

The stressing life of *Lactobacillus delbrueckii* subsp. *bulgaricus* in soy milk: other starters may help

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Abstract

Lactobacillus delbrueckii subsp. *bulgaricus* is a dairy starter implemented in yogurt and in diverse other fermented products, including cheeses. It has a long history of safe use, as well as documented probiotic effects, including alleviation of lactose intolerance. Soya products are increasingly consumed and the development of fermented soymilks requires development, and thus scientific knowledge, to allow such transition. We thus investigated *L.bulgaricus* adaptation to soymilk, compared to cowmilk(1). It did not grow in soymilk, alone or in co-culture with *S.thermophilus*, while acidification occurred. Comparative analysis between milk and soy environments revealed major differences in terms of morphology and proteome composition. Lactobacilli appeared deformed and segmented in soy. Major differences in both the surface and the cellular proteome indicated upregulation of stress proteins, yet downregulation of cell cycle and division machinery. These results indicate that soymilk is a stressing environment for the yogurt starter *L.bulgaricus*. As an alternative, we developed a co-culture of 2 probiotics, namely *Lactiplantibacillus plantarum* and *Propionibacterium freudenreichii*(2). Interestingly, *L.plantarum* grew and allowed growth of *P.freudenreichii*, although soymilk clearly stressed this probiotic. Finally, we developed a pipeline to select “2-in-1” bacterial starters, adapted to utilization of soymilk, and with demonstrated probiotic effects(3), to develop innovative fermented products.

Key words: *Lactobacillus*, *Propionibacterium*, soymilk, cow's milk, yogurt, probiotic, stress

Read more:

1. Jan G, Tarnaud F, Rosa do Carmo FL, Illikoud N, Canon F, Jardin J, Briard-Bion V, Guyomarc'h F, Gagnaire V. 2022. The stressing life of *Lactobacillus delbrueckii* subsp. *bulgaricus* in soy milk. Food Microbiol 106:104042.
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