

I/1 : RAHELIC S. ET AL : THE INFLUENCE OF FREEZING TIME POST MORTEM AND STORAGE TIME OF FROZEN PORCINE M. LONGISSIMUS DORSI ON DIFFUSION OF BRINE AND SOME CHARACTERISTICS OF THE MUSCLES
STUDY OF THE INFLUENCE ON NaNO_2 DIFFUSION, T.P. CONTENT AND FORMATION OF NOMB

QUESTION DE M. RANKEN :

1. What is the reason for the apparent fall in salt and nitrite content of unfrozen meat at 10 days storage, followed by an increase again,
2. And for the minimum in NOMB formation at 3 days ?

REPONSE :

1. I could not give any explanation. Only, I would mention that % of decrease of NaCl and NaNO_2 was not big.
2. Minimum formation of NOMB at 3rd day of curing is because of the rate of diffusion of brine in muscle. Similar rate of diffusion was found with NaCl. Diffusion was going on until 15th day of curing in the center of samples.

QUESTION DE M. WESTERINK :

Could you explain the contradiction in your findings from variance analysis and from the comparison of the mean values ; namely in the first case you find a significant influence of freezing time p.m. on diffusion etc... while in the latter you find none ?

REPONSE :

No, I could not. I have put the same question to the persons working on the statistical elaboration of our findings.

It asks for larger examination.

QUESTION DE M. WISMER-PEDERSEN :

Have you any theory to explain why your results on NaCl diffusion is not in agreement with the findings of other research workers ?

REPONSE :

I could not say that I have any theory to explain the findings that the freezing does not influence the rate of brine diffusion in muscle - but according to our previous findings we haven't found that freezing and storage of pork and beef, for longer time, change significantly the meat, let us say meat quality. Thus those findings could be some support to our results registered in this paper.

QUESTION DE M. WIERBICKI :

In your study, you did not find significant differences in salt penetration, WHC, etc. between the samples frozen 45 min. p.m. and 24 hours p.m. It is because you have thawed both groups of the samples at 4°C for 24 hours prior to curing. During thawing for 24 hours of the 45 min. p.m. samples the biochemical process of rigor mortis was completed in these samples making them comparable in chemical and physical characteristics with the samples frozen 24 hours p.m. It is confirmed by the pH data given in Fig. 2 (part I of your paper) by comparing the group A versus group B samples analyzed after 1 to 15 days curing.

REPONSE :

I agree with your explanation. I would, only, mention that this work was done after our examination of the influence of different time post mortem on the rate of curing.

I/2 : JACQUET B, ET COL. : INFLUENCE DU MODE DE CONGÉLATION ET DE DÉCONGÉLATION SUR LA TRANSFORMATION DU JAMBON EN SALAISON.

QUESTION DE M. P. ZEUTHEN :

In your experiments, have you considered protein losses in relation to the various freezing and thawing methods ?

QUESTION DE M. DAUVOIS :

Quand vous avez mesuré les "rendements" jambon aviez-vous des valeurs de H.P.D. constantes

QUESTION DE M. GAZAN :

Les rendements technologiques ne semblent pas présenter de différence significative mais avez-vous déjà des résultats sur la composition chimique (taux d'humidité, de protéines, etc...) des jambons des différents essais ?

REPONSES AUX TROIS QUESTIONS :

M. JACQUET estime ne pas être en mesure de répondre avec précision aux dans l'état actuel de son étude et du dépouillement des résultats disponibles.

I/4 : MIHALYI ET AL. : ON THERMOLYSIS OF MEAT PROTEINS

QUESTION DE M. HOFMANN :

- 1-Ihre Resultate sind neuartig und sehr interessant, auch für unsere Arbeiten. Man kann jedoch darauf hinweisen, dass erst bei sehr langen Erhitzungszeiten, die in der Praxis nicht vorkommen, eine beträchtliche Hydrolyse durch die Hitze erfolgt. Bei einer Erhitzungszeit von einer Stunde dürfte nach Tab. 2. Ihres Beitrags der Anteil an TCA-lösl.-N-Zunahme nur 0,2 - 0,3 % betragen.
- 2-Wir haben mit Hilfe der Elektrophorese gefunden, dass durch die Erhitzung auf 120°C, die Proteinbanden des Fleisches stark geschwächt werden. Es hat sich aber überraschender Weise gezeigt, dass dies auf einer Verminderung der Anfärbbarkeit der Proteine beruht. Andererseits fanden wir, dass die Proteinmoleküle sich auch zu höhermolekulären Partikeln vereinigen können. Haben Sie ähnliche Feststellungen machen können ?

REPONSE :

1. Ja, das ist richtig der Fall. Unter 100°C gibt es praktisch keine Thermolyse. Man braucht eine lange Zeit (7,5 St. minimum) um eine Thermolyse festzustellen.
2. Zukál und Krol (Holland) haben in einer früheren Arbeit festgestellt, dass die Verdaulichkeit des unlöslichen Anteils des hitzebehandelten Proteins sich stark vermindert hat. Es ist möglich, dass diese Resultate mit Ihren Ergebnissen im Einklang sind. Wir haben aber leider keine elektrophoretische Untersuchungen gemacht. Man kann nicht ausschliessen dass eine Bildung zu höhermolekularen Partikeln mit einer gleichzeitigen Thermolyse parallel geht.

QUESTION DE M. MOTHERSILL:

The content of glutamine on heating did not seem to increase very much. Is it normally low? or does it not become liberated by heating?

REPONSE :

There was no free glutamic acid in the samples before heating. As it is known, myofibrillar proteins have a rather high content of glutamic acid. So it does not become liberated to a high extent by heating at 120°C.

The formation of free glutamic acid by ripening at proteolysis of meat is rather extensive as it is generally known.

Glutamine was not investigated.

I/5 : RANKEN M.D. : SOME EFFECTS OF ADDED WATER AND SALT ON THE COOKING LOSSES OF MEAT.

QUESTION DE M. SCHUT :

- 1) Have you measured the internal temperatures of the samples during heating? Would it be possible, that the internal temperatures have been higher in those samples where drainage was prevented, due to a better heat conductivity of the price, surrounding the samples.
2. Was the meat pre-salted in the experiments with and without drainage, or was it not?
3. Do you think that the experiments of SHERMAN are comparable with your experiments, in which you allow the sample to drain during heating instead of pressing the sample to remove the soluble proteins? Would it be possible that in your experiments the soluble proteins are still able to do their job at heating and only the excess of water is exudated?
4. Could it be possible that in case of 0 and low salt concentration in the experiments "with drainage", the removal of sarcoplasm salts, is the main reason for the higher losses. When the salt concentration gets higher it could be that the soluble myofibrillar protein play a pre-dominating role.

REPOSE :

Yes we did follow internal temperatures in this part of the work, using thermocouples and a continuous recorder, and we could find no significant differences between the two processes. If a high proportion of fat is present, you do get a difference of the kind you suggest, but that was not the case here.

2. No, it was not.

3. SHERMAN'S experiments are not strictly comparable with ours, but I think there are enough similarities to make us consider them closely. Of course, one reason for our investigations is that we could not find this kind of information in the literature over a wide enough range of variables and obtained under comparable conditions.

4. See Dr. HAMM'S second question.

QUESTION DE M. HAMM :

1. You found a maximum of water retention at 4-6 % NaCl (related to raw meat) and explained this fact by a maximum protein solubility in that range of salt concentration. But it could also be possible that not the protein solubilization but the swelling and water-holding capacity of the myofibrillar fragments are of importance because we have found that in this range of NaCl concentration meat shows maxima of swelling and WHC (HAMM : "Kolloidchemie des Fleisches", Parey-Verlag, 1972). Have you considered this possibility? There is some reason to suggest that protein solubility might not be the decisive factor in water-retention of minced meat (HAMM : Fleischwirtschaft 53, 73 - 1973). I agree completely with your statement that the concept of moisture retention by coagulation of solubilized proteins is an over-simplification.

2. I never adopted the view that removing of soluble proteins would be the reason for the fact that separation of fluid from the tissue before cooking causes a decrease in WHC (page 1162). I rather think that here the removal of inorganic ions of the sarcoplasma is the decisive factor (HAMM, 1972). We have shown that the salts present in the sarcoplasma by nature, strongly increase the WHC of meat and that removing these salts causes a considerable decrease of WHC (HAMM : Zeitschr. Lebensmittel-Unters.-u. Forsch. 117, 8 1962). The same is true for

added salts. In your experiments, the sarcoplasmic salts were present during cooking and that is important for the water-retention. Sarcoplasmic salts (and also added NaCl) are of minor importance after coagulation (e.g. if they are going away by draining of water during cooking). The effect of sarcoplasmic salts is superimposed by added NaCl with increasing amounts of NaCl. I think, this concept would fairly explain the experimental data on table IV.

REPOSE :

1. I am aware that in Germany there are two schools of thought on this topic represented respectively by Dr. HAMM and Dr. KOTTER without now going into the arguments on both sides it seems that both parties are agreed that the maximum effects of salt or the WHC of fresh meat occur over the same range of salt concentration that we find to be optimal for fresh meat.

2. This is an interesting possibility. In some of our experiments we looked at salt distribution and over a wide range of conditions, the data show that by the end of cooking the salt was evenly distributed through all the water in the system and had a similar concentration in the cooking loss as in the lean meat. However we did not include cooking without drainage in these experiments ; we must now do so to follow up your suggestion.

I/9 : NORDIN ET AL. : THERMAL PROCESSING.

QUESTION DE M. SIMONSEN :

Would you care to comment on the applicability of your regression equation for thermal processing of cured meats.

Would it be possible to suggest to a processor that if he reduces the pH in his product by 0.1 unit, he can also reduce his ingoing nitrite by 65 p.p.m. and still have a safe process - or if he increases his salt concentration by 0.3 %, he can also reduce the nitrite concentration by 65 p.p.m. ?

REPONSE :

I do not consider this equation to be adequately substantial to apply in practice as yet but hope it may stimulate further research. We plan to do more work ourselves particularly in regard to the effect of heat input on outgrowth.

QUESTION DE M. NILSSON :

1. Was the *C. botulinum* strain you used a relative NO_2 sensitive one or a NO_2 insensitive one ?
2. What would the results be if the inoculum was reduced from $10^5/\text{g}$ to $10^2/\text{g}$.

REPONSE :

1. I am not aware if this was so we obtained it from the National Canners Assoc.
2. I would expect that at $10^2/\text{g}$ destruction would have been almost complete since S log. phases induction were involved in the thermal destruction.