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Effect of different sonication conditions on specific aminopeptidase activities of *Lactobacillus paracasei* ATCC 334 and *Lactobacillus helveticus* DPC 4571 strains

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One of the most effective methods to develop flavor in cheese is to increase the content of microbial enzyme in cheese matrix. This can be achieved by addition of some lactic acid bacteria which are rich in proteolytic enzymes. The biological role of enzyme systems is to provide the amino acids needed for flavor development. Permeabilization and/or autolysis of LAB enhance the total pool of intracellular enzyme activity released into the cheese matrix. Heat-shock, freeze-shock, high-pressure homogenization, chemical treatments are common methods used for flavor development. For this purpose, sonication can be used as an alternative method to the existing applications because it is fast, reproducible and does not change intracellular enzyme activity. The aim of this study was to investigate the effects of various sonication treatments on permeabilization and resulting changes in accessibility of specific intracellular enzymes in two *Lactobacillus* strains. That is, *Lactobacillus paracasei* ATCC 334 and *Lactobacillus* helveticus DPC 4571 strains cultivated in MRS (De Man, Rogosa and Sharpe agar) broth and were subjected to sonication treatments (pulse: 0.5 amplitude: 50µm, 75µm, 100µm and Pulse: 1 amplitude: 50µm, 75µm, 100µm) at different periods (30 and 45 min). Intracellular enzymes, i.e., PepN, PepX and PepI aminopeptidase activities were measured using synthetic substrates such as Leu-p-nitroanilide, Gly-Pro-p-nitroanilide and Pro-p-nitroanilide, respectively. The effectiveness of sonication treatments was also tested with bacterial counts on MRS. Both bacteria showed significant increases in enzyme activity values compared to the control (untreated sonication) increasing with pulse and amplitude. The activity of PepN within tested the enzyme activities was the highest for both strains. PepN activity for these strains was almost the same; however, PepX activity for *Lactobacillus* helveticus DPC 4571 was higher than that of *Lactobacillus paracasei* ATCC 334 especially at these conditions (pulse 1, amplitude 75 and 100µm). PepI activity was slightly high for *Lactobacillus paracasei* ATCC 334 for all sonication treatments. In general, an increase in application period caused an increase in all enzyme activities for the cell free extracts. However, this has not caused a significant change in activities between pulse 1, 75µm and 100 µm amplitudes. The decrease in bacteria counts was higher in *Lactobacillus paracasei* ATCC 334 than other bacteria, especially when the increasing from pulse 0.5 to 1 and in 75µm and 100µm amplitudes. In the same way, the bacterial counts decreased considerably with the increase in application period. In conclusion, sonication application may be used to produce permeabilized *Lactobacillus* strains having enhanced accessibility to intracellular enzymes. This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) as project no: 214O172.

Biography

Elif Dagdemir graduated from Ataturk University, Faculty of Agriculture, and Department of Food Engineering in 1998. She received Master's and Doctor's degree in the same university. She has been working as an Associate Professor in the Department of Food Engineering since the year 2012. Her specialty is on Dairy Technology. She participated in numerous national and international congress related to her expertise field.

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