

Research Article

Caffeine Extraction from Sarawak Liberica Coffee

Bryan Voon Li Qi, Elexson Nillian

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Samarahan, 94300, Malaysia

| Article history | ABSTRACT |
|---|--|
| <p>Keywords: Caffeine content, Liberica coffee, Total flavonoid content, Total phenolic content</p> <p>Received 04/02/2024 Revised 23/03/2024 Accepted 29/03/2024 Published 02/04/2024</p> <p>*Corresponding author: Email: nelexson@unimas.my</p> | <p>Liberica coffee is a minor coffee species that is cultivated all around the world. There are only a few studies conducted on this coffee species as it only occupies one percent of coffee plantations all around the world. There has yet to be a research study in Malaysia focusing on the caffeine content, the total phenolic content (TPC), and the flavonoid content (TFC) of the liberica sp. coffee mainly cultivated in Sarawak, Malaysia. Thus, in this research, Sarawak liberica sp. coffee was extracted using Soxhlet extractor using ethanol as solvent. The extracted sample was analyzed using high-performance liquid chromatography (HPLC) to identify the caffeine concentration in the sample. Colorimetric assays for phenolic compounds and flavonoids were also performed to determine the total phenolic content (TPC) and the flavonoid content (TFC). As a result, the dry basis of caffeine (w/w) in the extracted sample is 5.404%. In contrast, the total phenolic content of extracted products is 89.472 mg GAE/g of coffee beans, and the total flavonoid content of the extracted products is 308.19 mg quercetin/g of coffee beans. This research will further contribute knowledge for future Sarawak liberica sp. coffee studies.</p> |

INTRODUCTION

Coffee is a well-known beverage that contains caffeine prepared from roasted coffee beans. The major coffee species planted and traded around the world are Arabica (80%) and Robusta (20%), and the minor coffee species planted are Liberica and Excelsa, occupying about 1% only (Wintgens, 2009). *Coffea arabica* L. and *Coffea canephora* Pierre. are the two major coffee plant species contributing to the global coffee industry. It is different in Malaysia: 73% of coffee species grown in Malaysia are Liberica, whereas 27% are Robusta species, as the optimum temperature for Liberica and Robusta species to grow is within the range of 18 to 28°C (Ismail *et al.*, 2014). Liberica coffee (*Coffea liberica*) is a type of coffee with less commercial value and usually grows in lowlands in warm tropical areas such as Liberia, Surinam, and Malaysia (Lim, 2013). Due to historical developments and factors, Liberica plants with higher adaptation and production yields were planted to replace Arabica plants that yielded no cherries in the land of Sarawak, leading to the cultivation of Sarawak liberica sp. coffee. Caffeine, C₈H₁₀N₄O₂ is an existing natural methylxanthine alkaloid found in seeds, nuts, or leaves in plants. Caffeine will be physiologically active in the human body while stimulating the central nervous systems (CNS) and the cardiovascular system when consumed. Caffeine is an important aspect in determining the physiological properties of coffee, and it is the main cause of the bitter taste of coffee. Extraction of caffeine from coffee beans will result in obtaining a white crystalline powder. Caffeine content is different in coffee beans from different species. Coffee beans also contain phenolic compounds and flavonoids that affect their chemical properties, causing differences in flavor, aroma, and potential health benefits. Coffee can have various health benefits such as antioxidant, chemopreventive, anti-inflammatory effects, and antimutagenic. Flavonoids that are commonly found in plants, including catechins, quercetin, kaempferol, and myricetin, also exist in coffee beans. Caffeine can be extracted by a few methods due to its chemical properties as it is readily water-soluble and highly soluble in organic solvents. An organic solvent such as dichloromethane is used to dissolve caffeine from ground coffee beans, and the caffeine