

DETERMINATION OF THE FEASIBILITY OF YOGHURT STARTER CULTURES OVER MULTIPLE FERMENTATION CYCLES IN SET YOGHURT PRODUCTION

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Yoghurt performance depends on starter cultures, mainly *Lactobacillus delbrueckii* subsp. *Bulgaricus*, and *Streptococcus thermophilus*. Commercial yoghurt typically uses these cultures once, due to increased operational cost. This study evaluated the feasibility of multiple fermentation cycles using the back slopping method to reduce starter culture cost in commercial set-yoghurt production. Three commercial starter cultures (Yoflex Express 6, Yoflex SLB 3, and Yoprox 367) were tested with four fermentation cycles (C0 – C3). In back slopping, 3% fermented yoghurt was reused as inoculum for the next batch. Fermentation time, moisture content, pH, acidity, lactic acid bacteria (LAB) viability, texture, colour, and sensory evaluation (colour, aroma, taste, texture, after taste, and overall acceptability) were assessed during each cycle. Each test used three replicate yoghurts per culture. From cycle one to cycle three, pH and acidity showed a similar pattern to the initial cycle (C0). In C0, pH decreased from 4.5 (day one) to 4.2 (day fourteen), while acidity increased from 0.81% to 0.95%. Fermentation time decreased in the second fermentation cycle (2.0 h); but rose to 4.5 h in the third and fourth fermentation cycles, remaining typical commercial yoghurt fermentation time below 4.5 h. The moisture content remained within acceptable values (75.90 – 77.39%), with minor variation among starter cultures. Sensory evaluations by 30 untrained panelists using a five-point hedonic scale indicated consistent consumer acceptability across all cycles. Yeast counts were not observed in the initial fermentation cycles. Higher yeast counts were observed in the fourth fermentation cycle (246 CFU mL⁻¹). LAB viability declined with repeated use, raising contamination risk. Nevertheless, yoghurt starter cultures could be reused for up to four fermentation cycles with acceptable product quality with most parameters. Among cultures, Yoprox 367 and SLB 3 demonstrated the most stable performance, with minimal variation in quality and high acceptability.

Keywords: Back slopping, Lactic acid bacteria, Multiple fermentation cycle, Set-yoghurt, Starter cultures, pH