Abstract

Rapid changes are taking place in the diet and lifestyle which is associated with industrialization, urbanization, economic improvement and market globalization. This dynamics has a significant impact on the health and nutritional status of population. There has been an increasing demand for health promoting food products by the consumers all over the world. Anthocyanins are colorful pigments, which are present abundantly in jamun fruits. Studies have demonstrated that these bioactive compounds show functional benefits to humans due to their antioxidant capacity. A process for the development of stable anthocyanins from natural sources is most desirable. Microencapsulation using spray drying is one of such alternatives. Spray drying is an economical method for producing dry powders. The conversion of liquid juice into a dry form increases the product stability, resulting in reduced volume and packaging and easier handling and transportation. Moreover, the short residence time and the use of lower temperatures make spray drying suitable for heat sensitive food components, such as anthocyanins. With this background, the aim of the present investigation was to optimize the process parameters for the production spray dried jamun juice powder using three different carrier agents. Inlet and outlet temperatures, carrier agent concentration, total soluble solids, feed flow rate and pressure was optimized by single factor optimization based on the product yield. All the produced samples were analyzed for physicochemical and functional properties, instrumental and sensory analysis and shelf life for six months.

The effect of inlet temperatures on physicochemical properties of spray dried jamun juice powder was carried out. Inlet temperature plays a major role in the production of spray dried samples. The inlet temperatures were varied, where as other parameters like outlet temperature, carrier agent concentration and feed flow rate were kept constant. Response surface methodology was used to optimize the operating conditions of spray drying to increase the product yield. The independent variables were inlet air temperature, wall material concentration and total soluble solids. The responses were product yield, moisture and anthocyanin content. The highest powder yield was obtained in the sample produced by using maltodextrin as carrier agent. Results showed the significant difference in the physicochemical and functional properties. The sample produced with maltodextrin has been proven best from sensory analysis. Higher inlet temperature increased the moisture content of the powder, and led to the formation of larger particles. Powder samples showed water activity values...
below 0.3, which is good for powder stability. The color of the jamun juice powder was mainly affected by inlet temperature, leading to the formation of powders that were significantly brighter and less purple as the inlet temperature increased. Powders produced at lower inlet temperatures showed smoother particle surfaces whereas higher inlet temperature showed spherical particles with some shrinkage as analyzed by scanning electron microscope. Inlet temperatures had also a significant effect on the physicochemical properties. Statistical analysis revealed that independent variables significantly affected all the responses. Storage studies showed that the samples produced with different carrier agents can be stored for six months. The powder obtained in this study may be used as food additive for incorporation into functional foods due to the presence of anthocyanins. The present study to influence the different carrier agents, temperatures and other parameters to produce spray drying jamun juice powder and the effect of temperature and other important parameters on physicochemical, functional, instrumental properties to make better product and use for the consumers. The results obtained during the present investigation indicate that good quality powders with less moisture and water activity can be produced by spray drying, which demonstrates the great potential for use of such powders in food industry.