

Insight into Green Extraction for Roselle as a Source of Natural Red Pigments: A Review

ABSTRACT

Roselle (*Hibiscus sabdariffa* L.) is a source of anthocyanins as red pigments that is extensively farmed in tropical and subtropical regions, including Indonesia, Malaysia, China, Thailand, Egypt, Mexico, and West India. The roselle plant contains a variety of nutrients, including anthocyanins, organic acids, pectin, etc. Due to the toxicity and combustibility of the solvents, traditional extraction methods for these compounds are restricted. Obtaining pure extracts is typically a lengthy procedure requiring many processes. Supercritical carbon dioxide (ScCO₂) extraction as a green technology is rapidly improving and extending its application domains. The advantages of this method are zero waste production, quicker extraction times, and reduced solvent consumption. The ScCO₂ extraction of natural pigments has great promise in food, pharmaceuticals, cosmetics, and textiles, among other uses. The ScCO₂ technique for natural pigments may also be advantageous in a variety of other contexts. Due to their minimal environmental risk, the high-quality red pigments of roselle rich in anthocyanins extracted using ScCO₂ extraction have a high sustainability potential. Therefore, the objective of this review is to increase knowledge related to the natural colorant of roselle as a substitute for chemically manufactured colorants using ScCO₂ as a green method. This article covers ScCO₂ extraction, particularly as it relates to the optimization of pigments that promote health. This article focuses on the high extraction efficiency of ScCO₂ extraction. Natural colorants extracted via ScCO₂ are regarded as safe compounds, especially for human consumption, such as novel functional food additives and textile and pharmaceutical colors