Plectranthus* species [18]. Classes of alkaloids are among the major powerful poisons known [19]. Apart from being

poisonous, some alkaloids have also been proved to be useful in correcting renal disorders [20]. The inhibitory effect of *Plectranthusamboinicus* thanolic leaf extract, particularly *S. aureus* showed the fact that this plant may be effective in scalp disorders, skin disorder, throat infections which are frequently caused by *S. aureus*. It has been traditionally used as a medicine for the treatment of common cold and sore throats. From the result obtained, it shows that the antibacterial activity of all the extracts is more significant activity on Gram-positive strains, because Gram-negative bacteria were reported to be less susceptible to the action of antibacterial activity, since they possess an outer membrane surrounding the cell wall, which restricts diffusion of hydrophobic compounds through its lipopolysaccharide covering [21, 22].

CONCLUSION

From the obtained results the various microbial activity of the crude leaf extract of *Plectranthusamboinicus* against certain selected microbes like *Staphylococcus aureus* and another three gram negative bacilli, *E. coli*, *Klebsiellapneumoniae* and *Pseudomonas aeruginosawas* determined. The crude extract of the leaves are rich in phytochemicals and secondary metabolites such as steroids, alkaloids, terpenoids, flavonoids and tannins, these compounds may have direct interactions with the bacterial strains as antibacterial substances. Hence this shows the possibility of using *Plectranthusamboinicus* as a natural source for herbal treatments without an issue of side effects.

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