

Orawan Oupathunpanont 2010: Development of Fermented Kanom-jeen by *Lactobacillus plantarum*. Doctor of Philosophy (Agro-Industrial Product Development), Major Field: Agro-Industrial Product Development, Department of Product Development. Thesis Advisor: Associate Professor Thongchai Suwonsichon, Ph.D. 210 pages.

Fermented rice, sedimented starch and drained wet starch from Kanom-jeen manufacture in Pathum Thani and Chachoengsao provinces were used to screen and classify lactic acid bacteria. Majority of the strains was homofermentative rods. Two strains, A1 and A39, were classified into a group of high acid productivity and starch hydrolysis activity. Based on identification of API system with respect to utilization of various sugar for acid production, the strain A1 and A39 were identified as *Lactobacillus plantarum*. Only *L. plantarum* A1 was selected to develop a good starter culture having fermentation time within 24 h and providing Kanom-jeen like commercial one. Afterwards, two methods of mixing starter cultures were investigated. One was a solid form that mixed *L. plantarum* A1 with sterilized rice flour and the other was liquid form that mixed *L. plantarum* A1 with buffer solution. Results showed that the liquid form yielded minimum fermentation time within 24 h and could be kept the number of cells highest at  $10^9 - 10^{10}$  cfu/ml. It was selected as a suitable method for producing starter culture and could be kept in refrigerator at  $4^\circ\text{C}$  up to 4-weeks. When this liquid form of starter culture was used to ferment rice flour, after fermentation for 24 h, the fermented rice flour contained 1.01% lactic acid content, 33.54% amylose content, 0.39% reducing sugar content 6.44% protein content and pH 3.49. At  $95^\circ\text{C}$ , its swelling power and solubility were 15.00 g/g and 27.94%. Its onset temperature measured by the differential scanning calorimetry was  $71.19^\circ\text{C}$ . Its Peaking viscosity and final viscosity measured by the rapid visco analyzer were 285.04 and 373.00 RVU, respectively. Results of electronic nose showed that volatile compounds such as alcohol, aldehyde, ketone and ester of the fermented rice flour were increased when compared with rice flour without fermentation. Sensory descriptive analysis of Kanom-jeen produced from the liquid starter of *L. plantarum* A1 was investigated using ten highly trained panelists. Result showed that all 33 sensory attributes were not significant difference from the commercial Kanom-jeen ( $p > 0.05$ ). In addition to pilot scale study, scaling production up from 5 kg in a laboratory to 50 kg in a manufacture did not significantly ( $p \geq 0.05$ ) change any quality of Kanom-jeen. Process acceptance test of 15 manufacturers demonstrated that they all accepted this new developed process with a liquid form starter culture of mixed *L. plantarum* A1. Moreover, results of acceptance test of 200 consumers, confirmed that they mostly like this Kanom-jeen and its overall liking score was 8.12.

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Student's signature

Thesis Advisor's signature