TITLE: EVALUATION ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL OF *PIPER CERNUUM* AND NISINE IN SPECIES OF THE GENIUS *ALICYCLOBACILLUS*

AUTHORS: RIBEIRO, B. I. O.; RICHARD, F.; ABREU FILHO, B. A.

INSTITUTION: STATE UNIVERSITY OF MARINGÁ, MARINGÁ, PR (AVENUE COLOMBO, 5790, CEP 87020-900, MARINGÁ - PR)

ABSTRACT:
Increased resistance of bacteria to antimicrobials has been making them more difficult to control, especially those that cause damage and deteriorate food. Thus, studies of natural antimicrobials from plants are of fundamental importance. In Brazil there is a wide variety of plants with high antimicrobial activity, such as those of the genus *Piper*. *Alicyclobacillus* genus is major genus in the juice contamination due to its resistance to traditional methods of decontamination. Thus, the objective of the study was to evaluate the antimicrobial activity of the essential oil of the specie *Piper cernuum*, nisin and the combination of both in *Alicyclobacillus* species. The species used were *A. acidoterrestris*, *A. acidocaldarius*, *A. cycloheptanicus* and *A. hisperidum*. The Minimum Bactericidal Concentration (MBC) and the Minimal Inhibitory Concentration (MIC) of the oil and nisin were determined by assaying the antibacterial activity. The tests were performed with BAT culture medium (*Bacillus acidoterrestris*). The results of MIC with *Piper cernuum* essential oil were 250 µg/mL against *A. acidocaldarius*, *A.cycloheptanicus* and *A. hisperidum* and 125 µg/mL for *A. acidoterrestris*. The results of the CBM tests were 500 µg/mL for *A. acidocaldarius*, *A. cycloheptanicus*, *A. hisperidum* and 250 µg/mL *A. acidoterrestris.* In the evaluation of the antimicrobial activity of nisin, MIC results can be obtained for *A. acidocaldarius*, *A. Hisperidum,* 62.5 µg/mL, *A. acidoterrestris* of 15.62 µg/mL, *A. cycloheptanicus* of 31.25 µg/mL. For CBM the values found were 62.5 µg/mL for *A. acidocaldarius* and *A. hisperidum*, 31.25 µg/mL for *A. acidoterrestris* and *A. cycloheptanicus*. Checkerboard method, which was carried out with the aim of evaluating combinations of essential oil with nisin to indicate the Index of Fractional Inhibitory Concentration (FICI), for *A. acidocaldarius*, FICI was 0.738, addition. For *A. acidoterrestris*, *A. cycloheptanicus* and *A. hisperidum*, the values were obtained between 1 and 4, therefore they showed indifference. The following values of FICI, respectively, FICI=2.66, FICI=3 and FICI=2. The essential oil of *Piper cernuum* evaluated showed moderate antimicrobial activity against the tested microorganisms and in association with nisin presented an indifferent and additive effect against the *Alicyclobacillus* species studied.

Keywords: *Alicyclobacillus* spp., orange juice, *Piper*

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