

TITLE: ANTIMICROBIAL ACTIVITY IN VITRO OF *Plantago major* EXTRACT AGAINST PATHOGENIC AND SPOILAGE BACTERIA

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ABSTRACT:

Plant extracts emerge as an alternative to prevent food spoilage or the development of pathogenic bacteria. Studies indicate that some phenolic compounds present in vegetables, in addition to having antioxidant activity, may also have antibacterial activity. The objective of this study was to evaluate the antimicrobial and antioxidant activity of tansagem (*Plantago major* L.) against pathogenic and spoilage bacteria. Tansagem were dehydrated (40 °C for 24 h) to 15% moisture and extracted (2 g) with ethanol (100 mL) in ultrasound (45 °C for 30 min), followed by filtration. The solid residue was extracted twice more, and the solvent underwent in rotary evaporator at 40 °C and the dried extract was solubilized in 0.5 % DMSO solution, until obtaining the concentrations of 160, 80, 20, and 4 mg/ml. The extract obtained was used to determine the antimicrobial activity on pathogenic and spoilage bacteria and to determine the content of phenolic compounds and antioxidant activity by the ABTS and FRAP methods. Antimicrobial activity assessment had been conducted by agar diffusion method in which microorganisms and after, spread over Petri dishes in Mueller Hinton (pathogenic bacteria) and MRS agar (spoilage bacteria), using a swab. Next, 4 mm diameter perforations were performed in the agar, placing 50 µL of the preparations in each hole with a pipette. A 0.5 % DMSO solution was used as a negative control and chloramphenicol was used as a positive control. The tansagem extract showed 0.412 mg gallic acid equivalent /ml extract of total phenolic compounds, 4.6 mM trolox equivalent/ml and 1.98 µM trolox equivalent/ml of antioxidant activity by the ABTS and FRAP methods, respectively. However, the tansagem extract did not show any antimicrobial activity against *Bacillus cereus* CCCD B001, *Staphylococcus aureus* CCCD S007, *Escherichia coli* CCCD E003, *Salmonella choleraesuis* CCCD S016, *Pseudomonas aeruginosa* CCCD P004, *Lacticaseibacillus casei* BGP93 and *Latilactobacillus sakei* CCT 5841 ATCC 15521, at the concentrations evaluated. Although the results for the content of phenolic compounds and antioxidant activity are interesting, observed a low potential for using tansagem extract as an antimicrobial in foods.

Keywords: Natural extracts; Antibacterial; Food microbiology; Phenolic compounds.

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