CHEMICAL, PHYSICAL AND STRUCTURAL CHARACTERISTICS OF PORK LOINS FROM FOUR QUALITY GROUPS

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INTRODUCTION

Quality variations in meat are intimately and complex related to physical and chemical changes in muscle postmortem. The biochemical and structural changes of PSE and DFD muscle are well known but little is known about RSE or RFN muscle. In the 1980's, measurements of the initial and ultimate muscle pH were widely used as a rapid indicators of pork quality. Kauffman *et al.*(1993) showed that pH_{45} is not appropriate for predicting ultimate pork quality for single carcass, and also demonstrated that measurement of pHu alone is not a reliable indicator of the PSE condition. Since the techniques used to evaluate PSE, RSE, RFN and DFD meat are numerous, the purpose of this study was to evaluate selected quality characteristics for PSE, RSE, RFN and DFD pork loins after different periods of postmortem storage.

MATERIAL AND METHOD

The samples were taken from Large White and Landrace pig at a liveweight of about 95kg. Samples of muscle (*M. longissimus dorsi* from the 5th - 8th ribs) of different qualities were collected from 160 pig, 45min postmortem and stored at 2℃. For the purpose of this paper data from certain laboratory measurements at 45min, 24hr and 72hr postmortem were used: pH, objective color(using colorimeter), sarcomere length using a laser technique(Voyle, 1971), cooking loss(after heating to 75℃), drip loss during 3 and 7days storage at 2℃. WHC by the filter paper method(Grau and Hamm, 1957) and Instron shear force value. Measurements of pH_{45} and pHu, colour and drip were to allocate samples to one of four quality classes; Pale, Soft, Exudative(PSE): L^*>55, drip>7.5%, Reddish-pink, Soft, Exudative(RSE); L^*=49 ~ 55, drip >7.5%, Reddish-pink, Firm, Non - exudative(RFN) : L^*=49~55, drip loss<7.5% and Dark, Firm, Dry(DFD) : L^*<49, drip<5.5%.

RESULTS AND DISCUSSION

At 45min postmortem, DFD meat had higher pH values compared to PSE, RSE and RFN meat. After 24hr postmortem the differences between RSE, RFN and PSE meat are not significant with regard to pH. L^*(lightness) and b^*(yellowness) values at 45 min postmortem differed among PSE, RSE, RFN and DFD meat, with PSE meats having the highest values, then RSE, RFN and DFD meats. L^* values in all quality muscles increased consistently from 45min to 24h postmortem. Sarcomere length at the time of death were similar in all quality muscles, whereas sarcomere length at 24hr postmortem tended to be slightly longer in PSE muscle. DFD muscles had the highest WHC, and lowest cooking loss. The PSE and RSE muscle 24hr postmortem had higher cooking loss than those from the other two groups. There were no significant differences in Water-holding capacity and cooking loss 24 postmortem between PSE and RSE muscles. Warner *et al.*(1995) reported that RSE samples were similar to RFN samples in protein solubility and myosin denaturation. Drip loss at 7day postmortem was different between all four quality groups, which DFD muscles being < RFN muscles < RSE muscles < PSE muscles. Compare to PSE muscles, the RFN samples lost 5.84% less drip loss during 3days storage at 2℃ postmortem. The DFD muscles had the highest shear force during storage at 2℃ postmortem. However, PSE and RSE muscles show lower shear force value than RFN muscle. DFD beef muscles were considerably tougher than normal muscles, which were tougher than PSE muscles(Wulf *et al.*, 1995).

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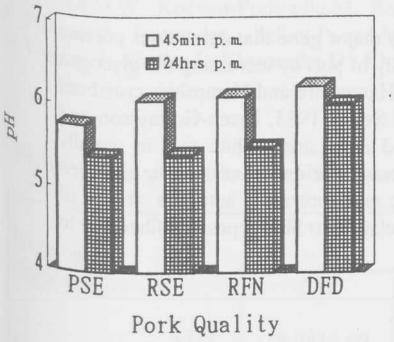

Fig. 1. Changes of pH in LD muscle of pork quality groups during p.m. storage.

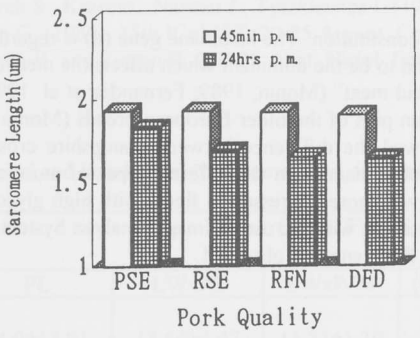

Fig. 2. Changes of sarcomere length in LD muscle of pork quality groups during p.m. storage.

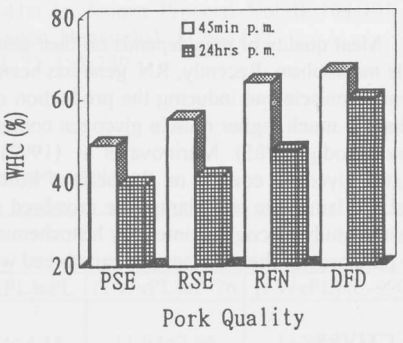

Fig. 3. Changes of WHC in LDmuscle of pork quality groups during p.m. storage.

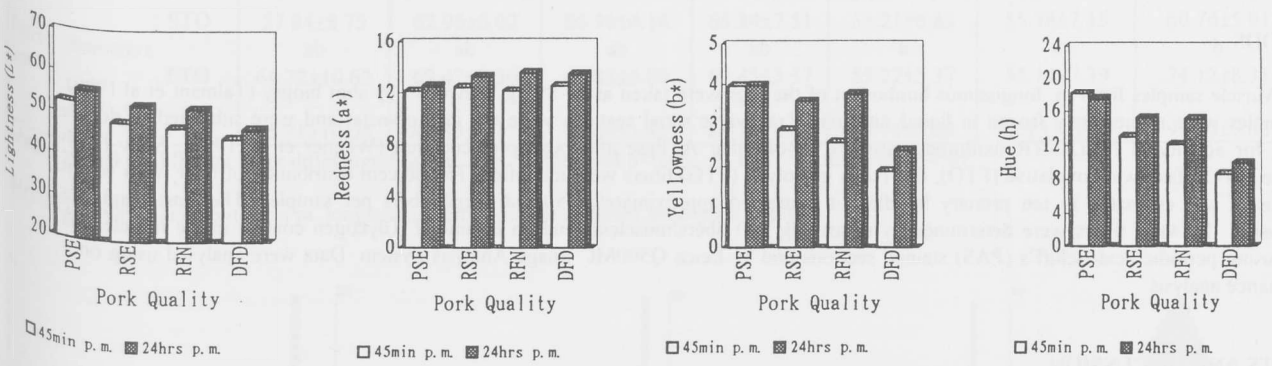

Fig. 4. Comparison of color values(L*, a*, b* and h) according to four pork quality groups.

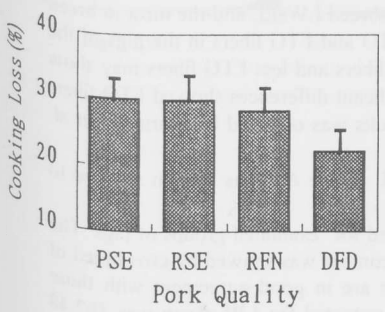

Fig. 5. Comparison of % cooking loss in LD muscles of four pork quality groups.

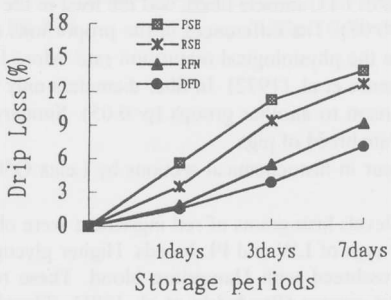

Fig. 6. Changes of % drip loss for four classes of pork quality during postmortem storage.

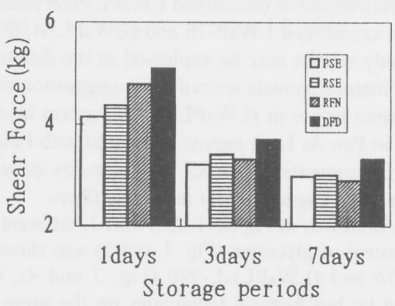

Fig. 7. Changes of shear force for four classes of pork quality during postmortem storage.