ABSTRACT

This research was to study the effect of bacteriocin and lactic acid on reduction of microorganisms in pork. The bacteriocin type used in this study was pediocin PA – 1 from Pediococcus pentosaceus TISTR 535 isolated from Nham. (Thai fermented meat)

The study consisted of 3 experiments. The first experiment the effect of bacteriocin and lactic acid on reduction of Salmonella Derby, Salmonella Anatum and Staphylococcus aureus. (in vitro test), inoculated the starter culture approximately 4 log CFU/ml were studied. The experiment was conducted in 2x4x6 factorial arrangement in completely randomized design. Three factors were as followed: Factor A was 2 of lactic acid levels (0 and 1%), Factor B was 4 of bacteriocin levels (0, 320, 640 and 1280 AU/ml) and Factor C was 6 durations of study (0, 6, 12, 18, 24 and 30 hours). The results showed that the use of 1% lactic acid + pediocin PA – 1 could instantly and effectively reduce the counts of S. Derby better than the use of pediocin PA – 1 or lactic acid only. When lactic acid was used together with pediocin PA – 1 at 640 and 1280 AU/ml, the bacterial counts could be reduced to 0.13 and 0.16 log CFU/ml, respectively (P<0.01). The bacterial counts were reduced to 0.13 and 0.11 log CFU/ml when using only pediocin PA – 1 at 640 and 1280 AU/ml, respectively. There were no different among treatments in efficacy of reduction of S. Anatum (P>0.05) at 0th hour. When using only pediocin PA – 1 at the high concentration (1280 AU/ml), the bacterial counts could be reduced to 0.06 log CFU/ml after 6 hours but there was no significant difference compare to using
pediocin PA - 1 1280 AU/ml with 1% lactic acid (P>0.05). There were no difference in efficacy between using 1% lactic acid and pediocin PA - 1 320 AU/ml. However, using only 1% lactic acid showed more efficacy on reduction of S. aureus than using either only pediocin PA - 1 or together with lactic acid which 1% lactic acid could reduce the counts to 0.11 log CFU/ml at h 24 (P<0.01).

The second experiment was to study the effect of bacteriocin and lactic acid on reduction of microorganisms on the surface of pork from unhygienic slaughterhouses at different storage temperatures and storage times in 3x3x5 factorial arrangement in completely randomized design. Three factors were as followed : Factor A was 3 combinations of 1% lactic acid + pediocin PA - 1 (0%, 1% + 640 AU/ml and 1% + 1280 AU/ml). Factor B was 3 levels of the storage temperatures (0-4°C, 10-15°C and 30-35°C) and Factor C was 5 durations of storage(pre - dip,0, 3, 6 and 12 hours) .The results showed that the bacterial counts on meat surface in all treatments were continuously reduced from h 0 to h 12 of the study when stored at 0-4°C. At h 0, meat dipped in 1% lactic acid + pediocin PA - 1 1280 AU/ml and stored at 10-15°C had bacterial counts of 6.53 log CFU/cm² which lower than the control group (6.66 log CFU/cm²) (P<0.01), but after h 3, the bacterial counts was constant until h 12 of the study. After dipping meat in sterilized water and using lactic acid and pediocin PA - 1 (640 and 1280 AU/ml), the amount of bacterial counts were limited and constant until h 12 of the study even though they were stored at 30-35°C. However, the meat stored at high temperatures together with using lactic acid and pediocin PA - 1, lowered the pH value to ultimate pH at h 6 (5.56 and 5.47 respectively) and had the highest lightness of meat (L⁺) (54.03) at h 12 of the study (P<0.05).

The third experiment was to study the effect of bacteriocin and lactic acid on the reduction of microorganisms on different wholesale cuts of pork from unhygienic slaughterhouses. The experiment was conducted in 3x3 factorial arrangement in completely randomized design. Two factors as followed : Factor A was 3 combinations of lactic acid + pediocin PA - 1 (0%, 1% + 640 AU/ml and 1% + 1280 AU/ml) and Factor B was 3 different wholesale cuts (Boston Shoulder, Loin and Belly). The results showed that the bacterial counts were reduced significantly (P<0.01) and pH value decreased significantly as the concentrations of pediocin PA - 1 increased in all cuts. The loin
dipped in lactic acid and pediocin PA-1 at 1280 AU/ml had higher lightness (L*) value (56.07) than the group using pediocin PA-1 640 AU/ml (54.11) and the controlled group (52.07) (P<0.05).