Whey utilization by novel non-dairy industry derived probiotic strains for the production of starter cultures

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Abstract

Whey is the major by-product of the dairy industry, produced in large quantities and usually disposed off causing major environmental pollution due its high organic load.
Several methods have been proposed for whey valorisation. Whey protein concentrate (WPC) production with subsequent utilization of the remaining lactose-rich stream for biotechnological production of added-value products and/or starter cultures has attracted the interest of several studies.

At the same time, probiotic foods receive market interest as health-promoting, functional foods. Likewise, most probiotic bacteria are lactic acid bacteria and, among them, lactobacilli represent one of the fundamental microbial groups. In contrast to well-adapted industrial starters, wildtype strains that naturally dominate traditional fermentations tend to have higher metabolic capacities, which can beneficially affect product quality, for instance with regard to aroma formation and/or food safety. Nevertheless, although traditional fermented foods are a plentiful source of microorganisms with probiotic characteristics, most probiotic strains are traditionally isolated from dairy products.
Results that incorporate probiotic strains, as starter cultures, in different type of fermented products than the industry source isolated from, are scarcely found in literature.

In the frame of that, two lactic acid bacteria (*Lactobacillus plantarum* E10 and *Lactobacillus pentosus* E108, which in previous study were found to possess desirable in vitro probiotic properties) isolated from naturally fermented olives, were incorporated in synthetic lactose medium and deproteinized whey fermentations, in order to investigate their potential as starter cultures for novel dairy products development.

Both strains were able to grow in lactose and produce lactic acid. Fermentations kinetics, in both synthetic media and whey, using the E10 strain showed that the strain performed better at 33 ^{o}C compared with fermentations carried out at 37 ^{o}C, while the opposite effect was the case regarding the strain E108. Nonetheless, strain E108 showed better fermentation performance in both substrates. It is worthnoting that lactic acid conversion yields were high (over 0.9 g/g), in all cases, and the obtained results were characterized as quite promising. Optimization of the fermentation media and incorporation of those strains in dairy products are still necessary in order to evaluate and assess their technological characteristics for applications as novel probiotic starters.

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