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Editorial: Bioprocess optimization: The potential of agro-food by-products

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Editorial on the Research Topic
Bioprocess optimization: The potential of agro-food by-products

This Research Topic mention that bioprocesses are being developed for strategies that properly valorize different sources of agro-food residue and by-products. Food residue and waste constitute one of the major challenges on the path to a sustainable food system, and the valorization of by-products also has the potential to provide a source of bioactive molecules (or high value-added products) that can be used in different industries. This requires innovation and a thorough investigation into how we can promote the development and use of competitive green technologies in the market, taking advantage of the biomass generated from agro-food residue, and establish processes that are both environmentally sustainable and economically sound.

The first paper (Ferreira-Santos et al.) is a collaborative effort between researchers of University of Minho, Instituto Politécnico de Bragança of Portugal, and EVRA S.r.l., Lauria, Osun Solutions S.r.l., Lauria of Italy. The objective of this work was to study the nutritional, chemical and bioactive value of red eggplant from Rotonda, Italy. Ohmic heating was compared to conventional heating, as different solvents were used (water, ethanol 30, 50, and 90% and methanol) for biocompounds extraction. Extracts were evaluated for their total phenolic compounds, antioxidant and antibacterial activities, and its toxicity was assessed in cells, L929 and Caco-2. The authors concluded that ohmic heating is a sustainable technology that increases the extraction yield of biocompounds, with reduced energy consumption and the resulting extracts show low toxicity and high biological activity.

The second paper is a review (Foronda et al.) is a contribution from researchers of Universidad Pontificia Bolivariana, Medellín, Colombia. In this article, a review was carried out through Scopus using a search equation with the keywords

"Electrohydrodynamic drying," "food" and "AGRI" which resulted in a total of 145 articles; which were analyzed through in-depth reading, analyzing aspects such as year, author, keywords, countries, quartile, journal, relationship with agroindustry, mathematical models used and applications in agro-industrial products, this analysis was complemented with the application of Vantage Point software through co-occurrence matrices and cluster analysis.

The third paper (Muñoz-Pabón et al.) is a collaborative effort between researchers of Universidad Nacional Abierta y a Distancia, Bogotá, Colombia, and Universidad del Cauca, Popoyán, Colombia. This paper evaluates the effects of including hyper-protein quinoa flour obtained through abrasive milling in four formulations cooked at 27% moisture content and processed in a laboratory level single screw extruder to determine their physical, textural, and pasting properties. The authors concluded that extruded samples revealed stability in the retrogradation process. Extruded snacks from quinoa could be an alternative approach to produce feed ingredients with high protein contents.

The fourth paper (Ortiz-Gómez, Fernández-Quintero et al.) is a collaborative effort between researchers of National University Open and Distance, Bogotá, Colombia, Universidad del Valle, Cali, Colombia, and Universidad del Cauca, Popoyán, Colombia. The goal of the study was to work a factorial design Box-Behnken to assess the effect of surfactant concentration, sodium hydroxide (NaOH) concentration and maceration temperature on structural and colorimetric properties. The best results show a possible structural change in the amylose/amylopectin ratio of the starch granule at 1,012, 1,077, and 1,150 cm^{-1} bands, which are associated with glycosidic bonds, these bonds were sensitive to NaOH concentration. The authors concluded that the co-products obtained by wet milling could be used in the development of functional foods, such as bread, snacks, pasta, and other products.

The fifth paper (Ortiz-Gómez, Nieto-Calvache et al.) is a collaborative effort between researchers of National University Open and Distance, Bogotá, Colombia, Universidad del Valle, Cali, Colombia, and Universidad del Cauca, Popoyán, Colombia. The objective of this work was to study the effect of two types of defatting of hyperprotein quinoa flour on its structural and rheological properties. The structural and rheological properties of three quinoa hyperprotein flours (without defatting chemically defatted, and mechanically defatted) were evaluated. The authors concluded that defatting conditions increase the protein adsorption kinetics and that the viscoelastic properties of the protein increase when the flour has a lower fat content. Hyperprotein quinoa flour could be used to improve the protein content of products such as snacks, pastas, ice cream, bakery products, meat extenders, among others, due to its foaming, gelling or emulsifying capacity.

The sixth paper (Bayram and Karabacak) is a contribution from researchers of Pamukkale University, Denizil, Turkey. This study aims to optimize a more efficient "green" technique for the extraction of total phenolic compounds and antioxidant capacity from three varieties of unripe grape juice by response surface method using ultrasound-assisted extraction. In this study, physicochemical properties, mineral composition, phenolic and organic acid components of three different verjuice's were also investigated. The authors concluded that the study is expected to contribute to the evaluation of unripe grape wastes, which are very rich in bioactive components, and to increase its economic potential by expanding local production, thus contributing to sustainable agri-food processing.

The seventh paper (Soliman and Nasser) is a contribution from researchers of National Research Center, Cairo, Egypt, and Damanhour University, Damanhour, Egypt. The objective of this paper was to enhance the functionality of fortified stirred yogurt by incorporating carotenoid beads. The carotenoids were extracted from carrot waste using ultrasonication. The authors concluded that yogurt's physicochemical properties, viscosity, and LAB count improve when double-encapsulated carotenoids are added. Also, the resultant stirred yogurt with carotenoids-loaded beads gave carotenoids high stability and sensory acceptability.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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