EFFECT OF EXTRACTION METHODS ON YIELD, PHYSICO-CHEMICAL PROPERTIES AND FATTY ACID DISTRIBUTION OF COCOA BUTTER FROM COMMERCIALLY AVAILABLE COCOA (*Theobroma cacao* L.) BEANS IN SRI LANKA

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Abstract

Cocoa butter (CB) is a valuable lipid fraction of cocoa (*Theobroma cacao*) beans and widely used in many industries because of its unique melting properties and fatty acid (FA) composition. Extraction method can influence both quantity and quality of recovered CB. However, the comparative scientific information on their effects on yield, physicochemical characteristics and FA profile of CB obtained from Sri Lankan cocoa beans is limited. The aim of this study was to investigate the effects of extraction methods on yield, physicochemical properties and FA distribution of CB extracted from commercially available cocoa beans in Sri Lanka by using micro-oil expeller assisted screw-press extraction, ultrasonic-cold extraction and Soxhlet-hot extraction using hexane as the solvent. Cocoa beans were collected from local market and dried at 50°C for 8h. After de-shelling, cocoa nibs were ground to powder, which was used for extraction of CB using three methods. Extraction yield, free fatty acid (FFA), peroxide value (PV) and iodine value (IV) were determined using standard AOCS analytical methods. FA distribution was determined by gas chromatography with flame ionization detection. The highest extraction yield was observed in Soxhlet extraction (50.20%), followed by screw-press (35.23%) and ultrasonic extraction (31.99%). Saturated FA content (60.93–63.81%) in all CB samples was higher than the unsaturated FAs. The highest unsaturated fatty acid (USFA) content was observed in ultrasonic extraction (39.09±0.05%), while the lowest was in screw-press extraction (35.82±0.03%). Both FFA and PV showed no significant (p>0.05) differences among the three extraction methods. The highest IV was reported in ultrasonic extraction (37.38 gI_2/100g), corresponding to its higher USFA content. Overall results highlight the effects of extraction methods on CB yield and FA composition with, Soxhlet extraction providing the highest yield, while ultrasonic extraction retaining higher unsaturation which would be valuable information for selecting suitable extraction methods for industrial applications.

Keywords: Cocoa butter, extraction methods, fatty acid composition, physicochemical properties