

IMPLICATION EFFECT OF PROBIOTIC BACTERIA TO YOGHURT QUALITY AND ENZYME ACTIVITIES

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The aims of this research is to understand the implication effect of probiotic bacteria as starters to yoghurt quality and the activities of enzyme in yoghurt. Results indicated that the probiotic bacteria combination as starters were the highest enzyme activities, even for yoghurt quality there is no significancy as starters. The activities of enzyme lipase and protease, from the probiotic starters, has highest activities than the controle starters, respectively for lipase and protease are 0.45 and 1.70 unit/ml; 0.19 and 1.65 unit/ml; then 0.27 and 1.62 unit/ml; 0.18 and 1.45 unit/ml from *Bifidobacterium* spp and *Lactobacillus acidophilus*; *Lactobacillus bulgaricus* and *Streptococcus thermophilus* and *Lactobacillus acidophilus*; *Lactobacillus bulgaricus* and *Streptococcus thermophilus* and *Bifidobacterium* spp; then *Lactobacillus bulgaricus* and *Streptococcus thermophilus*.

Keywords: enzyme activities, *Bifidobacterium* spp, *Lactobacillus acidophilus*, *Lactobacillus bulgaricus*, *Streptococcus thermophilus*.

The lactic acid bacteria have long been used in fermentation to preserve the nutritive qualities of various foods. Other than major function of a starter culture as lactic acid producer, it will act a source of proteolytic enzyme during growth in milk, finally contributing to the preservation of the fermented product as a consequence of a number of inhibitory metabolites produced by the lactic cultures (O'Keeffe and Hill, 1999). Lactic acid bacteria are among the most important probiotic microorganism typically associated with the human gastrointestinal tract (Holzapfel, et al, 2001). *Bifidobacterium* spp and *Lactobacillus acidophilus* as yoghurt starter produced lower lactic acid and acetic acid than *Lactobacillus bulgaricus* and *Streptococcus thermophilus* (Lengkey and Adriani, 2009). Health benefits associated with fermented milk products can be provided by the bacterial starter culture or by dietary adjuncts added after the product is fermented (Nighswonger, et al, 2007). Probiotics control intestinal pathogens through the production of antibacterial compounds, including lactic and acetic acid and antibiotic-like substances, competition for nutrients and adhesion sites, increased and decreased enzyme activity, increased antibody levels. (Hose and Sozzi, 1991). According to Adriani, et al (2009), lipase activities in yoghurt with *Bifidobacterium* spp. And *Lactobacillus acidophilus* starters is higher (0.45 unit/ml) than *Lactobacillus bulgaricus* and *Streptococcus thermophilus* starters (0.18 unit/ml).

MATERIAL AND METHODS

The milk, from farm animals at the faculty.

The bacteria, are pure cultivated *Bifidobacterium* spp, *Lactobacillus acidophilus*, *actobacillus bulgaricus* and *Streptococcus thermophilus*. The identification of the cultures was based on the characteristics of the lactobacilli and streptococci as described in Bergey's Manual of Determinative Bacteriology (Holt, et al, 1994)

Lactobacillus bulgaricus and *Streptococcus thermophilus* are the controle starters.

Yoghurt quality, was tested by preference test.

Enzyme activities, in unit/ml.

RESULTS AND DISCUSSION

Preference test.

For preference test, we're using 25 well trained tester, for testing the aroma, colour, consistency, taste and texture. In Table 1, presents the results of the preference test. The preference test is used for determine yoghurt quality.

Table 1. Preference test

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Yoghurt starters	Consumer Preference					
	Aroma	Colour	Consistency	Taste	Texture	Average
B-La	3.30	3.35	2.95	2.80	3.00	3.08
Lb-St-B	3.45	3.30	3.25	3.15	3.45	3.32
Lb-St-La	3.25	3.36	3.31	2.70	3.01	3.12
Lb-St	2.70	3.25	3.20	3.05	3.15	3.07

Notes:

B-La = *Bifidobacterium* spp. : *Lactobacillus acidophilus* = 1 : 1

Lb-St = *Lactobacillus bulgaricus* : *Streptococcus thermophilus* = 1 : 1

Lb-St-B = *Lactobacillus bulgaricus* : *Streptococcus thermophilus* : *Bifidobacterium* spp = 1 : 1 : 1

Lb-St-La = *Lactobacillus bulgaricus* : *Streptococcus thermophilus* : *Lactobacillus acidophilus* = 1 :

1 : 1

Scale : 1 = dislike extremely

2 = dislike moderately

3 = moderately

4 = like moderately

5 = like extremely

From Table 1, for yoghurt quality the highest average for preference test is yoghurt from combination starters *Lactobacillus bulgaricus*, *Streptococcus thermophilus* and *Bifidobacterium* spp; and then *Lactobacillus bulgaricus*, *Streptococcus thermophilus* and *Lactobacillus acidophilus*; and *Bifidobacterium* spp, *Lactobacillus acidophilus* and the lowest is from *Lactobacillus bulgaricus* and *Streptococcus thermophilus* starters; even there is no significancy for yoghurt quality between all yoghurt. Probiotic bacteria starters (*Bifidobacterium* spp.and *Lactobacillus acidophilus*) has higher results if added to the controle starters, or without controle starters.

Lactobacillus bulgaricus and *Streptococcus thermophilus* are the controle starters.

Enzyme activities.

Table 2. Enzyme activities

Yoghurt starters	Enzyme activities (unit/ml)	
	Protease	Lipase
B-La	1.70	0.45
Lb-St-B	1.62	0.27
Lb-St-La	1.65	0.19
Lb-St	1.45	0.18

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Notes:

B-La = *Bifidobacterium* spp. : *Lactobacillus acidophilus* = 1 : 1

Lb-St = *Lactobacillus bulgaricus* : *Streptococcus thermophilus* = 1 : 1

Lb-St-La = *Lactobacillus bulgaricus* : *Streptococcus thermophilus* : *Lactobacillus acidophilus* = 1 : 1 : 1

Lb-St-B = *Lactobacillus bulgaricus* : *Streptococcus thermophilus* : *Bifidobacterium* spp. = 1 : 1 : 1

From Table 2, the enzyme activities of *Lactobacillus bulgaricus* -*Streptococcus thermophilus* starters has the lowest activities for both enzyme (protease and lipase), but if we add *Lactobacillus acidophilus* or *Bifidobacterium* spp. as starter, the enzyme activities will raised. The highest enzyme activities is the yoghurt with probiotic bacteria starters only (*Bifidobacterium* spp and *Lactobacillus acidophilus*). This is to be in accord with Hose and Sozzi, 1991; that probiotics will increase or decrease the enzyme activities.

CONCLUSIONS

Yoghurt quality for all starters are no significance, but yoghurt with starters of *Lactobacillus bulgaricus* : *Streptococcus thermophilus* : *Lactobacillus acidophilus* got the highest points (3.12 points). Enzyme activities of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* starters has the lowest enzyme activities (protease and lipase), but as we add *Bifidobacterium* spp or *Lactobacillus acidophilus* starters, enzyme activities will raised; but the highest enzyme activities are in yoghurt with combination probiotic starters (*Bifidobacterium* spp and *Lactobacillus acidophilus*).

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