SCREENING OF ANTIBACTERIAL SENSITIVTY OF ESSENTIAL OILS OF CAMPHOR AND CINNAMON

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ABSTRACT:

In the present investigation antimicrobial activity of two different plant essential oils i.e Cinnamon (Cinnamomum zeylanicum) and Camphor (Cinnamomum camphora) oils have been evaluated. After bioassays, most of the essential oils were found susceptible to both Gram-positive bacteria such as Streptococcus sp., Lactobacillus casei and Gram-negative bacteria Niserria sp., Pseudomonas sp.For screening of antimicrobial susceptibility in each essential oil, both positive and negative controls growth inhibition zone diameters. Among the two essential oils cinnamon was found to be bactericidal, as it has shown high growth inhibition zone diameter but camphor didn't show any zone of inhibition.

INTRODUCTION

By the 13th century Essential Oils were being made by pharmacies and their pharmacological effects were described in pharmacopoeias (Bauer, K., D. Garbe, and H. Surburg. 2001) but their use does not appear to have been widespread in Europe until the 16th century, from which time they were traded in the City of London (Crosthwaite, D. 1998). The first experimental measurement of the bactericidal properties of the vapours of EO is said to have been carried out by De la Croix in 1881 (Boyle, W. 1955.). However, in the course of the 19th and 20th centuries the use of EOs in medicine gradually became secondary to their use for flavour and aroma (Guenther, E. 1948).

CURRENT USE OF ESSENTIAL OILS

Individual components of EOs are also used as flavourings, either extracted from plant material or synthetically manufactured (Oosterhaven, K., B. Poolman, and E. J. Smid. 1995). The antibacterial properties of essential oils and their components are exploited in such diverse commercial products as dental root canal sealers (Manabe, A., S. Nakayama, and K. Sakamoto. 1987.), antiseptics (Bauer, K., and D. Garbe. 1985) and feed supplements for lactating sows and weaned piglets (Ilsley, S., H. Miller, H. Greathead, and C. Kamel. 2002).

COMPOSITION OF ESSENTIAL OILS

Steam distillation is the most commonly used method for producing EOs on a commercial basis.

Extraction by means of liquid carbon dioxide under low temperature and high pressure produces a more natural organoleptic profile but is much more expensive (Moyler, D. 1998).The difference in organoleptic profile indicates a difference in the composition of oils obtained by solvent extraction as opposed to distillation and this may also influence antimicrobial properties. This would appear to be confirmed by the fact that herb EOs extracted by hexane have been shown to exhibit greater antimicrobial activity than the corresponding steam distilled Eos (Packiyasothy, E. V., and S. Kyle. 2002). The major components of the economically interesting EOs are summarised by Bauer et al. (Bauer, K., D. Garbe, and H. Surburg. 2001.). Detailed compositional analysis is achieved by gas chromatography and mass spectrometry of the EO or its headspace (Scheffer, J. J. C., and A. Baerheim Svendsen. 1981). EOs can comprise more than sixty individual components (Senatore, F. 1996). Major components can constitute up to 85 % of the EO whereas other components are present only as a trace (Bauer, K., D. Garbe, and H. Surburg. 2001.). The phenolic components are chiefly responsible for the antibacterial properties of EOs (Cosentino, S., C. I. G. Tuberoso, B. Pisano, M. Satta, V. Mascia, E. Arzedi, and F. Palmas. 1999.).

MATERIAL AND METHODS

Essential oils of plants:

The essential oils of Cinnamon (Cinnamomum zeylanicum) and Camphor (Cinnamomum camphora) were collected from a local herb dealers i.e. Tejaswini herbs, bhopal.

Bacterial cultures:

Cultures of four pathogenic bacterial strains each of Streptococcus sp., Lactobacillus casei, Niserria sp., Pseudomonas sp were maintained in nutrient agar media at 37ºC in the laboratory. For activity testing, bacterial cultures were stored at 4ºC and sub cultured after every 8th day in solid agar plates

Screening of antibacterial activity:

Agar disc diffusion method was used for screening of antimicrobial activity of each essential oil. Bacterial inoculum was spread evenly on to the surface of each agar plate with sterile rubber pad spreader and with the help of punching machine wells are prepared.100 microlitres of essential oils of all the plants are poured in respective plates. Sterile distilled water was used as negative control. All treated and untreated plates were incubated for 24 h at 37 ºC and size of inhibition zone diameters were measured.

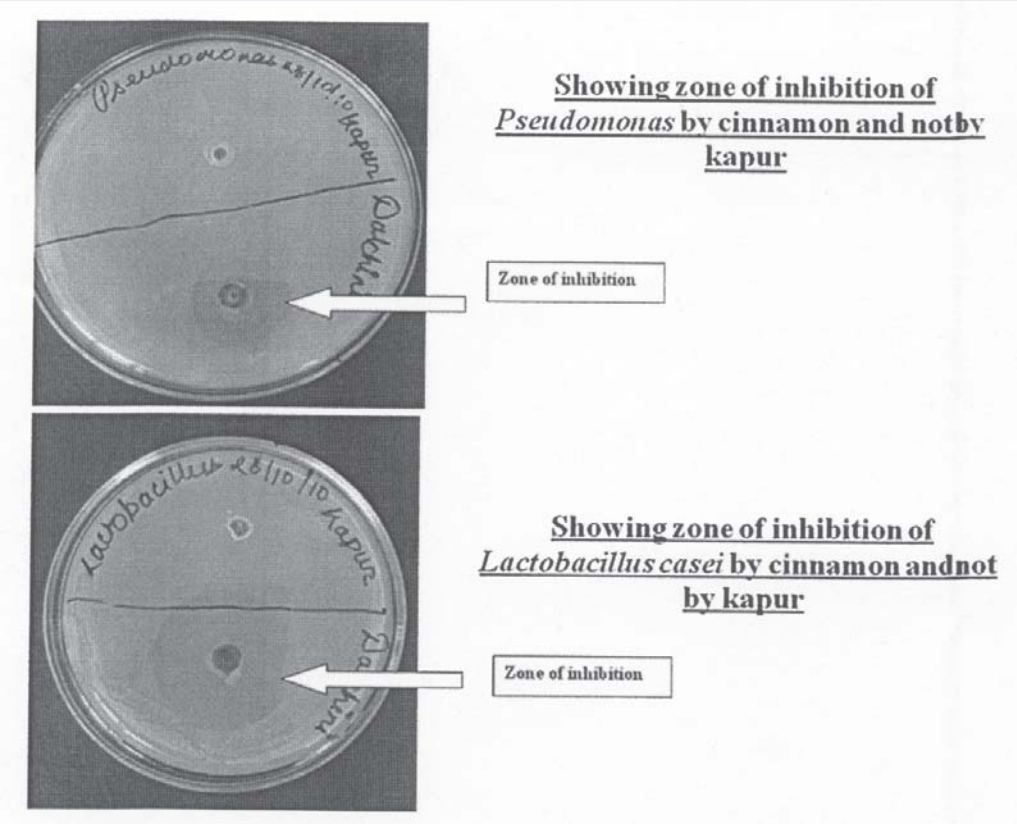
RESULT AND DISCUSSION

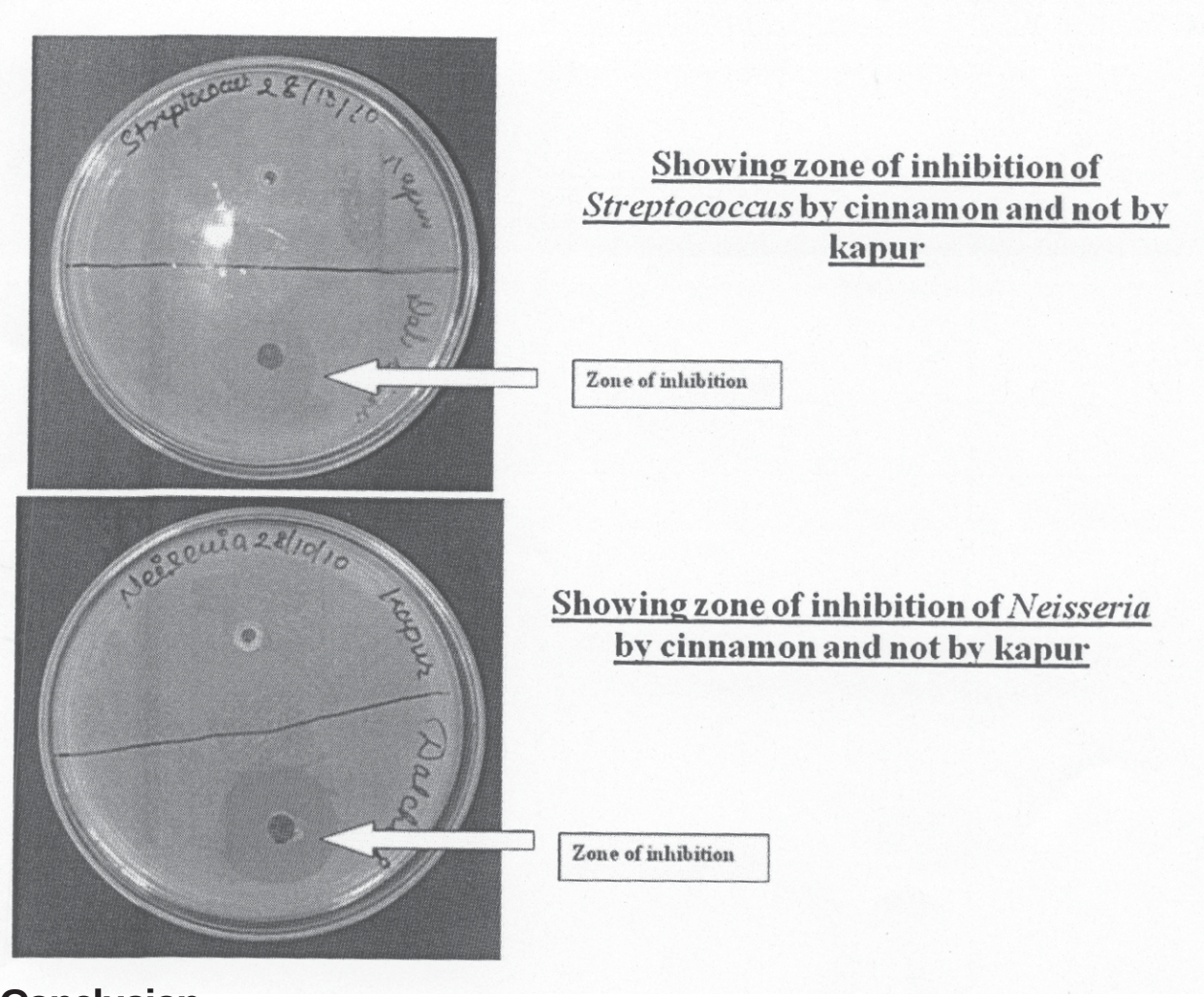
The antimicrobial activity of essential oils of two plants i.e. Cinnamon (Cinnamomum zeylanicum) and camphor (Cinnamomum camphora) were tested on four strains i.e Streptococcus sp., Niserria sp., E. coli, Pseudomonas sp., Lactobacillus casei. shows sensitivity and growth inhibition with Cinnamon (Cinnamomum zeylanicum) but negative results with kapur (Cinnamomum camphora).

The identified strains are then tested for antibacterial sensitivity of essential oils of selected plants.

TABLE No.2.5

STRAINS	ZONE OF INHIBITION FROM DALCHINI IN cm	ZONE OF INHIBITION FROM KAPUR
Streptococcus sp.	1.6	No zone
Niserria sp.	1.4	No zone
Pseudomonas sp.	1.2	No zone
Lactobacillus casei	1.6	No zone





Conclusion

Cinnamon oil was found to be a better antibacterial agent, exhibiting broarange of anti-bacterial activity against common bacteria. Hence, it represents an alternative source of natural antimicrobial substances for use in food systems to prevent the growth of food-borne bacteria extend the shelf-life of the processed food. The study also shows that further research on the effects of spices and essential oils on microorganisms can be rewarding to pursue in the search for new broad spectrum antimicrobial agent.

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