

Plackett-Burman Design for Microencapsulation of Blueberry Bioactive Compounds

Authors : Feyza Tatar, Alime Cengiz, Dilara Sandikçi, Muhammed Dervisoglu, Talip Kahyaoglu

Abstract : Blueberries are known for their bioactive properties such as high anthocyanin contents, antioxidant activities and potential health benefits. However, anthocyanins are sensitive to environmental conditions during processes. The objective of this study was to evaluate the effects of spray drying conditions on the blueberry microcapsules by Plackett-Burman experimental design. Inlet air temperature (120 and 180°C), feed pump rate (20% and 40%), DE of maltodextrin (6 and 15 DE), coating concentration (10% and 30%) and source of blueberry (Duke and Darrow) were independent variables, tested at high (+1) and low (-1) levels. Encapsulation efficiency (based on total phenol) of blueberry microcapsules was the dependent variable. In addition, anthocyanin content, antioxidant activity, water solubility, water activity and bulk density were measured for blueberry powders. The antioxidant activity of blueberry powders ranged from 72 to 265 mmol Trolox/g and anthocyanin content was changed from 528 to 5500 mg GAE/100g. Encapsulation efficiency was significantly affected ($p < 0.05$) by inlet air temperature and coating concentration. Encapsulation efficiency increased with increasing inlet air temperature and decreasing coating concentration. The highest encapsulation efficiency could be produced by spray drying at 180°C inlet air temperature, 40% pump rate, 6 DE of maltodextrin, 13% maltodextrin concentration and source of duke blueberry.

Keywords : blueberry, microencapsulation, Plackett-Burman design, spray drying

Conference Title : ICFSN 2014 : International Conference on Food Science and Nutrition

Conference Location : Paris, France

Conference Dates : August 28-29, 2014