

(186)

Analysis and Characterization of Four Selected Sri Lankan Seed Oils for the Potential Applications in Cosmetics and Dietary Supplements

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Abstract

As a tropical country, Sri Lanka has a wide variety of oil-bearing seeds explicitly used in Ayurvedic and indigenous medicine. Plant seed oils offer an exciting avenue for the use in cosmetic and dietary supplements due to their fatty acid composition and other non-polar constituents specially found in unsaponifiable fraction. This study aimed to characterize plant seed oils by determining Fatty Acids (FA) composition, constituents in unsaponifiable matter, and other physical properties. *Mesua ferrea* L. (Na), *Crotalaria juncea* L. (Hana), *Ricinus communis* L. (Thel edaru), and *Bauhinia acuminata* L. (Koboleela) seeds having some medicinal values were selected. The oil was extracted using soxhlet extraction method with Hexane. Moisture and ash content, Acid Value (AV), Iodine value (IV), and Smoke Point were also determined. Prepared Fatty Acid Methyl Esters (FAME) and unsaponifiable matter were analyzed using GC-MS. Thermogravimetric Analysis (TGA) was performed to access the thermal stability. *M. ferrea* obtained the highest oil yield of 63.87% while others lay within the range of 28.59-29.94%. Smoke point values of these oils varied from 179.0±10.5°C to 241.5±6.2°C. AVs lay between 4.62±1.18-49.64±2.92 mgKOH/g range. IVs ranged from 6.82±0.89 to 16.82±0.45 gI₂/100g. Ash content values varied from 1.42±0.33% to 3.69±0.29% while the moisture content ranged from 0.69±0.09% to 4.46±0.51%. The yield of unsaponifiable matter of these four seed oils ranged from 0.7024±0.0001% to 1.5864±0.0001%. All except *M. ferrea* oil exhibited higher levels of unsaturated fatty acids than saturated fatty acids. In contrary *M. ferrea* contained almost equal amounts of UFAs and SFAs. The most abundant FA constituents of all the oils were long-chain FAs like Oleic, Linoleic, and α -Linolenic Acid. γ -Sitosterol was the most dominant compound in unsaponifiable fraction in most of the seed oils which indicate their potential use in dietary supplements. The high level of Squalene found in *R. communis* shows its applicability in the cosmetic industry as a moisturizing agent. This analysis found that all 4 oils have the potential to use in dietary supplements and cosmetics.

Keywords: Seed oils, Unsaponifiable matter, Fatty acids, Cosmetics and dietary supplements