RESUMO SIMPLES - ENGS - ENGENHARIAS

COLD PLASMA-ACTIVATED WATER AS A GREEN SOLVENT FOR RECOVERING BIOACTIVE COMPOUNDS FROM COFFEE BY-PRODUCTS

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The valorization of agro-industrial waste represents a challenge and an opportunity for the sustainable production of functional ingredients. In this study, we investigated the application of plasma-activated water (PAW) as an innovative solvent for the extraction of bioactive compounds from coffee waste, including husks, silver skin, and grounds. CPW was generated by surface dielectric barrier discharge (SDBD) for 20 minutes and used in the preparation of aqueous extracts, which were compared to the conventional method of maceration in distilled water. Total phenolic and flavonoid contents and color parameters were determined. The results showed that CPW significantly increased extraction efficiency, especially for coffee grounds, which presented 25.48 ± 1.18 mg GAE/g of phenolics and 7.39 ± 0.01 mg CE/g of flavonoids,

surpassing maceration (17.29 ± 0.47 and 4.51 ± 0.01 mg/g, respectively). Significant gains were also observed for the peel and silver skin, reaching 14.40 ± 0.42 and 2.20 ± 0.01 mg/g, and 7.48 ± 0.01 and 2.05 ± 2.68 mg/g, respectively, compared to the maceration values. No significant differences were observed in the color of the extracts ($p > 0.05$). The effect may be associated with reactive oxygen and nitrogen species (RONS) present in PAW, capable of promoting greater solubilization of the compounds. These findings reinforce the potential of PAW as a promising green technology for the recovery of bioactive compounds from coffee waste, contributing to sustainability and adding value to the production chain.

Palavras-chave: cold plasma; coffee waste; phenolic compounds; green extraction; antioxidants.