

Optimize the process for spray drying of aloe vera (*Aloe barbadensis*) gel

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SUMMARY : Aloe vera drying process experimental design was developed by considering the factors such as inlet drying air temperature, feed rate and maltodextrin per cent with their levels; (153.18-186.82°C), (19.32-22.68 ml/min) and (11.59-28.41 %), respectively. The objectives of present research work was to select the range of operational parameters for spray drying of Aloe vera gel in such a way that by minimizing the changes in moisture content, bulk density and maximizing the yield, overall acceptability of powder, the quality can be improved during drying process. A mathematical model was developed that determines optimum operating conditions by optimizing the above parameters. The response surface method (RSM) with a criteria based on acceptable moisture reduction and quality. Comparison between the experimental and calculated results showed that the mathematical model could predict fairly well. The optimal parameters claimed for the model of optimization to dry the Aloe vera gel with the good characteristics in powder yield, moisture content, bulk density, solubility and overall acceptability were found to be 14.42 per cent, 6.46 per cent, 0.67 g/ml and 7.28, respectively.

How to cite this paper: Gore, T.B., Devadas, C.T., Chandwade, G.S. and Patil, S.S. (2011). Optimize the process for spray drying of aloe vera (*Aloe barbadensis*) gel, *Internat. J. Proc. & Post Harvest Technol.*, 2 (2) : 106-110.

Research chronicle : Received : 17.08.2011; Sent for revision: 05.10.2011; Accepted : 29.11.2011

KEY WORDS : Aloe vera gel, Spray drying, Process optimization, Response surface method

Aloe vera (*Aloe barbadensis* Miller) is a perennial plant of Liliacea. Its name is most likely derived from the Arabic word *Alloeh* meaning shining bitter substance. Aloe vera is a spicy cactus-like, xerophytic plant. It is not a cactus but a member of lily family. It has now been designated as its own family, known as Aloeaceae. The plant has many common names and is often referred to as Aloe vera, burn plant, first aid plant or medicine plant or silent healer.

Aloe vera is known as Ghee-kanwar or Ghi-kuvar in Hindi and has been in use since ages as folk medicine. It grows wild in Maharashtra, Tamil Nadu states, whereas, Andhra Pradesh, Gujarat and Rajasthan states are known for its cultivation. Major areas of Aloe vera production are Alwar in Rajasthan, Satnapali in Andhra Pradesh, Rapipla in Gujarat and dry areas of Maharashtra and Tamil Nadu. The annual consumption of Aloe vera extract

by the Indian pharmaceuticals companies is 200 tones which is met from the wild sources from the states of Maharashtra and Tamil Nadu.

The resulting dried product may be around 598, presented in different forms such as powders, granules or agglomerates, depending upon the physical and chemical properties of the feed and dryer design and operation (Andrade and Flores, 2004). Each foodstuff has powder requirements to be met during manufacture (Master, 1991). The advantages of spray drying as a continuous and economic process allowing the production of good quality powders is established. (Pérez and Farías, 1995) From this point of view, the present study was carried out with following objective.

– Standardize the processing conditions for quality Aloe vera gel powder and study the effect of inlet temperature and maltodextrin concentration on yield, moisture content, bulk density and overall acceptability of Aloe vera gel powder at feed flow rate 21 ml/min.

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EXPERIMENTAL METHODS

Standardization of process for the preparation of Aloe vera gel powder was done by spray dried in a LSD 48 mini spray dryer (JISL), as per the methods outlined by Banga and Singh (1994). The inlet temperatures, Flow rate were maintained 160-180°C and 20-22 ml/min, respectively with maltodextrin of 15-25 per cent. This