

Thesis Title	Production of Lactic Acid Bacteria as Starter Culture
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ABSTRACT

The production of yoghurt, the interesting health food product in Thailand, are mostly based on the oversea starter cultures. In the large scale manufacture, it will be more economic if the starter culture can be self-made in Thailand. So the study of *Streptococcus thermophilus*, one of the starter strains was carried out in order to produce high cell concentration for making the yoghurt starter culture. *S. thermophilus* is gram positive coccus. It is usually found in pairs or long chain when grown in liquid media. It has no spore and is non-motile. It produces no catalase and it reduces tetrazoliums. When *S. thermophilus* was grown in various media that stating as the enumerated media for lactic acid bacteria, then was incubated at various temperatures, pH, and without or with shaking conditions. The results showed that the good supporting media for growth derived in orderly, i.e. sterile whole milk, 10% skim milk, 10% whey (adjusted pH to 6.8), M17, and MRS. The proper

temperature was 43°C and the pH range was around 6 to 8. The non-shaking and shaking conditions provided similar results of bacterial growth. At least 1 log cycle of cells increased was observed after 4 hours of incubation. The cells produced acid and then lowered pH of the medium. Sucrose, and lactose appeared to be essential carbon sources and yeast extract appeared to be essential nitrogen source. Vitamins such as pantothenic acid, riboflavin, folic acid, and niacin did not promote the growth of *S. thermophilus* in the presence of yeast extract.

When the cell production was enlarged to the high scale of 1L medium in 2L stirred-tank bioreactor, without or with automatically pH control. The agitation was at 200 rpm, just enough to make the medium homogenously. The bacterial growth showed the same performance. The automatic control of constant pH in the bioreactor could not enhance its growth. Both pH and lactic acid produced seemed to have some effects on bacterial cells. The cell recycle system by half replacement of the new medium which could reduce the amount of lactic acid and increase the pH of the medium, suggested the trend to increase the growth of *S. thermophilus*.

The storage of the concentrated culture in this study was suggested that the concentrated culture should be kept in 30% sucrose at -20°C or milk product at 4°C for 2 weeks. The viability was 80% or 70% respectively.