

Food by-products valorisation for the development of high added-value bakery products

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The growing world population leads to an increased need for food, especially valuable proteins. Agriculture and food processing lead to generation of several billions of metric tons of rest raw materials. Side streams are generated at all phases of the value chains, from production to distribution. These raw materials are an easily available source of biomass, however good preservation and processing methods are needed to utilize them for value added products. Utilization of some agroindustrial by-products for value added foods will lead to increased availability of valuable ingredients such as proteins, lipids, vitamins, dietary fibers, polyphenols, antioxidants. They may contribute to consumers' health and well-being when incorporated into food matrices, through increase of essential nutrients and bio-active compounds in the diet. Current developments in food industry and biotechnology provide a big potential for better utilization of by-products as viable carriers of functional ingredients.

In this study, membrane separation processes (micro-, ultra-, nano-, and dia-filtration) and supercritical CO₂ extraction processes were set-up and optimised from lab scale to pilot facilities to extract bioactive compounds (e.g., oils, waxes, fatty acids, carotenoids, polyphenols, tocopherols) from by-products from different food production chains, namely: dairy (whey), oilseeds, and brewery spent grains. Raw materials (by-products) and extracts were characterised for verifying their quality and assuring their safety, by applying different analytical techniques. This way, new ingredients enriched in valuable proteins and health-promoting compounds were generated and tested for use in preparation of bakery products. Techno-functionality of ingredients and final products was evaluated, too.

Keywords: membrane extraction, supercritical CO₂, whey, brewery spent grains, oilseeds

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