I CONGRESO EUROAMERICANO DE PROCESOS Y PRODUCTOS ALIMENTARIOS

ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY FROM ORGANIC VEGETABLE EXTRACTS

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Introduction: Plants and vegetables have been widely studied by the scientific community due to the richness of compounds and bioactivity they present. Many of these compounds have been extracted to be used as additives in processed foods, either with nutritional or technological functions. In particular, the technological function has been exploited, especially to replace synthetic compounds for these natural matrices. **Aims and objectives:** In this scenario, the present work evaluated the antioxidant and antimicrobial potential of organic vegetable extracts obtained using green and GRAS solvents such as water and ethanol. **Methods:** Serial extractions were performed with samples of organic garlic (Allium sativum), organic thyme (Thymus vulgaris), and organic coffee (Coffea sp.) using water and ethanol. The chemical composition was evaluated by high-performance liquid chromatography (HPLC), using the EXTRACT-US system and an adapted analysis method. The separation of compounds was performed on a Kinetex C18 chromatographic column (150 x 4.6 mm, 2.7 µm, Phenomenex) maintained at 37 oC. Absorbance was monitored at 260 nm, and compound identification was based on authentic standards. Colorimetric methods of Folin-Ciocalteau, FRAP, ABTS, and DPPH were used to evaluate the antioxidant activity of the extracts. The antimicrobial activity of these extracts was analyzed against pathogenic bacteria *Bacillus cereus*, *Escherichia coli*, and *Staphylococcus aureus* (isolated from food) and probiotic bacteria *Bifidobacterium animalis* BB12, *Lactobacillus acidophilus* LA5 (Chr-Hansen), *Lactiplantibacillus plantarum* BG112, and *Lacticaseibacillus casei* BGP93 (Sacco). The microdilution method was used to evaluate the minimum inhibitory concentration (MIC), and to observe indications of selective antimicrobial activity. **Results and discussion:** Chromatography analysis identified the presence of caffeine, chlorogenic acid, caffeic acid, and p-coumaric acid for the coffee extract; hydroxybenzoic acid for garlic extract, and caffeic and p-coumaric acids for thyme extract. The presence of these compounds in these vegetable species is in accordance with the described in the literature. The antioxidant activity of the extracts showed concentrations similar to those described in other studies, especially for coffee, with a higher concentration of total phenolic (1,821.73mg EAG/L) and higher antioxidant activity in the majority of the methods applied, and for garlic, which showed a concentration of phenolic 50 times less than coffee extract and the lowest antioxidant activity. Thyme extract presented 751.57mg EAG/L of total phenolic and the highest antioxidant activity in DPPH method. In the evaluation of antimicrobial activity, only the garlic extract showed some inhibition and only for probiotic species, indicating a possible negative effect when adding this extract to probiotic products. **Conclusions**: The results obtained suggest that the antimicrobial activity may not be proportionally related to the antioxidant activity, as indicated by some reports in the literature. The extracts that showed antimicrobial activity were selective for the analyzed probiotic species, which indicates the need for caution when using these components as additives in foods containing these bacterial species. A deeper study with identification of the compounds responsible for this inhibition can contribute to better understanding natural antimicrobials and contribute to the development of natural food additives.

Palavras-chave: Antimicrobial, Antioxidant, Preservatives, Vegetable.

ISBN 978-65-88884-12-6