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DEHYDRATED LACTIC CULTURES

The latic acid bacteria (LAB) are a group of microorganisms that shows as general characteristic the production of lactic acid from the fermentation of glucose and, depends on the metabolic pathway of fermentation, they are classified as strict homofermentative (produce only lactic acid), facultative heterofermentative (produce lactic and acetic acids) or strict heterofermentative (produce lactic, acetic and formic acids, ethanol and carbon dioxide). Besides these compounds, the LAB are also able to produce bacteriocins, hydrogen peroxide, exopolysaccharides, enzymes with lipolytic, proteolytic and molecules associated to flavor of some foods. The food industry stands out by broad use of LAB in the production of fermented milks, vegetables and meats. From technological point of view, these bacteria are applied in food industry in order to define the sensorial characteristics of products, improve the texture, increase the water retention in fermented milks, develop holes in cheeses, act as biopreserver and inhibit the growth of spoilage and pathogen microorganisms. Depending on the metabolic characteristics, the LAB culture can be used to start the fermentation (starter culture) or act as a coadjuvant to accelerate the maturation or to modify the organoleptic properties of the food (NSLAB culture). In both cases, the culture should be pure with high population density (~10^9 - 10^{11} CFU.g^{-1}) and the cells should be metabolically active. Many these cultures used in food processing are commercialized in dried form ensuring both reduction in transportation costs and space storage inside the industry. The dehydration of cells is often performed by freeze-drying that consists in freezing the culture and promote the water removal by sublimation. The greater advantage of this technique lies on the fact that the fast freezing followed by sublimation promotes low mechanical damage to cellular structure. In this way, the cells suffer less injuries keeping high cellular viability after the process. On the other hand, the freeze-drying is a batch procedure that demands high times of operation and consumes a substantial amount of energy. Considering these operational drawbacks, several works has appointed the spray drying as being a promising alternative to replace the dehydration of LAB cultures by freeze-drying, in 1996 only 386 scientific articles involving the term "spray drying bacteria" were registered in the Science Direct platform while August 2019, 2717 articles are available. This increasing interest can be explained by the fact that this technology

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consumes up to 10 times less energy than freeze-drying and can be conducted in continuous process. Moreover, some works have proposed that spray dried culture can be storage at room temperature reducing the cost with refrigeration. Despite all advantages, the spray drying promotes a series of injuries to cells causing viability loss and alterations of technological properties of culture. According to the drying conditions, some cultures have their population substantially reduced; making it the main factor limiting the industrial application of spray dried bacteria. Therefore, it is very importante to create strategies to improve the cell viability of spray dried LAB.

References

Cani, P. D. (2017). Gut microbiota — at the intersection of everything. Nature reviews gastroenterology & hepatology, 14,1-2.

Bintsis, T. (2018). Lactic acid bacteria : their applications in foods, 6(2), 89–94.

Frantzen, C. A., Kleppen, H. O., Holo, H. (2017). Diversity of Lactococcus lactis in undefined mixed dairy starter cultures revealed by comparative genome analyses and targeted amplicon sequencing of epsD. Applied and Environmental Microbiology, 84(3).

Huang S, Vignolles ML, Chen XD, Le Loir, Y, Schuck P, Jan G., Jeantet R. (2017a). Spray drying of probiotics and other food-grade bacteria: A review. Trends in Food Science and Technology, 63,1–17.

Schuck, P., Dolivet, A., Méjean, S., Hervé, C., Jeantet, R. (2013). Spray drying of dairy bacteria: New opportunities to improve the viability of bacteria powders. International Dairy Journal, 31(1), 12–17.

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