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An approach to turn olive mill wastewater into a valuable food by-product based on spray drying in dehumidified air using drying aids

**Athanasios N. Chasekioglou¹, Athanasia M. Goula^{1*}, Konstantinos G. Adamopoulos²,
Harris N. Lazarides¹**

¹Department of Food Science and Technology, School of Agriculture, Natural Environment and Forestry, Aristotle University of Thessaloniki, Thessaloniki, Hellas

²Department of Chemical Engineering, School of Engineering, Aristotle University of Thessaloniki, Thessaloniki, Hellas

Abstract

Several methods have been investigated for olive mill wastewater (OMW) management. However, there has been little success in finding an environmentally friendly and economically viable solution to be generally adopted. The main objective of this work was to develop a new method for OMW management, which simultaneously will lead to the recovery of high-added value substances, based on screening and spray drying. The polyphenol enriched solid fraction derived from screening (OMWS) is spray dried to make an olive powder product rich in antioxidants for dietary uses. A new technique for spray drying OMWS using dehumidified air as drying medium and maltodextrin as drying agent was developed. Different drying experiments were conducted varying the inlet air temperature, the drying air flow rate, the compressed air flow rate, the type of drying agent, and the ratio (OMWS solids)/(drying aid solids). Data for the product collected in the receiving vessel were gathered and the OMWS powders were analyzed for moisture content, bulk density, and solubility. The achieved values of product recovery (87 – 94%) were much higher than those obtained in a typical spray drying system (< 3%). Thus, the combination of maltodextrin addition and use of dehumidified air as drying medium seems to be an effective way of producing a free-flowing olive mill wastewater powder to be included in food formulations.

Keywords: By-products; food waste; olive mill wastewater; product recovery; stickiness

* Tel./fax: +30 2310 991658.

E-mail address: athgou@agro.auth.gr

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