Optimizing growth condition for bacteriocinogenic lactic acid bacteria and bacteriocins production

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Bacteriocinogenic lactic acid bacteria (LAB) have attracted significant attention due to their GRAS status and antimicrobial property. The objectives of this study were to determine the optimal growth conditions for LAB and bacteriocins production, and correlations of pH, optical density (OD), bacteriocin activity and viability of LAB. Growth curves of four identified bacteriocinogenic LAB strains of *Lactobacillus curvatus*, *Enterococcus faecium*, *Lactobacillus paracasei subsp. paracasei* and *Streptococcus thermophilus* isolated from dairy products were investigated using a Bioscreen C. Various combinations of growth condition were tested including two culture media, five initial pHs (4.5, 5.5, 6.2, 7.4, and 8.5), and three growth temperatures (20, 37, and 43 °C). For the selected growth conditions, pH, OD, bacteriocin activity (AU) and viability of LAB (CFU ml⁻¹) were determined. Our results indicated that *L. curvatus*, *Ent. faecium*, and *L. paracasei subsp. paracasei* grew well on both culture media at 20, 37 and 43 °C while *Strep. thermophilus* was only able to grow at 37 and 43 °C. The OD values were significantly affected by the initial pH of media ($p < 0.001$) and the optimal pH was found between 6.2 and 7.4. Bacteriocin production was significantly affected by the culture media ($p < 0.001$). The optimal condition for LAB strains to produce bacteriocins was in MRS broth with initial pH 6.2 and incubated at 37 °C. The correlations of pH, OD value, AU and viability of LAB were also found. These research findings provided useful information on the application of LAB and bacteriocins efficiently to improve food safety and quality.