

Fig Tree Leaves as Natural Food Preservatives

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Abstract

Figs are widely consumed Mediterranean fruits that are greatly appreciated for their sweet taste and healthy properties. Their production yields high amounts of waste, particularly the peels, stems and leaves. The leaves of the fig tree constitute the highest waste of the entire crop and could be used in several areas of the food industry. In this work, the leaves from five varieties of fig trees, namely Pasteliere, Longue d'Aout, Dauphine, Bourjassote Noire and Mareille, were subjected to a maceration extraction with ethanol water 80/20 v/v, and further screened for potential bioactive molecules, antioxidant, and antimicrobial activities. Organic acids were screened through UFLC-DAD, showing 7 individual acids, namely oxalic, quinic, malic, chiquimic, ascorbic, citric and fumaric, being oxalic and malic the most abundant. In terms of soluble sugars, fructose, glucose, sucrose, trehalose and raffinose were identified through HPLC-RI, in which fructose and glucose were the most abundant. In terms of the antioxidant activity, analysed through the thiobarbituric acid reactive substances, all varieties showed high antioxidant activity, being the Pasteliere variety the one with the highest antioxidant activity, and Bourjassote Noire the least antioxidant. When screened against foodborne bacteria and fungi, the Dauphine variety showed interesting inhibition of *Escherichia coli*, *Salmonella enterocolitica* and *Yersinia enterocolitica*, while Pasteliere was quite active against *Aspergillus fumigatus*. Overall, to understand the safety of using the leaves in the food industry, the plant extracts were screened against porcine liver and monkey kidney primary cell lines to rule out toxicity, and thus, no toxicity was sought for any of the varieties. Finally, the antiproliferative and anti-inflammatory activities were also screened, in which Longue d'Aout was the most promising against tumor cell lines, while Dauphine showed the best anti-inflammatory activity. Overall, these leaf extracts can be used in the food industry as preservatives, although further analyses will be performed,

namely on the individual phenolic compounds and other antioxidant activity assays.

Keywords: circular economy, sustainability, preservatives, figs

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