

From waste to functional ingredients: application of fermentative processes for the valorisation of Tuscan agricultural by-products

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● The economic value of agri-food by-products in Italy has been estimated at €8.5billion/year. The interest in using by-products as functional ingredients is strongly increasing. Despite the growing value of the economic sector of by-products in Italy, most of them are still treated as waste and disposed of in landfills. Their disposal represents a cost for agri-food companies, environmental damage, and a loss of bioactive compounds. Fermentation is a suitable tool that can contribute to the valorisation and reuse of by-products. Therefore, the project aimed to obtain dried fermented food-grade products from Tuscan agricultural by-products and waste from fruit and vegetable processing, with enhanced nutritional potential and peculiar properties. The agricultural by-products were 13, including olive and grape pomace and different fruits and vegetables. The fermentation process for each by-product was optimised using up to 4 consortia of microorganisms (yeasts and lactic acid bacteria), testing different times and temperatures of fermentation and drying. All substrates supported microbial growth, and a general increase in the antioxidant activities was observed. For instance, a fermentation of 48 h at 30°C increased the total phenolic compounds of olive pomace, especially tyrosol and hydroxytyrosol. The results allowed the selection of the best conditions for each by-product to be used during the scale-up process. The scale-up enabled the production of 13 food-grade functional fermented powders with high added value and innovative features, demonstrating the suitable application of fermentation for the valorisation of Tuscan agricultural by-products.

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