

Modelling and determination of physico-chemical and morphological properties of microencapsulated red amaranth powder

ABSTRACT

Amaranth betacyanin, responsible for a red or violet colour, is extracted from *Amaranthus gangeticus* by using the water extraction method and microencapsulated by spray drying. The physicochemical and morphological properties of microencapsulated betacyanins are assessed as influenced by the inlet temperature and the maltodextrin concentration. The process was conducted using a mini spray dryer and maltodextrin is used as an encapsulating agent. Central composite design is applied and thirteen experiments are carried out. The responses are betacyanin retention, moisture content, water activity, particle densities, particle size, colour values and antioxidant activity. The quadratic effect of the inlet temperature is determined to be positive on betacyanin retention whereas the antioxidant is affected by the linear change of maltodextrin concentration. The moisture content and water activity of spray-dried betacyanin powders are insignificantly affected by inlet temperature and maltodextrin concentration individually. Only the effect maltodextrin concentration is found to have a significant effect on colour value. Particle densities and sizes are slightly affected by the process conditions studied.

Keyword: Amaranth; Colour stability; Natural colourant; Pitaya; Spray drying modelling