



DEVELOPMENT AND EVALUATION OF AN ANTIOXIDANT BIOINPUT FROM THE DRY EXTRACT OF *Coffea arabica* GROUNDS

Ana C. Oliveira^{1*}, Gizelle I. Almerindo¹, Ruth M. Lucinda-Silva¹.

¹Programa de Pós-Graduação em Ciências Farmacêuticas. Universidade do Vale do Itajaí, Brasil. *anaeq.bnu@gmail.com.

INTRODUCTION

Coffee is one of the main raw materials of the global agribusiness, holding high commercial value. In 2024, Brazilian arabica coffee production reached 39.6 million bags, while urban solid waste generation, including coffee grounds, totaled 81 million tons. Due to the presence of compounds with antioxidant properties, coffee grounds have been widely studied for potential sustainable applications. In this context, the present study aimed to develop a dry extract from *Coffea arabica* grounds, investigating its potential as an active pharmaceutical ingredient with antioxidant activity.

MATERIAL AND METHODS

The factorial analysis of the extraction was performed using different times and ethanol concentrations. The dry extract was obtained in two stages—screening and optimization—using spray drying. The characterization of the dry extracts included analyses of dry residue [1], total phenolic content (TPC) [2], antioxidant activity (EC₅₀) [3], chlorogenic acid content by HPLC-DAD, thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), and scanning electron microscopy (SEM).

RESULTS

The factorial analysis indicated that the best extraction conditions were 4 hours and

a 50% hydroethanolic solution. In the drying screening, the mixture of starch and microcrystalline cellulose showed the best results for total phenolic content (238.37 mg GAE/g), efficiency (106.36%), and encapsulation yield (23.84%). In the optimization phase, the ideal drying conditions were 150 °C, a flow rate of 4 mL/min, and 30% excipient, providing greater thermal stability to the extract. Morphological analysis revealed spherical and heterogeneous particles with an average diameter of $1.68 \pm 0.23 \mu\text{m}$.

CONCLUSIONS

The study enabled the obtaining of a dry extract from *Coffea arabica* grounds with promising physical properties, chemical composition, and antioxidant activity for application as an active pharmaceutical ingredient.

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REFERENCES

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