

Somjit Thanomwongwattana 2006: Study on Quality of Silage on Lactating Cow. Doctor of Philosophy (Biotechnology), Major Field: Biotechnology, Department of Biotechnology.  
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Production and application of *Lactobacillus pentosus* KUB ST 10-1 as the silage inoculant were investigated. The cultivations of *L. pentosus* KUB ST 10-1 in various selected media revealed the highest growth in the cornsteep liquor-molasses medium (CSLM), followed by Nata de coco fermented medium (NDCFM), MRS broth and urea-molasses medium (UM) with the cell concentrations averaging at 12.019, 11.706, 11.257 and 10.694 log cfu/ml, respectively ( $P < 0.05$ ). To lower the cultivation cost, NDCFM was used as the media for further experiment. The cultivations of the strain in the 2 liter fermenter with pH ranging from 5.5-7.0 showed no significant differences in the growth ( $P > 0.05$ ). The laboratory spray-drying of the strain in different conditions were studied. The survival rate of 71.01% with the lowest moisture content of the product (5.35%) could be obtained from the spray-drying with 20% skim milk powder (w/v) as the carrier medium and the inlet and outlet air temperatures at 120°C and 80°C, respectively. For the pilot scale drying, 19% skim milk powder and maltodextrin at the ratio of 3 : 1 (w/w) gave high survival rate (0.28%) and yield of 58.85%. Effects of protective agents on survival rate of cell were also studied. During spray drying, no significant differences were found in viable cell number of the dried cell powder in the presence or absence of ascorbic acid and monosodium glutamate. The survival rate of cell during 150 days storage at 4°C and 30°C were 9.375% and 0.002%, respectively. It was also found that 2% monosodium glutamate showed the highest survival rate (20.145%) during storage at 4°C. The silage fermentations were investigated. The optimal condition was obtained from the supplementation of *L. pentosus* KUB ST10-1 at the concentration of  $10^5$ - $10^7$  cfu/g forage and 2% glucose (w/w) in the forage prior ensiling. The silage fermented with the dried inoculants showed the fermentation parameters, nutritional values and the dry matter degradability in the rumen better than the control. Moreover, the cows fed with the silage gave the same amount and quality of milk as of those fed with fresh grass. In addition, the feed cost to yields of 4% fat corrected milk trended to lower in the cow fed with inoculated silage.

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Student's signature

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Thesis Advisor's signature