Freeze dried non-dairy LAB strains as novel starter cultures with potential applications in dairy products

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ABSTRACT

Whey is the main cheese manufacturing by-product, representing an important environmental pollutant due to the high volumes produced worldwide and the high organic content. The production of starter cultures using cheese whey as a low-cost and nutrient rich fermentation substrate entails an emerging valorization approach.

The aim of this work was the exploitation of cheese whey for the production of novel starter cultures. In these terms, we performed Screening of two non-dairy isolated stains for potential utilization in dairy product manufacturing.

Strain cultures of *L. plantarum* LQC 820 and *L. sakei* LQC 845 previously isolated from sausages was evaluated and optimized as fermentation starter cultures. Experimental data obtained by fermentations performing at 500 ml working volume and 5% inoculum (10^9 cfu/ml), using 4% (w/v) synthetic lactose medium or deproteinized whey containing 5% w/v lactose, with pH 6.5 and incubated at 37 ^oC in static conditions. The produced bacterial biomass was collected, and freezed-dried cells were produced. The viability of lyophilized cells was evaluated along with their efficacy for lactose fermentation.

L. plantarum LQC 820 strain exhibited better fermentation activity in the case of wet cells, hence selected for further experiments. Fermentations time using freeze-dried cells was slightly higher, still up to 42.2 g/L of initial lactose was consumed after 48h of fermentation. Lactic acid concentration (in whey fermentations), reached 50 g/L and 43 g/L, using wet and freeze dried cells, respectively. High lactose to lactic acid yield was obtained in both cases ($\geq$ 1 g/g) and the final biomass production ranged from 3.5 to 4 g/L. Viability of freeze dried LQC 820 strain remained at the levels of 10^9 cfu/ml.

The obtained results highlight the potential of novel starter cultures production through cheese whey valorization. Further optimization of the fermentation media along with incorporation of the selected strains into dairy products are still necessary to assess the technological aspect for applications as novel probiotic starters

Acknowledgement
This study is part of the project "Valorization of cheese dairy wastes for the production of high added-value products" (MIS 5007020) which is implemented under the Action "Targeted Actions to Promote Research and Technology in Areas of Regional Specialization and New Competitive Areas in International Level" funded by the Operational Programme "Ionian Islands 2014-2020" and co-financed by Greece and the European Union (European Regional Development Fund).