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Antibacterial Activity of the Essential Oil of Rosemary Pepper

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Abstract

In this study, it was evaluated the antimicrobial activity of essential oil of rosemary pepper (Lippia sidoides). To determine this activity, six bacterial species related to spoilage and foodborne disease, Listeria monocytogenes, *L. innocua, Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa* and *Salmonella choleraesuis*, were used. The agar diffusion method was employed. The results showed that the essential oil of rosemary pepper has antibacterial activity against all species studied. Therefore, the oil can be considered a natural alternative for use in food preservation.

Keywords: Essential Oil; Antibacterial Activity; Food Preservation

Introduction

Several pathogens still represent a public health problem in developed and developing countries. Salmonella spp., Clostridium perfringens, Campylobacter, Listeria monocytogenes, Vibrio parahaemolyticus, Bacillus cereus and enteropathogenic Escherichia coli, cause more than 90% of cases of food poisoning [1]. In addition, *Staphylococcus aureus*, which is responsible for the most frequent food poisoning, is acquiring a new epidemiological dimension due to methicillin-resistant strains [2]. The extensive use of antimicrobials has driven growing resistance among bacterial species and the effectiveness of these compounds have declined seriously [3-5]. Thus, due to increasing pressure from consumers and legal authorities, food processors, researchers and regulatory agencies are showing interest in natural products with bactericidal activity. Rosemary pepper (Lippia sidoides Cham) is a shrub native to the semi-arid region of northeastern Brazil, which was introduced in governmental phytotherapy programs in several northeastern states, due to its use in the region's popular medicine practices [6].

The chemical constituents and pharmacological properties of Rosemary pepper essential oil have been disclosed as results of successive studies in the areas of dentistry and cosmetology [7-8]. In addition to the antimicrobial property, which justifies the therapeutic application of the plant, the oil also has larvicidal activity for Aedes aegypti, a mosquito that transmits dengue and molluscicide on Biomphalaria glabrata, a vector of schistosomiasis [9-10]. Considering the effectiveness of oil essential of rosemary pepper against some human pathogens, this paper are presented information about the antimicrobial activity of oil against some foodborne pathogenic bacteria in order to develop strategies for future applications as a bio-agent in foods. The essential oil used in this study was kindly provided by Prof. Dr. Renato Innecco, from Department of Plant Science at the Federal University of Ceará. The oil was obtained from leaves of the rosemary pepper, extracted by the steam distillation method. After extraction the oil was added with anhydrous sodium sulfate to absorb possible water molecules. The dried oil was transferred to an amber glass jar with screw cap and stored in a cool place without the incidence of light [11].

The antimicrobial activity of the essential oil was determined by agar diffusion method described by the National Committee for Clinical Laboratory Standards [12], modified, using agar wells for the application of the different concentrations of oil, instead of using paper disks impregnated with the samples. The antimicrobial activity was assessed by the diameter of the growth inhibition zone (IZ)of Escherichia coli ATCC 10536, Listeria monocytogenes ATCC 7644, *Pseudomonas aeruginosa* ATCC 9027, *Staphylococcus aureus* ATCC 25923 and Salmonella Typhimurium ATCC 51812. Zone of inhibition with diameters equal to or greater than 7 mm were considered indicative of microbial sensitivity to oil. The results showed that rosemary pepper essential oil has antibacterial activity against all species studied. L. monocytogenes was the most

oil sensitive species (IZ = 48.5 ± 0.7 mm), followed by P. aeruginosa (IZ = 44.0 ± 1.4 mm), S. aureus (42.5 ± 0 mm), 7 mm), E. coli (41.5 ± 0.7 mm) and S. Tiphymurium (39.5 ± 0.7 mm). This suggests that the oil can be considered a suitable alternative to chemical additives for use in the food industry, since security needs and satisfies consumer demand for natural components.

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