ABSTRACT

*Lactobacillus salivarius* K4 and K7 were isolated from chicken intestine. These 2 strains produced bacteriocins against several bacteria. According to the effective inhibiting activities of these strains, its probiotic properties were therefore, further studied. The inhibition activity of cell free supernatant (CFS, pH 4) against indicator strains and strains survival *in vitro* study were determined at pH 2, 2.5, 3 and 3.5, concentration of bile salts at 0, 0.3, 0.6 and 1%, concentration of ox-bile at 0, 3, 6, 9 and 12%, and also fresh chicken bile in MRS at 3%. The percentage of cell survival in gastrointestinal tract model was performed at pH 2, 3, 4 and 7. Besides, antibiotic susceptibility for these strains was also study. Its antimicrobial activity showed that these strains inhibited both gram positive and negative in CFS. *Lb. salivarius* K4 could survive at pH 3-3.5, while *Lb. salivarius* K7 could survive at pH 2.5-3. These strains could survive in ox-bile concentration up to 12%. However, in the presence of 3% chicken bile revealed slightly decreased in cell number. *Lb. salivarius* K4 no survival was found in bile salts. These strains survived in gastrointestinal tract model at pH 3, 4 and 7. On the contrary, *Lb. salivarius* K4 and K7 were completely destroyed in the presence of gastric juice at pH 2. *Lb. salivarius* K4 and K7 was resistant to Gentamycin, Kanamycin, Nalidixic acid, Neomycin, Norfloxacin, Oxolinic acid, Tetracyclin, Oxytetracyclin and Streptomycin. This study indicated that *Lb. salivarius* K4 and K7 could be used as probiotic for food-industry in the future.

The effect of nitrite 100 ppm on growth of *Lb. salivarius* K4 and K7 was investigated. The result found that these 2 strains could survive in the presence of nitrite lower than in control
group. However, *Lb. salivarius* could grow in the presence of nitrite better than *Lb. salivarius* K4.

In order to investigate whether the rapid reduction of salmonellae concerned to the use of starter culture or the synergistic inhibitory effect between starter culture and garlic on salmonellae during Nham fermentation, an inhibitory effect of *Lb. salivarius* K4 or K7 and 5% of sterile fresh garlic on *S. Typhimurium* TISTR 292 which is contaminated in Nham product has been studied in the sterile condition of Nham Model Broth (NMB) with the same water activity value as Nham (0.97). The results confirmed that NMB fermented with 5% fresh garlic and *Lb. salivarius* K4 and K7 exhibited the best diminishment of *S. Typhimurium* TISTR 292 (within 24 hr of fermentation) compared to NMB with 5% fresh garlic or fermented with *Lb. salivarius* K4 or K7 alone.

The effect of *Lb. salivarius* K7 as starter culture on growth of salmonellae in Nham fermented with *Lb. salivarius* K7 and naturally fermented products (without using starter culture) was investigated. It was found that all Nham samples with starter cultures exerted a higher percentage of lactic acid and led to more rapid in pH reduction than those samples without starter cultures. However, pH value of Nham with *Lb. salivarius* K7 was higher than 4.5 in day 4 of fermentation. This can be explained that Nham fermented with starter culture revealed no inhibitory effect on *S. Typhimurium* TISTR 292 during Nham fermentation.

To analyze amount of *Lb. salivarius* K4 or K7 and *S. Typhimurium* TISTR 292 from Nham Model Broth and Nham products 16S rRNA genes were amplified from the DNA extract from all bacteria and analyzed by real-time PCR. Nham Model Broth was shown to contain these three strains using the 16S rRNA gene-based real-time PCR assay and the standard plate count method. The 16S rRNA gene-based real-time PCR assay could not detect *S. Typhimurium* TISTR 292 which is contaminated in Nham products but shown to contain this strain using standard plate count method.