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EFFECT OF PSE CONDITION OF PORK ON STABILITY  
OF LUNCHEON MEAT DURING STERILIZATION.

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Introduction.

Instability of comminuted meat products during heating gives rise to separation of fat and jelly rendering the finished products unacceptable in severe cases and therefore being an economic loss. As many factors such as composition, level of salt and polyphosphates, starch, the chopper used, number of bowl-revolutions, temperature during chopping and properties of lean and fat influence stability of meat emulsions, it is not easy to estimate the effect of meat quality separately.

It was attempted to establish whether a certain amount of PSE meat has an effect on separated fat and jelly in two luncheon meat type products. Variables in the experimental design were:

- the amount of PSE meat
- the pH<sub>1</sub> in the M. semimembranaceus measured appr. 45 minutes post mortem.
- the product composition, the main difference being the percentages of beef and potato starch.

Materials and methods.

From the normal supply of Dutch Landrace pigs two groups of carcases were selected according to pH<sub>1</sub> measured in the M. semimembranaceus approximately 40 minutes post mortem, one group having a pH<sub>1</sub> value between 5,3 and 5,8, the other between 5,9 and 6,3.

Loins were dissected from the carcases the day after slaughter and judged visually on condition. From PSE loins only the parts showing this condition clearly were used, while for the control batches only loins with a completely normal appearance were selected. Both PSE and normal loins were taken from carcases in the two pH<sub>1</sub> classes.

The four lots of loins thus obtained were frozen, chopped into pieces of appr. 1 cm., mixed and stored at -10°C until use.

All other meat raw materials also were frozen, chopped, mixed for reasons of standardization and stored at -10°C.

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## Composition of products and way of preparation:

Ingredients	product 1	product 2	revolutions chopper bowl (cumulative)
frozen beef	19.0	—	
pork loin meat	33.0	54.5	
polyphosphates	0.4	0.4	
curing salt	1.8	1.8	
spices, flavourings	0.6	0.6	60
water	6.0	6.0	120
lean mix	60.8	63.3	
pork fat trimmings	9.0	9.0	180
potato starch	3.7	1.2	190
pork fat trimmings	6.5	6.5	
pork bellies	20.0	20.0	235
complete mix	100.0	100.0	
loin meat in lean mix	54.0	85.0	
loin meat in complete mix	33.0	54.0	

The analytical fat content of both products was between 25 and 26%. The two products were made on one single day, the batches being distributed over two technically identical 30 liter Krämer und Greebe bowl choppers operating simultaneously.

An extra batch was prepared in each chopper before the experimental series started to bring the chopper at the desired temperature.

The temperatures of the dough were measured during the chopping process. From each batch three 340 gram rectangular cans were filled with the dough before the addition of potato starch and 25 with the dough after completion of the chopping process.

The cans were sterilized at 114°C for 70 minutes as soon as possible after filling.

The amount of cooked out fat plus jelly was determined after storing the cans for a few days.

#### Results and discussion.

##### 1. Temperatures during chopping.

After 60 revolutions of the chopper bowl the temperature in all batches was -4°C. On further chopping temperatures on the batches with PSE meat rose more rapid, the average difference being 1.5°C after 120, 2.0°C after 180 and 3.5°C after 190 revolutions; after 180 revolutions the potato starch was added.

At the end of the chopping process the difference was reduced to 1.5°C; the final temperatures of dough are given in the table below, those of product 2 in general being somewhat higher. A distinct influence of pH<sub>1</sub> on temperature could not be found.

2. Amount of separated fat and jelly.

product	bowl chopper	pH <sub>1</sub>	type of meat	final dough temperature °C	average cooking loss	
					lean mix N = 3	complete mix N = 25
1	1	low	normal	8	2.5	<0.1
1	2	low	PSE	10	7.8	<0.1
1	2	high	normal	8	1.6	<0.1
1	1	high	PSE	9	4.3	<0.1
2	2	low	normal	11	2.7	0.3
2	1	low	PSE	10	8.7	2.0
2	1	high	normal	9	<0.1	<0.1
2	2	high	PSE	12	6.1	1.0

The effect of PSE meat on separated jelly of the lean mix is considerable, giving an average increase of 5%. substitution of beef by pork loin meat as such (product 2) did not have a measurable influence.

The effect of pH<sub>1</sub> is also clear; the higher pH<sub>1</sub> group giving about 2,5% lower cooking loss.

The effect of the PSE condition of the meat is independent of pH<sub>1</sub>; the cooking loss level however is lower in case the PSE meat originates from carcasses with a higher pH<sub>1</sub>.

Finished product 1 was completely free from cooked out fat and jelly; in product 2 the same relationship between cooking loss and PSE condition or pH<sub>1</sub> existed as with the lean mix, but the loss level was lower.

The lower stability of product 2 is presumably caused by the higher PSE meat content and/or the lower content of potato starch.

No difference between the two bowl choppers and no three-factor interaction was found on statistical analysis of the data.

OSS, 1st April 1971.

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