Differential Culture and Enumeration of Lactobacillus plantarum in the Presence of Yogurt Starter Bacteria in Probiotic Yogurt

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Background & Objectives: *Lactobacillus plantarum* is a probiotic species which posses many health effects on its host. Assessment of improved Methods of differential culture and enumeration of this probiotic species besides the yogurt starter bacteria is necessary for production of probiotic yogurt.The main purpose of this study was to assess different selective media and incubation conditions for achieving an appropriate methods for enumeration and identification of *L. plantarum* PTCC 1058, *L. delbrueckii* ssp. bulgaricus and *Streptococcus thermophilus* in probiotic yogurt.

Methods: The yogurt samples contained 1% of *L. plantarum* were industrially prepared by the use of YoFlex express culture and stored at 4˚ C. After 24 h, they were cultivated in seven different agar media including: MRS, MRS-Bile, MRS (acidified, pH: 5.2), Yogurt-Lactic-agar (YL), Elliker's-Lactic-agar (EL), M17 and ST-agar (*S. thermophilus*), as pour plate and surface plate culture and were incubated in aerobic and anaerobic conditions at three different incubation temperatures: 15, 37 and 45˚ C, for 48 to 72 h. *L. plantarum* and yogurt bacteria were enumerated every week over 6 weeks. Also, the growth ability of *L. plantarum* and yogurt bacteria in concentration of 0.5 to 5 % of bile salts were investigated.

Results: The results indicated that both *L. plantarum* and yogurt bacteria could grow in concentration (≤ 2%) of bile salts. So, MRS-Bile medium was not suitable for differentiation of L. plantarum and yogurt bacteria. The best condition for differentiation of this probiotic species beside yogurt bacteria was cultivation on MRS medium and incubation at 15˚ C for 72 h. YL and EL media and aerobic incubation at 37 ˚ C for 48 h were suitable for enumeration of of L. bulgaricus. Also, surface plate culture in YL, M17 and ST media and aerobic incubation at 45˚ C for 48 h, was useful for enumeration of S. thermophilus in yogurt.

Conclusion: It was concluded that the best condition for differentiation of *L. plantarum* in the precence of the yogurt starter bacteria is cultivation in MRS-agar and incubation at different incubation temperature.

Keywords: *Lactobacillus plantarum*; Probiotic Yogurt; Differential Culture; Yogurt Starter Bacteria