



ANTIBACTERIAL ACTIVITY OF PLECTRANTHUS AMBONICUS ON SELECTED ORAL MICROBES

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ARTICLE INFO

Article History:

Received 11th January, 2017

Received in revised form 19th February, 2017

Accepted 22nd March, 2017

Published online 28th April, 2017

Key words:

Plectranthus ambonicus, Indian borage, antibacterial, oral microbes, agar well diffusion method.

ABSTRACT

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

Methods: The investigation was done by Agar well diffusion method.

Result: *Plectranthus ambonicus* has antibacterial activity against *Streptococcus mutans* showing a zone of inhibition of 27mm, which is the major initiator of dental caries. It also has inhibitory effect against *Enterococcus faecalis* and *Lactobacillus acidophilus*.

Conclusion: The extract *Plectranthus ambonicus* showed a significant antibacterial activity. Detailed study on pharmacological activities such as anti-inflammatory study and others on this plant is needed for future health care product formulations like mouthwashes and toothpastes.

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INTRODUCTION

Plant oils and extracts have been used for a wide variety of purposes for many thousands of years [1]. Natural products are a major source of new natural drugs and their use as an alternative medicine for treatment of various diseases has been increased in the last few decades. Oral diseases, including caries and periodontal disease, are especially of concern to public health, where they affect a large part of the population, leading dental professionals to seek alternatives for their control. Medicinal plants represent a rich source of anti-bacterial agents which can be used to control oral diseases. *Plectranthus ambonicus* is one amongst them. Indian borage (*Plectranthus ambonicus* Benth), also known as country borage, is a medicinal plant used widely in Indian medicine. It is a succulent, aromatic, perennial herb belonging to the family *Lamiaceae*, and decoction of its leaves is used for several medicinal purposes (2). The leaf of *Plectranthus ambonicus* has many medicinal uses, especially for the treatment of common illnesses such as of cough, stomachache, headache, skin infection, asthma and urinary conditions (3). The plant extracts especially the volatile essential oils from the leaves have been reported to possess antioxidant, antibacterial, antimicrobial, anti-inflammatory and fungi-toxic activities (4) but due to the geographical region and variety, the activity and composition of essential oils may vary.

Therefore, it is important to access the local *Plectranthus ambonicus* to screen the potential biological activity especially antimicrobial properties and volatile components of the plant. The objective of this work was to evaluate the antibacterial activity of the essential oil of *Plectranthus ambonicus*, a plant used by the local population for the treatment of diseases of the oral cavity against *Streptococcus mutans*, *Enterococcus faecalis* and *Lactobacillus acidophilus*.

MATERIALS AND METHODS

Test microorganisms

Bacterial strains used were *Streptococcus mutans*, *Enterococcus faecalis* and *Lactobacillus acidophilus*. The organisms were maintained in nutrient agar slope at 4°C in department of Microbiology, Saveetha Dental College. The crude extract of *Plectranthus ambonicus* was dissolved in distilled water in following concentrations 2.5mg/ml, 5mg/ml and 10mg/ml so that 100µl delivers 250µg/ml, 500µg/ml and 1000 µg/ml respectively.

Screening of antibacterial activity [Agar well diffusion technique]

Broth culture of the bacterial strain compared to MacFarland's standard ^[5,6]0.5 was prepared. Lawn culture of the test organisms were made on the Muller Hinton agar [MHA-Hi media M1084] plates using sterile cotton swab and the plates were dried for 15 minutes. Wells measuring 4mm depth were cut on the plate with sterile cork borer. 100µl of the different concentrations of the extract were filled in the wells on the respective plates. The plates were incubated at 37°C

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overnight and the zone of inhibition of growth was measured in millimetres. All the tests were done in triplicate to minimise the test error.(7-11)

RESULTS AND DISCUSSION

The investigation on the antibacterial activity of *Plectranthus ambonicus* against *Streptococcus mutans*, *Enterococcus faecalis* and *Lactobacillus acidophilus* tabulated in table 1 and fig 1



Fig 1 Zone of inhibition of *Enterococcus faecalis*

Table 1 Zone of inhibition in mm diameter

	Zone of Inhibition In Mm Diameter		
	E1	E2	E3
<i>Plectranthus ambonicus</i>	20mm	25mm	21mm
Chlorohexidine	25mm	27mm	26mm

E1 – *Enterococcus faecalis*; E2- *Streptococcus mutans* ; E3- *Lactobacillus acidophilus*

From the above results it is evident that *Plectranthus ambonicus* has antibacterial activity against *Streptococcus mutans* showing a zone of inhibition of 27mm, which is the major initiator of dental caries. It also has inhibitory effect against *Enterococcus faecalis* and *Lactobacillus acidophilus*. Medicinal plants are believed to be important source of new chemical substances with potential therapeutic effects. The secondary metabolites of plants were found to be source of various phytochemicals that could be directly used as intermediates for the production of new drugs. The use of herbs in dentistry should be based on evidence of effectiveness and safety. The present study has shown the antibacterial activity of *Plectranthus ambonicus* extract on the oral microbes tested. Anti-bacterial activities could be enhanced if active components are purified and adequate dosage determined for proper administration.

CONCLUSION

The extract *Plectranthus ambonicus* showed a significant antibacterial activity. Detailed study on pharmacological activities such as anti inflammatory study and others on this plant is needed for future health care product formulations like mouthwashes and toothpastes. The scope for drug development from this plant is endless and there is undoubtedly a call for further research into this area.

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How to cite this article:

Priadarsini T and Geetha R.V (2017) ' Antibacterial Activity Of *Plectranthus ambonicus* On Selected Oral Microbes', *International Journal of Current Advanced Research*, 06(04), pp.3029-3030.

DOI: <http://dx.doi.org/10.24327/ijcar.2017.3030.0170>
