

Thiraporn Kliangkham 2010 : The Study of Stability of Probiotics under Partial Freeze-Drying.  
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Probiotics is the food supplement products which are mostly used in animal feed industries since it is able to prohibit the growth of pathogen and enhance the food absorption and digestive system in the intestine. It also affects on the balance of microorganisms in the intestine of the animal as well. Thus the objectives of the research are to study the stability of probiotics microorganism under partial freeze-drying and to develop preservation technique from this drying process. Therefore the experimental design of 3x3x3x2 factorial in completely randomized with 3 replications was used to study the factors effect on prototype probiotics microorganism of *Lactobacillus acidophilus* TISTR 1034. Three types of cryoprotectants: - lactose, glucose and sucrose and each has 3 levels of concentration: - 5, 10, and 15% and 3 levels of drying temperature: - 60, 75, and 90°C as well as with/without addition of CaCO<sub>3</sub> for assisting drying were the studied factors. The result was analyzed for the difference by the analysis of variance and Duncan's new multiple range tests in order to obtain the appropriate drying condition specific for the strain of microorganism.

It was found that the percentage of the survival amount of microorganism from 3 levels of drying temperature was significantly different ( $p < 0.05$ ). At the drying temperature of 60 °C, the percentage of the survival mount of microorganism was highest at 36.91% ( $4.95 \times 10^7$  CFU/ml) while at 90 °C, it was minimal at 12.56% ( $1.67 \times 10^7$  CFU/ml). However at the same drying temperature and same concentration of cryoprotectant without the addition of CaCO<sub>3</sub>, the survival amount of microorganism from samples treated with different types of cryogenic protectants was significantly different ( $p < 0.05$ ). Lactose at 15% provides highest survival amount the microorganism while sample with 5% sucrose obtained the minimum. Moreover survival amount of microorganism could be significantly increased with an assisting of adding 1:1 v/w CaCO<sub>3</sub> into MRS broth during drying. Therefore drying temperature of 60 °C and using 15% lactose as cryoprotectant together with 1:1 v/w CaCO<sub>3</sub> provided such a co-factor affecting-condition that the percentage of the survival mount of microorganism was highest at 99.63-99.69% ( $1.42 \times 10^8$  -  $1.44 \times 10^8$  CFU/ml) and significantly different ( $p < 0.05$ ) from others.

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Student's signature

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Thesis Advisor's signature