Studies on the Preservation of Starter Activity of Lactobacillus acidophilus

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ABSTRACT

Cell suspensions of Lactobacillus acidophilus prepared by the addition of 5~15% of gelatin, gum arabic or lecithin were frozen at -20, -40 or -80°C, then freeze-dried. The water contents of the freeze-dried products were in the range of 3.04~3.86%. The survival rate of the lyophilized culture varies with the type and concentration of the protectants added and the prefrozen temperatures. Reference to the protectant type, the survival rate was in the order of gelatin > gum arabic > lecithin. Reference to the protectant concentration, it is in the order of 15% > 10% > 5%. Reference to the freezing temperature, it was in the order of -80°C >-40°C > -20°C. The survival rates of all lyophilized cultures treated with protectants were higher than that of untreated. The specific activity of b-galactosidase of the culture increased both after frozen and freeze-dried, which was likely a result caused by mechanical damage of cell membrane during freezing and freeze-drying. The lyophilized cultures of L. acidophilus were stored at different temperatures for 3 months. Reference to the storage temperature, the storage stability of the culture was in the order of 0°C > 25°C > 50°C. Reference to the protectant type, it was in the order of gelatin > gum arabic > lecithin during storage at 0°C and 25°C, however, the gum arabic had the best protective effect during storage at 50°C. Reference to the freezing temperature, it was -80°C > -40°C > -20 °C. Regardless of protectant type and concentration, the specific activity of b-galactosidase increased with storage time. The lyophilized culture of L. acidophilus added with lecithin had a higher b-galactosidase specific activity than those added with gelatin or gum arabic.

Keywords : Lactobacillus acidophilus ; lactic acid bacteria ; culture preservation ; freez-drying ; lecithin ; gelatin ; gum arabic ; β-galactosidase specific activity

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