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Extraction and Utilisation of Natural Colorants from Fruit and Vegetable Waste: A Step towards Sustainability

Imana Pal[1] and Chaitali Bose[2]

[1]Postdoctoral Fellow, Food and Nutrition Consumer Sciences, Faculty of Applied Sciences
Durban University of Technology, South Africa
[2]Research Scholar, P.G. Dept. of Physiology, Hoogly Mohsin College
University of Burdwan, India
E-mail: [1]imanaP@dut.ac.za

Abstract—*Due to the unprecedented rise in global population, agricultural output has grown to meet the surging demand for food. Massive amounts of food waste have been generated as a result of improved agricultural and food production, which is now a danger to both the environment and humanity. To solve these problems, encouraging people to use potential green technologies to control and utilise agri-food waste into useful food additives is essential. One of the new opportunities they have created is the use of natural food colours derived from agri-food waste pigment extraction. Pigments have many applications, leading to a quickly expanding market. Many processed food products have long used synthetic colours. However, due to their negative impacts on human health, scientists have a responsibility to look for better, all-natural, environmentally-friendly alternatives. Since there is a demand for pigments, a safe method of producing them using renewable bioresources is necessary. Industrial manufacturing of natural pigments for use in food, pharmaceuticals, and cosmetics can be met by making use of fruit and vegetable wastes and the associated byproducts. Natural colours like anthocyanins, betalains, carotenoids, and chlorophyll can be found in abundance in these by-products and waste. These natural pigments contain great bio-therapeutic potential and are expected to play a major role in the future of functional food development. The current study, offers up-to-date information on the recovery of natural pigments from food wastes and by-products and their utilisation scenarios in the service of promoting waste management, the circular economy, and sustainable development.*

Keywords: *Food waste, green technologies, food colours, bioresources, biotherapeutic, circular economy.*