

CHARACTERIZATION OF BIOACTIVE COMPOUNDS IN COFFEE OIL EXTRACTED FROM SPENT COFFEE GROUNDS

Drita Abazi Bajrami^{1*}, Zimere Saiti Musliji¹, Arjan Ganiji¹, Sani Demiri¹

¹Faculty of Technological Sciences, Mother Teresa University,
Petre Georgiev 22, 1000 Skopje, Macedonia

*e-mail: drita.abazi@unt.edu.mk

Abstract

Spent coffee grounds (SCGs) are a significant waste product generated from coffee consumption, presenting environmental challenges while containing up to 20% coffee oil rich in beneficial compounds suitable for various industries. This research focuses on extracting and characterizing coffee oil from SCGs to explore its bioactive substances.

The material for this research was coffee waste gathered from a coffee machine, containing 95% Robusta and 5% Arabica. This coffee waste was subsequently subjected to thermal drying in an oven at 102 °C for 3 hours to remove any water content. Following the drying process, the samples were carefully stored at room temperature. Utilizing Soxhlet extraction with n-hexane, a coffee oil yield of 9.43% was achieved. The pH value of the extracted oil was assessed using the Benchtop Biobase 210 pH meter - China. Extracted oil underwent ATR-FTIR analysis, revealing characteristic bands corresponding to various oil compounds.

pH of the coffee oil samples was determined to be 6.5 at 25 °C. Notably, the peak at 3009 cm⁻¹ indicates the presence of unsaturated fatty acids, while bands at 2850 cm⁻¹ and 2921 cm⁻¹ confirm the presence of hydrocarbons. Additionally, bands at 1748 cm⁻¹ and 1150 cm⁻¹ confirm the presence of triglycerides.

This study highlights the abundant bioactive substances found in coffee oil, representing a significant advancement in sustainable waste management strategies.

Key words: Coffee oil, Extraction, FTIR analysis, Bioactive substances, SCG.