



POTENTIAL ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF SOME SPICES ON SOME HUMAN PATHOGENS

Seema Hashmi

Department of Microbiology Milliya College, BEED ,(Maharashtra)

ABSTRACT Spices & Herbs have been used as food additives ,flavoring agents & as natural preservatives also they have shown to possess medicinal value, in particular, antimicrobial activity. This article in the present study compares the sensitivity of some human pathogenic bacteria to various spice extracts viz. essential oils, by agar well diffusion method. Of the different spices tested clove, and cinnamon were found to possess relatively higher antimicrobial activities. Essential oil of cinnamon showed broad spectrum inhibition against all tested bacteria. Gram positive bacteria were found to be more sensitive to essential oils than Gram negative bacteria.essential oils of Spices might have a great potential to be used as antimicrobial agents.

KEYWORDS : Spices, Essential oil, Antibacterial activity

INTRODUCTION

Herbs and spices are the most important parts of human diet. In addition to boosting flavor, herbs and spices are also known for their preservative and medicinal value. Antimicrobial activity of spices and herbs has been known and described and used for medicinal purposes for several centuries. Since the introduction of antibiotics there has been tremendous increase in the resistance of diverse bacterial pathogens and the side effects of conventional treatment in healing and treatment of various diseases has been rise in the last few decades, the world has been diverting towards the traditional medicine or herbal medicine. At present, it is estimated that about 80% of the world population rely on botanical preparations as medicines to meet their health needs Silviya (2016). Herbs and spices are generally considered safe and proved to be effective against certain ailments. It is only in recent years that modern science has started paying attention to the properties of spices. In recent years, because of their beneficial effects, use of spices and herbs has been gradually increasing in developed countries, naturally derived components from the plants have applications in controlling pathogens in foods. Due to antimicrobial properties, Spices can be the alternative to chemical food additives. But, its application has been minimal. The antioxidant and antimicrobial property of spices are very important to preserve the quality of food material and at the same time provide safety to consumer Puangpronpitag (2009). Medicinal value of spices is due to antimicrobial activity exhibited by different bioactive compounds like alkaloids, flavonoids, isoflavonoids, tannins, cumarins, glycosides, terpenes and phenolic compounds. Spices are also of great economic value as they are incorporated in perfumes, cosmetic and some dietary products and also in medicine due to their sweet scent. Therefore, the investigation of the antimicrobial properties of spices used as food additives to control the growth of food-borne pathogen bacteria may give useful results. Tapan K (2018) An essential oil is a concentrated hydrophobic liquid containing volatile (easily evaporated at normal temperatures) chemical compounds from plants. Essential oils are also known as volatile oils, ethereal oils, aetherolea, or simply as the oil of the plant from which they are extracted, such as oil of clove. An essential oil is "essential" in the sense that it contains the "essence of" the plant's fragrance—the characteristic fragrance of the plant from which it is derived. The term "essential" used here does not mean indispensable, as with the terms essential amino acid or essential fatty acid, which are so called because they are nutritionally required by a given living organism. In contrast to fatty oils, essential oils typically evaporate completely without leaving a stain or residue. A.J Sachin et al (2016)

Essential oils are generally extracted by distillation, often by using steam. Other processes include, solvent extraction, absolute oil extraction, resin tapping, wax embedding, and cold pressing. These oils are used in perfumes, cosmetics, soaps and other products, for flavoring food and drink, and for adding scents to incense and household cleaning products. Zhang et al .(2017)

Essential oils are often used for aromatherapy, a form of alternative medicine in which healing effects are ascribed to aromatic compounds. Aromatherapy may be useful to induce relaxation, but there is not sufficient evidence that essential oils can effectively treat any condition. Improper use of essential oils may cause harm including allergic reactions and skin irritation, and children may be particularly

susceptible to the toxic effects of improper use. Babar & Firoz (2015)

MATERIALS & METHODS

The essential oils of Black pepper (Marich) Piper nigrum Cinnamon (Daalchini) Cinnamomum zeylanicum Clove syzygium aromaticum was obtained from local market and stored in refrigerator at 4°C until use.

Preparation of stock/working solution.

The stock solution of essential oil was prepared by dissolving 1g of oil in 2% Tween80 in physiological saline (0.85g of sodium chloride dissolved in 100 ml water, sterilized by autoclaving).. The solutions were stored in refrigerator.

Fresh active Standard bacterial cultures were used four bacterial cultures E. coli, S. aureus, P. aerogenosa & S. typhi were selected for the study.. The bacterial cultures were maintained on nutrient agar slant.

Screening and evaluation of antibacterial activity: The oils of all the spices were used to check its antimicrobial activity against the organisms by agar well diffusion method. Then with the help of sterile cork borer, wells were made in the inoculated plate and labeled properly. 0.1ml of oil was dispensed in the respective wells with the help of the micropipette. Then the plates were incubated at 37°C for 24 hr then observed for the zone of inhibition which is observed by the clear area around the well.

RESULTS AND DISCUSSION

Table-1 Antimicrobial activities of essential oils against different microorganisms

Essential oil of different spices	E.coli	S.aureus	P aerogenosa	S.typhi
Clove	++	++	++	++
Cinnamon	+	+	+++	-
Pepper	++	+++	++	-

Table 1. summarizes the antimicrobial activities of the essential oils, of the three spices, clove, cinnamon and pepper all were found to be effective against tested bacteria. oil of cinnamon showed broad spectrum inhibition all the bacteria tested with the highest inhibitory effects producing inhibition zones of 20 mm of diameter in P.aeruginosa Essential oil of clove inhibited E. coli, S.aureus., S. Typhi and P.aeruginosa. Essential oil of black pepper inhibited only S. aureus, followed by E.coli & P.aeruginosa

Plants & their derivatives ,such as essential oils are often used in folk medicine in nature, essential oils play an important part in protection of plants .essential oil contain a wide variety of secondary metabolites that are capable of inhibiting or slowing down the growth of microorganisms clove oil cinnamon oil lavender oil and pepper oil has been found to possess strong antimicrobial activity the presence of different types of aldehydes, phenolocs, terpenes are effective against a diverse range of pathogens the reactivity of essential oil depends upon the nature, composition & orientation of its functional group M.K Swamy(2016). The antimicrobial impacts of essential oils & their chemical components have been recognized the antimicrobial potential of clove cinnamon & rosemary essential oil against meat spoilage bacterial pathogens as pseudomonas fluorescences, Serratia

liquifaciens & Bbrochotrix according to them 1/100 diution of these essential oils was capable of inhibiting majority of organism the inhibitory effect of these oils was mainly correlated with the occurrence of eugenol & cinnamaldehyde in the essential oils Katarzyna (2019) other major compounds found were carvacrol, thymol, SR Ponmurugan (2012) analysed the antimicrobial activity of garlic ginger onion on bacillus ,& Enterobacter aerogens garlic has crotonaldehyde as antimicrobial agent & onion has acrolein

C .Raghu et al (2004) studied the cytotoxic activity OF *lantana camara* Linn all the parts of this plant have been used traditionally for several ailments the roots of this plant is used for treatment of malaria, rheumatism & skin allergies ,several tri-terpenoids, naphthaquinones flavonoids, alkaloids & glycosides have been isolated from this plant The volatility and poor solubility of most essential oils are problematic especially with diffusion and dilution of the test substance in a microbiological medium. Antimicrobial activity of spices depend on several factors, including kinds of spices, composition and concentration of spices, microbial species and its occurrence level, substrate composition and processing conditions and storage .

The spread of drug resistant pathogens is one of the most serious threats to successful treatment of microbial diseases there has been an increased interest in looking at antimicrobial properties of essential oils antiinflammatory activity is found in basil orange & pepper oils has found to possess anticancer activity Ismail et al (2019) in the present study the work showed that the essential oils inhibited bacterial growth but their effectiveness varied the important characteristics of essential oil is their hydrophobicity which enable them to partition the lipids of the bacterial cell membrane & mitochondria disturbing the cell structures & rendering them more permeable in the present study it was thus concluded that all the essential oils of clove, cinnamon & pepper exhibited effective antimicrobial activity against all the organism tested

The present investigation promotes the use of essential oils of some spices as a potential antimicrobial agent

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