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Quality valorization of microencapsulated probiotics dehydrated by microwave drying

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In this study, alginate microcapsules were made to protect the viability of Saccharomyces cerevisea cells used here as a probiotic model. Dehydration is required for a proper addition of the microencapsulated material in foods. Thus, in this study the dehydration of the microcapsules, in a fix-fluidized bed and heated using microwave power, was analyzed to reduce the deterioration of probiotic material observed in other conventional drying techniques and even freeze-drying. Contrarily, this drying technology here studied allows to obtain high drying rates through the application of operational strategies, with low and moderate heat levels, to ensure the quality of dehydrated material. Different operating strategies were obtained by combining the thermal gradient, between air and product, and the heat level of the product. Three different thermal gradients, between 5 and 40ºC, were applied by microwave drying; either for the gradient or the product temperature, giving rise to a total of 9 different operational strategies that were conveniently analyzed under kinetic and quality criteria. The results obtained were compared with the results obtained by freeze-drying that was assumed to be the reference process. The results showed that the encapsulation system along with the selection of the optimum conditions for dehydration by the proposed drying process, allows increasing the viability of the microcapsules considerably respect to other reference processes. This, together with other favorable aspects such as minor process time and energy, show clearly the convenience of adopting this drying technique for the purpose of this work.

Biography

Jose Ignacio Lombrana received his PhD in industrial chemistry from the University of the Basque Country (UPV/EHU). He has occupied several positions as researcher and teacher at the UPV/EHU and, from 1997 he holds the position of Professor in chemical engineering. His research activity addresses advanced technologies for water contaminant removal and the application of drying processes in which he has led various projects. He is the author of more than 70 papers in internationally highly recognised journals in the fields of advanced technologies for water treatment and drying processes for foods.

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