Chapter 10

Extraction of Protein and Polyphenols From Agro-Industrial Waste Through Eco-Innovative Technologies

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ABSTRACT

The recovery of valuable sources from waste material is an excellent and encouraging approach towards the ecological significances and food security. Agro-industrial surplus produced by agricultural and food processing activities signifies a rich source of beneficial compounds like minerals, vitamins, and other essential components that are helpful in different industries for different purposes. The demands of plant-

based protein extraction are very high. Along with proteins, various bioactive components, like carotenoids, lycopene, polyphenols, sugars, and polysaccharide, have also been extracted with the help of eco-friendly technologies. The purpose of this chapter is to study the latest researches related to extraction of protein and polyphenols or also to highlight the significances of green-technologies. These eco-friendly technologies play their vital role in producing nutrient rich products from waste residues to overcome the food shortage and to maintain food wastage.

INTRODUCTION

The world's population is increasing day by day and this explosion creates a demand for an increase, in the need for various food and energy resources, causing a significant surge which has led to advancements, in agriculture and related industries (Awasthi et al., 2020). This increasing demand prompted the rapid industrialization and modernization of agriculture and food-related sectors, resulting in enhanced production diversity and the overall improvement of both product quality and quantity (Arun et al., 2020). During various unit operations from different sources like industrial and domestic kitchens, cafeterias restaurants, and different food processing plants the organic waste (biodegradable material that comes from animal or plant sources) was generated at a heavy scale (Melikoglu et al., 2013).

According to FAO, 1.3 billion tons' approx. vegetables, dairy products, fruits, bakery, and other food products are lost during the food supply chain (FAO, 2012). From 2005-2025, in Asian countries, the amount of food wastage rose from 278 to 416 million tons approximately every year. Over the next 25 years, due to demographic and economic growth in Asian countries food wastage is supposed to be increased (FAO, 2014).

The major source of municipal solid waste is yard and kitchen waste. The major portion of kitchen waste comprises peels, seeds, leaves, and extra portions of food products like peels of fruits and vegetables, egg shells, etc. which are not consumed by humans. Instead of Landfilling and throwing away the waste, it may be converted into beneficial products by using Green technologies and could be further utilized for the welfare of human beings and to overcome food wastage and shortage (Hansen et al., 2006).

The peels are considered a valuable source of various bioactive components such as cutin, Protein, and polyphenols (Lu et al., 2019). The extraction of these compounds from peel extracts presents an opportunity for both economic gain and environmental enhancement (Benítez et al., 2018).

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