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Potential applications for Lippia graveolens Kunth (Mexican oregano) extracts in the treatment and prevention of foodborne protozoal diseases

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Abstract

Amoebiasis caused by *Entamoeba histolytica* is associated with high morbidity and mortality and has become a significant public health problem worldwide (Carrero et al., Int. J. Med. Micobiol. 2019, 309, 1-15). E. histolytica does not require a vector for its transmission and initiates the infection in a cyst-resistant form, generally through the ingestion of contaminated water or food (McElhatton and Marshall, Food safety: a practical and case study approach, 2007, Springer, New York). Natural products have proved to be an important source of antiparasitic compounds that could be used as food additives for the prevention of foodborne diseases.

We reported the antiamoebic activity in vitro of the methanolic extract of Lippia graveolens Kunth recently and the bioguided isolation of carvacrol as a bioactive compound with antiprotozoal activity (Quintanilla-Licea et al., Molecules, 2014, 19, 21044-21065). In this study, we are describing the isolation and structure elucidation of additional antiamoebic compounds occurring in this plant.

The following workup of the methanol residue by partition with ethyl acetate followed by chromatography of the EtOAc over a silica gel column afforded the known flavonoids pinocembrin (1), sakuranetin (2), cirsimaritin (3) and naringenin (4). The identification of the isolated compounds was based on spectroscopic/spectrometric analyses (IR, 1H- and 13C-NMR; MS) and comparison with literature data. These compounds were tested for antiprotozoal activity against Entamoeba histolytica trophozoites using in vitro tests. The 50 % inhibitory (IC50) concentration of these compounds was determined by using a Probit analysis with a 95 % confidence level.

The isolated flavonoids from L. graveolens displayed more than 90% growth inhibition against E. histolytica at a concentration of 150 µg/mL. The observed IC50 against E. histolytica are: 29.51 µg/mL for Pinocembrin (1), 44.47 µg/mL for Sakuranetin (2), 150.01 µg/mL for Cirsimaritin (3) and 28.85 µg/mL for Naringenin (4)

The results of this research suggest that it is possible to use extracts of Lippia graveolens Kunth as well as the isolated compounds as possible food additives for the preservation of food, capable of increasing the safety, commercial life and quality of these.

Speaker Biography:

Dr. Ramiro Quintanilla-Licea has got a degree in industrial chemistry (1977) and a master's degree in organic chemistry (1979) from the Universidad Autónoma de Nuevo León (Mexico). He made his Ph. D. in organic chemistry at the University of Frankfurt am Main in Germany (1988). He is currently involved in the investigation of Mexican plants with anticancer, anti-protozoal, and anti-diabetic activity. He has published more than 35 papers in reputed journals. ORCID-Nr. 0000-0002-4379-6913.

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