

Microwave Freeze Drying of Fruit Foams for the Production of Healthy Snacks

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Abstract : Nutritional quality and taste of dried fruit products is still often unsatisfactory and does not meet anymore the current consumer trends. Dried foams from fruit puree could be an attractive alternative. Due to their open-porous structure, a new sensory perception with a sudden and very intense aroma release could be generated. To make such high quality fruit snacks affordable for the consumer, a gentle but at the same time fast drying process has to be applied. Therefore, microwave-assisted freeze drying of raspberry foams was investigated in this work and compared with the conventional freeze drying technique in terms of nutritional parameters such as antioxidative capacity, anthocyanin content and vitamin C and the physical parameters colour and wettability. The following process settings were applied: 0.01 kPa chamber pressure and a maximum temperature of 30 °C for both freeze and microwave freeze drying. The influence of microwave power levels on the dried foams was investigated between 1 and 5 W/g. Intermediate microwave power settings led to the highest nutritional values, a colour appearance comparable to the undried foam and a proper wettability. A proper process stability could also be guaranteed for these power levels. By the volumetric energy input of the microwaves drying time could be reduced from 24 h in conventional freeze drying to about 6 h. The short drying times further resulted in an equally high maintenance of the above mentioned parameters in both drying techniques. Hence, microwave assisted freeze drying could lead to a process acceleration in comparison to freeze drying and be therefore an interesting alternative drying technique which on industrial scale enables higher efficiency and higher product throughput.

Keywords : foam drying, freeze drying, fruit puree, microwave freeze drying, raspberry

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