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OPTIMIZATION OF AQUEOUS EXTRACTION OF MANGABA (HANCORNIA SPECIOSA GOMES) PULP FOR MAXIMIZED POLYPHENOL CONTENT AND ANTIOXIDANT ACTIVITY

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This study aimed to optimize the aqueous extraction process of mangaba (*Hancornia speciosa* Gomes) pulp to maximize polyphenol content and antioxidant activity. Fruits were collected from Embrapa Cerrados (Planaltina, Brazil). Optimization was carried out using two Central Composite Rotational Designs (CCRD), analyzed by Response Surface Methodology (RSM). Independent variables were extraction time, pulp-to-solvent ratio, and temperature, while response variables included extraction efficiency (soluble solids), total polyphenol content and DPPH radical scavenging capacity. In the first experimental design (ED1), conducted at 30 °C, only the pulp-to-solvent ratio significantly influenced solids content and polyphenol concentration, with optimal results at ratios between 1:3 and 1:5 (m/v). Extraction time showed no significant effect, consistent with equilibrium diffusion described by Fick's second law. Extracts with higher pulp content presented greater polyphenol concentrations; however, antioxidant activity by the DPPH assay showed a negative correlation, likely due to fiber and latex interactions with phenolic compounds. The second experimental design (ED2) included temperature as an additional factor. Results confirmed the critical role of pulp-to-solvent ratio and highlighted the positive effect of elevated temperatures (up to 80 °C) on antioxidant activity, possibly due to enzyme inactivation and enhanced fiber solubilization. A strong positive correlation was observed between polyphenol content and extraction efficiency, while yield was negatively correlated, reflecting filtration challenges in concentrated extracts. To integrate multiple responses, a desirability function was applied, identifying optimal extraction conditions as 6 minutes, pulp-to-solvent ratio of 1:3.3 (m/m), and temperature of 80 °C. In conclusion, optimized dynamic maceration proved effective for producing aqueous extracts of mangaba pulp with high polyphenol content (284.8 µg /mL) and strong antioxidant activity (91.6 % inhibition). Acknowledgments: University of Brasília (UnB), National Council for Scientific and Technological Development (CNPq), Coordination for the Improvement of Higher Education Personnel (CAPES), and Federal District Research Support Foundation (FAPDF). Grant numbers: 00193 00001194/2021-47; 405961/2021-9.

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