



# XV

MADEIRA

# ENCONTRO DE QUÍMICA DOS ALIMENTOS

5-8 DE SETEMBRO DE 2021



ESTRATÉGIAS PARA A EXCELÊNCIA,  
AUTENTICIDADE, SEGURANÇA  
E SUSTENTABILIDADE ALIMENTAR



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# Livro de Resumos

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## PC-A03: Exploration of pineapple bio-waste as a low-cost material for natural ingredients with health benefits for application in the food industry

Bruna Moreira, Eliana Pereira, Tiane C. Finimundy, José Pinela, Ricardo C. Calhelha, Isabel C.F.R. Ferreira, Cristina Caleja\*, Lillian Barros

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Pineapple (*Ananas comosus* [L.] Merr.) is one of the most consumed tropical fruits worldwide and appreciated not only for its nutritional properties, but also for its beneficial effects on the human body.<sup>1</sup> However, only the pulp of this fruit is consumed, thus generating annually tons of waste and, consequently, an inefficiency in the use of natural resources and economic losses for the agri-food sector.<sup>2</sup> Thus, this study aimed to characterize the pineapple peel and crown and to extract bioactive compounds, aiming to apply the most promising extract in a pastry product as a natural ingredient to validate its potential for application in the food industry.

A heat-assisted hydroethanolic extraction was performed to recover phenolic compounds subsequently identified and quantified by high-performance liquid chromatography coupled with a diode array detector and electrospray ionization mass spectrometry (HPLC-DAD-ESI/MS). Twenty phenolic compounds were identified in both peel and crown extracts, among them, phenolic acids and flavonoids. The main detected compounds were caffeic acid derivatives, namely caffeine putrescine and flavones such as apigenin 6,8-C-diglucoside. The antioxidant activity of the extracts was tested through two *in vitro* tests: the lipid peroxidation inhibition assay (TBARS) and the oxidative haemolysis inhibition assay (OxHLIA). The antiproliferative activity of both extracts was evaluated in tumour and non-tumour cell lines using the sulforhodamine B method, and the anti-inflammatory activity in lipopolysaccharide-activated RAW 264.7 macrophages by the ability to inhibit NO production. The analyses showed that both extracts had an excellent performance in the cell-based antioxidant activity assays, highlighting the lower IC<sub>50</sub> values and consequently greater activity for the peel extract. The same trend was seen in the tests of antiproliferative activity, with none of the extracts showing toxicity up to the maximum concentration tested (GI<sub>50</sub> > 400 µg/mL).

Although both extracts have bioactivity, the peel extract showed antioxidant and antimicrobial activity superior to that of the crown extract, so it was selected for incorporation in a typical Portuguese pastry product, the so-called “súplicas”. The effect of incorporating the natural ingredient on the chemical and nutritional composition as well as on the bioactive properties of the developed pastry product was evaluated over 7 days and compared with the product traditionally made.

This study confirms the potential application of pineapple bio-waste, especially the peel, in the food industry as a source of compounds with bioactive properties, contributing to the valorisation of this low-cost natural resource.

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