Phenolic compounds from Mexican Hawthorn: Effects on the growth of selected probiotic and pathogenic microorganisms

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Abstract

The consumption of natural food has increased due to concerns of living a healthy life. Consumer takes a decision not only according to sensorial but also to nutritional properties of food. Polyphenols, or phenolic compounds, are secondary metabolites present in fruits. These compounds have been reported to have antioxidant activity (beneficial to prevent cardiovascular diseases, many types of cancer and aging-related illnesses), and may act as prebiotics. Mexican Hawthorn, also known as *t*ejocote, is a Mexican variety of the gene *Crataegus*. It is considered an underutilized fruit despite being very important in internal trade. Some studies which evaluated the modulatory effect of some isolated phenolic compounds on the growth of probiotic and pathogenic bacteria, reported differences between the effect on probiotic and pathogenic strains: isolated phenolic compounds do not affect the microbial growth of probiotics.

The purpose of this research was to take advantage of the peel and seed of the Mexican Hawthorn fruit, plant material considered waste, to: extract phenolic compounds, quantify some polyphenols, and study the in vitro activity of the extracts against bacteria and fungi (probiotics and pathogenic). In this work, we obtained the ethanol extracts from peel and seed of *Crataegus mexicana* fruit, by ultrasound-assisted extraction. We identified and quantified some polyphenols (catechin, epicatechin, hyperoside, procyanidin B2, vitexin, chlorogenic acid and ascorbic acid) from raw ethanol extracts of peel and seed of Mexican Hawthorn by HPLC. We studied the *In vitro* activity of extracts against probiotics bacteria, *Staphylococcus aureus, Saccharomyces* and *Dermatophytes* strains. The broth microdilution method was performed to determine MIC_{50}.

Polyphenols from peel and seed extracts of Mexican Hawthorn can selectively discontinue the growth of some pathogenic bacteria and fungi without interfering with the viability of probiotics.

Image

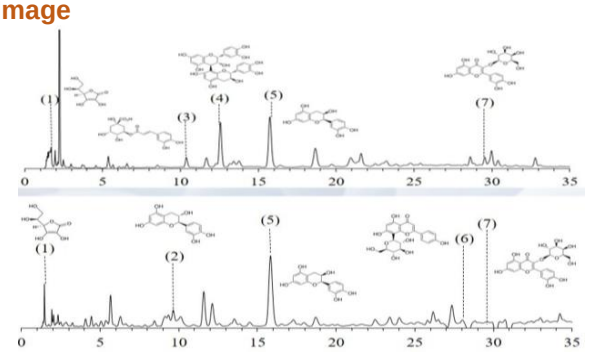


Figure 1: HPLC chromatograms: peel (up) and seed (down) extracts.

Recent Publications

1. Pacheco-Ordaz, R., Wall-Medrano, A., Goñi, M. G., Ramos-Clamont, G., Ayala-Zavala, J. F., Gonzáles-Aguilar, G.A. (2018). Effect of phenolic compounds on the growth of selected probiotic and pathogenic bacteria. Lett. Appl. Microbiol. 66: 25–31.
2. Tsao, R. (2010). Chemistry and biochemistry of dietary polyphenols. Nutrients 2: 1231–1246.
3. Zhang, X., Yang, Y. & Weng, P. (2016). The Modulatory Effect of Anthocyanins from Purple Sweet Potato on Human Intestinal Microbiota in Vitro. J. Agric. Food Chem. 64: 2582–2590.
4. Rojas, F. D., Sosa, M. A., Fernández, M. S., Cattana, M. E., Córdoba, S. B., Giusiano, G. (2014). Antifungal susceptibility of *Malassezia furfur, Malassezia sympodialis, and Malassezia globosa* to azole drugs and amphotericin B evaluated using a broth microdilution method. Med. Mycol. 52: 641–646.
5. Betancourt-Olvera, M., Nieto, R., Urbano, B. & González, F. (2018). Analysis of the biodiversity of hawthorn from the morphological, molecular, and ethnobotanical approaches: the case of Mexico. Genet. Resour. Crop Evol. 65: 897–916.



Biography

Viviana Robles Botero has her expertise in ultrasound-assisted extraction of bioactive compounds, passion for research to improve the health, wellbeing and the care of the environment. Her research on the extraction of bioactive compounds with antioxidant activity from plant material presents different applications to take advantage of raw material, considered waste, fomenting sustainability in agro-food processes and giving promotion to natural food consumption.

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Notes/Comments: