

THE USE OF SOLID STATE FERMENTATION FOR FOOD AND FEED PLANT MATERIAL PROCESSING

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Abstract. The present study is aimed at selection of the optimal conditions for solid state fermentation of flaxseed, white lupine, defatted soy flours and Jerusalem artichoke tubers and integrated evaluation of the changes of product physico-chemical properties during the processing.

The moisture content, pH kinetic and total titratable acidity (TTA) as well as contents of D(-) and L(+) isomers of lactic acid, amylolytic and proteolytic activities, excreted by *Lactobacillus sakei*, *Pediococcus acidilactici* KTU05-7 and *Pediococcus pentosaceus* KTU05-8 during submerged (SMF) and solid state fermentation (SSF) of plant products were analysed.

The results showed the impact of moisture content of substrate on formation of organic acids and vitality of LAB during SSF in the analysed plant products. The fermented products of 50 % moisture were found to have the lowest values of pH and the highest TTA and content of bacteria.

The highest amylolytic activity excreted by *L. sakei* and *P. acidilactici* were measured in Jerusalem artichoke products (1280.7 and 765.7 AU g⁻¹ (SMF fermentation) and 1075.0 ir 390.6 AU g⁻¹ (SSF fermentation) respectively). On the contrary, plant products treated by SSF showed the lower proteolytic activity of LAB. Results indicated that SSF technology allow to produce the plant products with higher amounts of L-(+) isomers of lactic acid (from 2.8 g/100 g in fermented with *P. acidilactici* Jerusalem artichoke to 10.3 g/100 g of fermented with *L. sakei* lupine products) as well as lower formation of D(-) isomers of lactic acid (from 0.18 g/100 g in fermented with *P. acidilactici* Jerusalem artichoke to 7.05 g/100 g in fermented with *P. pentosaceus* soy products) ($P \leq 0.05$).

Keywords: solid state fermentation, lactic acid fermentation, hydrolases, lactic acid D(-)/L-(+) isomers.