

Valorization of by products in Vegetable oil Industry using Membrane Technology

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Abstract

The oilseed industry is vast and worldwide growing enterprise. The rapid expansion in oilseed production is reflective of a rising standard of living, with people demanding more fried foods in their diets. Due to the rising world population, the consumption of refined vegetable oils has increased significantly, resulting in an increase in the production of seed by-products. The use of byproducts for valuable component production is a very good alternative for earning additional revenue and to solve related environmental disposal problems. The scope of this brief is to present the state-of-the-art for obtaining value added components (phytochemicals and nutraceuticals) from by-products of the vegetable oil industry emphasizing the expediency of membrane separation process. In treatment of various life style related chronic disease, phytochemicals and nutraceuticals play significant role as functional food component. Plant protein ingredients, specifically proteins hydrolysates, small peptides and natural phytochemicals (natural antioxidants) are of particular interest to the food engineers to meet the demand of functional foods. These biologically active ingredients from natural sources are claimed to be health-enhancing components and used to reduce the risk of diseases or to enhance a certain physiological function. Bioactive components of food origin can serve as both nutrient and non-nutrient, which may exert regulative activities in the human organism beyond basic nutrition. In membrane separation process, the principle of selective permeability of one or more of the constituents through the membrane according to their molecular weight profile are usually employed to enrich bioactive peptides from protein hydrolysates. Use of electrical potential difference (electro-dialysis, electrophoresis) and coupling of electrical potential gradients with pressure (electro-nanofiltration) improves the yield as well as high peptide selectivity. Use of ultrafiltration membranes in the production process of bioactive peptides in form of membrane bioreactors allows the continuous production of specific peptide sequences with functional and nutritional properties. Furthermore, recycling of the enzyme and elimination of residual proteins results in a much improved enzyme yield and process productivity level. Present research activities aims profitable utilization of agro-industrial waste employing the concept of membrane fractionation and membrane bioreactor emphasizing its potential in the field of food-biotechnology.

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