FERENCES IN THE PROCESS OF HEAT DENATURATION OF INTRAMUSCULAR CONNECTIVE TISSUE COLLAGEN HEAT OF DIFFERENT QUALITY GROUPS - NOR, PSE AND DFD

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MARY

paper comprises data obtained by method of differential scanning calorimetry used to dy the process of heat denaturation of intramuscular connective tissue collagen at hea- to 80°C of meat, belonging to different quality groups: NOR, PSE and DFD during its ing from 2 to 72 hours. It was shown that PSE meat differs significantly from the other quality groups by temperature of collagen heat denaturation maximum at 24 hours of ing. It was supposed that this property of PSE meat may give basis for identification this meat.

RODUCTION

state of structure of intramuscular connective tissue collagen and its change during hnological processing of meat influence significantly toughness of meat and after chop- g - its water-binding ability (Whiting R.C.). Thus, it is very important to define con- ions, under which negative influence of connective tissue on these characteristics could minimized. First of all it seems to concern time of post mortem ageing of meat. Earlier a on the change of structure of intramuscular connective tissue collagen in the process meat ageing are available but they show contradictory character (Stanton and Light,1988; ls et al.,1989; Stanton and Light, 1990; Stanton and Light,1990). Some authors consider t in the process of post mortem ageing, changes in the collagen of connective tissue her do not take place or are insignificant, and because of that could not be identified. hers agree on partial degradation of collagen in course of ageing due to participation of osome enzymes in this process. In this case time of these changes vary from 8 to 24 hrs. even to 7 days, according to different authors. However, for this research connective ue of only normal meat was studied, that is of meat with normal course of post mortem ycogenolysis.

this work we aimed at the study of the state of intramuscular connective tissue collagen t only in the process of ageing to 72-96 hrs. and also during comparative research of the se meat quality groups: NOR, PSE and DFD. This study was conducted using method of dif- ential scanning calorimetry (DSC), (Honikel and Cheon-Jei Kim, 1986). Intramuscular con- tive tissue collagen, excised from M.Longissimus dorsi was studied during its heating 80°C.

ULTS AND DISCUSSION

esearch data on heat denaturation of intramuscular connective tissue collagen showed that anges in PSE pork collagen differ significantly from changes of this protein in normal ditional meat. Temperature of collagen denaturation maximum of PSE meat ($t_{shrinking}$)

during first hours post mortem is 3-4°C lower than in case of NOR meat (fig.1,2). During ageing it gradually grows becoming equal for both quality groups after 48 hours. However, in NOR meat this process is different: during its ageing to 48 hours temperature of denaturation maximum of collagen lowers and remains unchanged during further ageing to 96 hrs. It is worth noting that after 24 hrs post mortem NOR meat acquires additional high-temperature peak at 70°C at the heat absorption curve, this peak according to its intensity becoming the major one, and the initial peak at 63-64°C remains as a shoulder (fig.2).

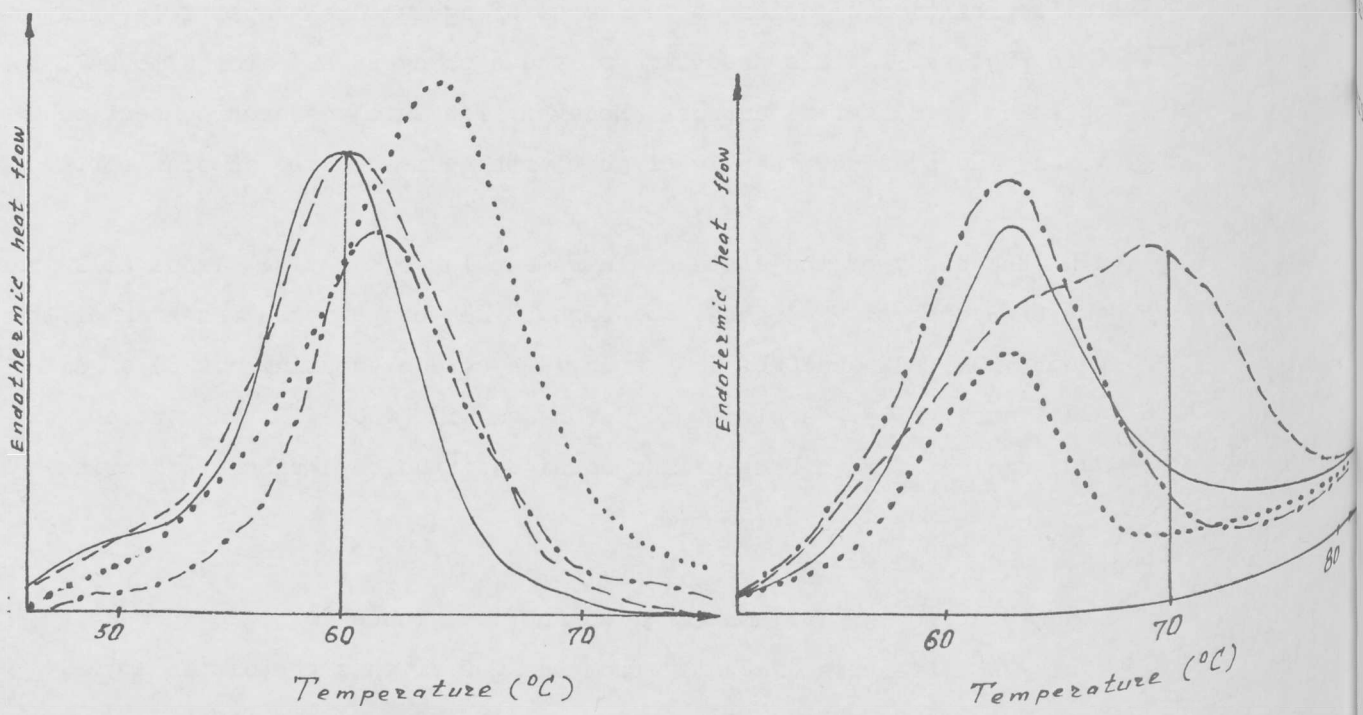
Similar picture is observed in case of DFD meat. Connective tissue collagen of this meat during heat denaturation after 24 hours of ageing also shows heat absorption peak at ~70°C. However, this meat differs from normal one by the fact, that at other ageing times (2,48, 72 and 96 hrs) temperature of heat denaturation maximum of collagen remains constant, neither decreasing, nor increasing (~63-64°C).

During heat denaturation of intramuscular connective tissue of PSE meat, a high-temperature peak at 70°C was not discovered. What are the reasons for the presence of this peak at 70°C in some cases and for its absence in other ones? Of course, further research is needed, however, it could be supposed that after 24 hours post mortem, as a result of rigor shortening of sarcomeres of NOR and DFD meat, mechanical stiffening of intramuscular connective tissue takes place,i.e. artificial aggregation of collagen fibrils. This results in structural transition with maximum at higher temperatures. Upon accomplishment of rigor mortis

Fig.1 Curves of heat absorption of intramuscular connective tissue collagen of PSE pork (pH=5.5) at different ageing times

fig.2 Curves of heat absorption of intramuscular connective tissue collagen of normal meat (pH=5.9) at different ageing times

——— 3 hrs. post mortem; — — — — 24 hrs p.m.; —·—·—·— 48 hrs p.m.; ····· 72 hrs p.m.



reason for such "aggregation" disappears, so does this high-temperature structural sition. It is known (Honikel, Cheon-Jei Kim, 1986), that in PSE meat length of sarcoes in the process of rigor mortis development is not changed, thus, "aggregation" of llagen fibrils doesn't occur.

inking fall of intramuscular connective tissue collagen of NOR meat during its ageing 48 hours can be probably explained by lysosomal proteinase activity (Stanton and Light,) which is probably inactivated in DFD meat. Inverse process of t_{shr} increase of colla- in PSE meat seems to occur due to the "marinating" effect of lactic acid, abundantly uced in this meat during first hours post mortem, its content gradually decreasing ing ageing because of enzymatic splitting.

CLUSIONS

, results of research have shown that PSE meat differs significantly from normal meat haviour of connective tissue collagen during heating. Absence of heat denaturation of collagen of PSE meat at 70°C (24 hrs of ageing) and its presence in normal and FD meat may serve means for identification of this type of raw material even after ours post mortem.

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