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PHYSIC-CHEMICAL CHARACTERISTICS OF SURIMI FROM NORMAL AND PSE PORK

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Background:

The pale,soft and exudative (PSE) condition is often found in pork and is a major problem for the pork industry worldwide. PSE meat is caused by the denaturation of muscle proteins that takes place when a muscle has a low pH and high temperature (Offer and Knight, 1988). This phenomenon occurs principally in pigs among meat animals due to post-mortem glycolysis rate is faster than other animals. Glycolysis results in lactic acid accumulating in muscle, the pH of muscle falls from the initial high value, to the ultimate postmortem pH around 5.5. PSE pork expresses that it has poor water holding capacity, meat color, and texture. Surimi is repeatedly washed with 5-10℃ water until all the water-soluble proteins are removed. Washing discards not only water soluble proteins but also other undesirable substances, such as fat, blood, lactic acid and enzymes. Usage of surimi processing technology may overcome the defects of PSE pork to improve the utilization of the PSE pork.

Objectives:

The present experiment was performed in order to study the properties of surimi from PSE and normal pork loin. Find out a way to increase the utilization of PSE pork in meat processing.

Methods:

In the present work, a total of twenty-four normal and PSE *longissimus dorsi muscle* was purchased from a local pork retail store. Fresh pork were minced through a 5 mm plate and divided into four treatments: A treatment (normal minced pork), B treatment (PSE minced pork), C treatment (normal pork surimi) and D treatment (PSE pork surimi). The surimi was prepared using the method described by Pan *et al* (1991). The pH and electric conductivity was measured by a pH Probe (Suntex, TS-1, Taiwan) and a microprocessor conductivity meter (WTW, LF 196, Germany). Moisture content was obtained as the percentage of weight lost after heating at 105℃ for 24 hrs. The water holding capacity, emulsifying capacity and emulsifying stability of the samples were made using the procedure described by Ockerman (1983). The gel strength of cooked samples was determined using a Reho meter (Fudoh NRM-2010J-CW, Japan). A sodium dodecyl-sulfate polyacrylamide gel electrophoresis (SDS-PAGE) was performed on protein extracts (Laemmli, 1970). The data were analyzed with randomized blocks design, variances and differences among treatments were tested with the Tukey test for significance at the 5% level (SAS, 1995).

Results and discussions:

The result showed that moisture content ranged from 76.3 to 78.2% in *longissimus dorsi* muscle (table 1). The pH value of PSE pork was lower than normal pork ($p<0.05$), but the pH value of surimi made from PSE pork was higher than PSE pork ($p<0.05$). The electric conductivity of normal pork was lower than PSE pork ($p<0.05$). Otherwise, normal and PSE surimi had higher electric conductivity than normal and PSE pork ($p<0.05$). The water holding capacity (WHC) of PSE pork was lower than normal pork. But the WHC of surimi made from PSE pork was higher than PSE pork. This result showed that surimi processing could be used to improve the water holding capacity of PSE pork. However, no significant effect on the gel strength was found. The result of emulsifying capacity showed that PSE pork was lower than normal pork ($p<0.05$). The emulsifying capacity of surimi from PSE pork was higher than PSE pork ($p<0.05$). SDS-gel electrophoretogram did not show any significant difference among the myofibrillar from normal pork, PSE pork, surimi from normal and PSE pork (Fig. 1).

Conclusions:

Surimi processing technology can be used to improve the physic-chemical properties of PSE pork.

Literature:

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Table 1. Moisture, pH, electric conductivity, water holding capacity, gel strength, emulsifying capacity and emulsifying stability of *lonhissimus dorsi* derived from normal and PSE pork, surimi made from normal and PSE pork

	A	B	C	D
Moisture, %	77.5	78.2	77.3	76.3
pH	6.2^b	5.7^c	6.5^a	6.4^a
Electric conductivity, mS/cm	5.4^c	8.0^b	10.2^a	9.9^a
Water holding capacity, %	83.8^d	76.9^a	82.8^c	79.4^b
Gel strength, g	242.0^a	195.0^b	230.0^a	210.0^b
Emulsifying capacity, ml oil/g protein	7.4^a	6.6^d	7.3^b	6.9^c
Emulsifying stability, %	78.2^a	75.2^b	77.5^a	75.1^b

A. normal pork
B. PSE pork
C. surimi made from normal pork
D. surimi made from PSE pork
^{a,b,c,d} Different superscripts in the same row indicate significant differences ($p<0.05$).

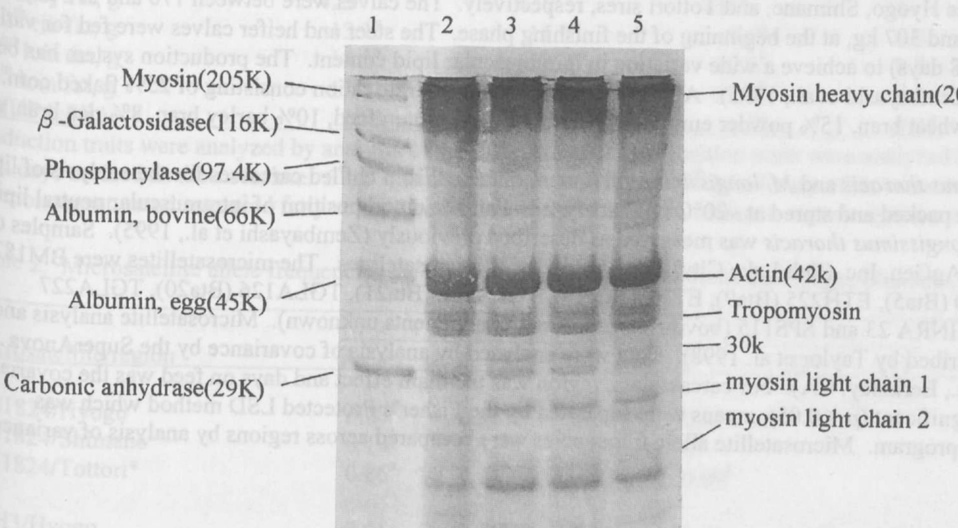

Fig. 1. SDS polyacrylamide gel of extracted protein. Lane 1 contains standard protein markers of 29 to 205 kilodaltons. Lane 2 contains protein from normal pork. Lane 3 contains protein from PSE pork. Lane 4 contains protein from surimi made from normal pork and lane 5 contains protein from surimi made from PSE pork, respectively.