

Title: Acidification Kinetic and growth of *Streptococcus thermophilus* TA 040 and *Lactococcus lactis* CECT 4434 from whey

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Abstract:

Whey is a by-product of dairy industry which has a high nutritional value. Therefore, it would be of great interest to exploit this waste as a fermentation medium for the production of high value biomolecules. In Brazil, it is estimated that approximately 50% of whey are improperly discarded, causing the pollution of rivers and water sources due to its high content of organic matter. On the other hand, studies have been reported the probiotic properties of *Lactococcus lactis*. As a result, *Lc. lactis* as well as *Streptococcus thermophilus* have been proposed for starter culture preparations in dairy industry. In this context, we examined the acidification kinetic and growth of *S. thermophilus* TA 040 and *Lc. lactis* CECT 4434 using whey as a culture medium. Cultures of *Lc. lactis* and *S. thermophilus* were inoculated into 100 mL of whey and the initial average count of each inoculum was approximately 10^8 UFC/mL. After inoculation, the samples were incubated in the *Cinetique d'acidification* (CINAC) fermentation system. The kinetic parameters, particularly maximum acidification rate (V_{max}), time to reach pH 5.0 ($t_{pH5.0}$) and to complete the fermentation ($t_{pH4.5}$) were determined. The time for *S. thermophilus* and *Lc. lactis* to complete fermentation (i.e., when the pH reached 4.5) was 13.8, 7.9 and 49.2 % shorter than without inulin, respectively. In particular, the V_{max} values were 9.63×10^{-3} pH units/min and 5.29×10^{-3} for *Lc. lactis* subsp. *lactis* and *S. thermophilus*, respectively. As expected, the shortest fermentation time ($t_{pH4.5}=5.33$ h) was obtained by *Lc. lactis*. The counts of *Lc. lactis* and *S. thermophilus* were about 1.7×10^8 CFU/mL and 1.9×10^8 CFU/mL, respectively. These fermentations were mainly characterized by a partial consumption of lactose and formation of lactic acid as a main product of the fermentation. It can be concluded that whey can be used as a culture medium with additional carbon source thus providing the power supply needed for the fermentation product of the microbial cultures studied, the CECT 4434 *Lc. lactis* subsp. *lactis* and *S. thermophilus* TA 040.

This work dealt with the effect of whey as a culture medium to improve the quality of dairy fermented products

Key-words: lactic acid bacteria, acidification kinetic, whey