Effectiveness of aqueous and hydroalcoholic extracts of Acanthospermum australe against diarrhea-inducing bacteria

Raquel Mallmann ¹ (IC), Paula Blanchetti ² (PQ), Lucélia Hoehe ² (PQ), Miriam Ines Marchi ² (PQ), Eduardo Miranda Ethur ²+ (PQ), eduardome@univates.br

¹ Centro Universitário UNIVATES, Centro de Ciências Biológicas e da Saúde, Avelino Tallini 171, Bairro Universitário, 95900-000, Lajeado, RS, Brazil
² Centro Universitário UNIVATES, Centro de Ciências Exatas e Tecnológicas, Avelino Tallini 171, Bairro Universitário, 95900-000, Lajeado, RS, Brazil

Palavras Chave: Acanthospermum australe, diarrhea, antimicrobial activity, plant extracts.

Abstract
The aim was to evaluate the antimicrobial activities of the extracts of A. australe against diarrhea-inducing bacteria.

Introduction
Acanthospermum australe (Loefl.) Kuntze (Asteraceae) is widely used in folk medicine for the treatment of diarrhea, skin diseases, blennorrhagia, dyspepsia, parasitic worms and malaria, among other ailments. Typically, the leaves and roots of this plant are employed in the form of teas or applied as external dressings. Diarrhea is normally caused by infection of the intestinal tract by bacteria, viruses or parasites that are present in contaminated food or drinking-water or enter the system as a result of poor hygiene. In view of the above, the present study aimed to characterize the chemical profiles of the aqueous and hydroalcoholic extracts from leaves and roots of A. australe, to evaluate their antimicrobial activities against the diarrhea-inducing bacteria Enterococcus faecalis, Shigella dysenteriae, and Yersinia enterocolitica.

Results and discussion
The aqueous extract A. australe leaves gave the highest yield (28.5%) followed by the aqueous root extract (23%), the hydroalcoholic leaf extract (18.7%) and hydroalcoholic root extract (8.8%). The presence of saponins, flavonoids, tannins, and phenolic compounds in aqueous and hydroalcoholic extracts of A. australe were determined using the fitochemical methods. Activities of A. australe extracts against Enterococcus faecalis (ATCC 51299), Shigella dysenteriae (ATCC 13313) and Yersinia enterocolitica (ATCC 9610) were evaluated according to the methodology recommended by the CLSI. The presence of microbial growth was verified by the addition of the redox indicator triphenyl tetrazolium chloride (0.5% solution) or of the blue dye resazurin (0.02% solution). The aqueous leaf extract of A. australe showed bacteriostatic (10 mg.mL⁻¹) and bactericidal (20 mg.mL⁻¹) activities against E. faecalis, bacteriostatic activity (20 mg.mL⁻¹) against S. dysenteriae but was ineffective against Y. enterocolitica (>20 mg.mL⁻¹). The hydroalcoholic leaf extract showed similar activities against E. faecalis but was ineffective (>20 mg.mL⁻¹) against S. dysenteriae and Y. enterocolitica. In contrast, the aqueous and hydroalcoholic root extracts were ineffective against E. faecalis and Y. enterocolitica (>20 mg.mL⁻¹). The aqueous extract showed bacteriostatic activity against S. dysenteriae (20 mg.mL⁻¹), and the hydroalcoholic root extract showed bactericidal activity against S. dysenteriae (20 mg.mL⁻¹).

Conclusions
The results presented herein demonstrate that the Gram-positive E. faecalis and the Gram-negative S. dysenteriae were susceptible to A. australe extracts, although bacteriostatic/bactericidal activities were only observed at concentrations considered too high for clinical application.

Acknowledgements
We thanks to Centro Universitário UNIVATES for the financial support.