Effect of the grading of pork carcasses on the quantity and the chemical composition of the meat sorted for sausage manufacture

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The manufacture of quality meat products and the introduction of new brands requires precise data on the chemical composition of the raw materials applied. The different grades of pork carcasses graded by back fat thickness yield sorted meat of different quantitative and qualitative characteristics. Given data on the chemical composition of the raw materials depending on the quality of slaughter pigs, it would be easier to effect current technological control and also to make calculations relative to the expected values of basic characteristics for new meat products.

Experiments were conducted on 40 carcasses of the Camborough hybrid, of weights above 55 kg and of back fat thickness at the sacrum (over the Gluteus medius muscle) of up to 15 mm (group I); 16-20 mm (group II); 21-25 mm (group III); and more than 25 mm (group IV).

The basic raw materials for sausage manufacture were analysed: namely, lean, and semi-fat pork.

Lean represented the thoroughly trimmed, of fat and connective tissue, muscles from the ham and the shoulder. Semi-fat pork was obtained from the spareribs and the side and also from the trimmings obtained upon the trimming of the outer loin, the neck, the ham and the shoulder. Sorted meat was cut into pieces, ground in a grinder and mixed to a condition of a visible homogeneity of the distribution of muscle and fat particles. Before the analyses, the whole sample of a definite meat grade was homogenized to a fine paste-like mass. The contents of water, fat, protein and connective tissue were determined in accordance with the requirements of the standards valid in this country.

The quantitative yields of the lean and the semi-fat meat obtained with relation to the weight of carcasses with back fat (A) and without back fat (B) are presented in Table 1.

The results in the table indicate that the yield of lean is higher in the carcasses with a back fat thickness of up to 15 mm, while in the remaining groups no substantial differences are observed. The yield of semi-fat pork in group I is comparatively lower, but the differences are insignificant with respect to the remaining three groups.

In Tables 2, 3, 4, 5, and 6, the results are presented of the analyses for water content, fat content, protein content by Kjeldal, and protein content by the amido black method, and connective tissue content (hydroxyproline x 8,07).

Table 1. Yields of lean and semi-fat sausage-manufacturing meat, %

Group	A		B	
	Lean	Semi-fat	Lean	Semi-fat
I	18.1	29.1	21.0	33.8
II	14.5	29.5	17.8	36.0
III	13.8	29.3	17.2	36.4
IV	14.7	29.7	17.9	36.0

Table 2. Water content (%) of lean and semi-fat pork

Group	Lean pork			Semi-fat pork	
	n	$\bar{x}$	$S\bar{x}$	$\bar{x}$	$S\bar{x}$
I	10	71.9	0.47	54.9	0.60
II	10	71.4	0.41	51.3	0.60
III	10	70.1	0.51	44.5	1.13
IV	10	68.9	0.76	42.6	0.82

Comparison between water content means

Lean pork	I	II	III	IV
Semi-fat pork	I	II	III	IV

Note: The means of the experimental groups underlined by the same line do not differ significantly at the 0,05 level.

Table 3. Fat content (%) in lean and semi-fat pork

Group	Lean pork			Semi-fat pork	
	n	$\bar{x}$	$S\bar{x}$	$\bar{x}$	$S\bar{x}$
I	10	5.55	0.24	28.45	0.47
II	10	8.15	0.44	34.50	0.32
III	10	9.35	0.56	41.00	0.89
IV	10	10.10	0.78	41.35	1.00

Comparison between fat content means

Lean pork	I	II	III	IV
Semi-fat pork	I	II	III	IV

Table 4. Protein content (%) by Kjeldal's method in lean and semi-fat pork

Group	Lean pork			Semi-fat pork	
	n	$\bar{x}$	$S\bar{x}$	$\bar{x}$	$S\bar{x}$
I	10	18.4	0.27	13.4	0.23
II	10	18.3	0.24	12.4	0.10
III	10	17.9	0.31	11.1	0.31
IV	10	17.7	0.21	11.2	0.27

Comparison between the protein content means

Lean pork	I	II	III	IV
Semi-fat pork	I	II	III	IV

Table 5. Protein content (%), by the amido-black method, of lean and semi-fat pork

Group	Lean pork			Semi-fat pork	
	n	$\bar{x}$	$S\bar{x}$	$\bar{x}$	$S\bar{x}$
I	10	18.4	0.19	12.6	0.33
II	10	18.5	0.31	11.6	0.19
III	10	17.8	0.39	9.4	0.30
IV	10	17.1	0.26	10.2	0.08

Comparison between amido-black protein content means

Lean pork I II III IV

Semi-fat pork I II III IV

Table 6. Content of connective tissue (hydroxyproline x 8.07, %) in lean and semi-fat pork

Group	Lean pork			Semi-fat pork	
	n	$\bar{x}$	$S\bar{x}$	$\bar{x}$	$S\bar{x}$
I	10	1.06	0.06	1.48	0.14
II	10	0.85	0.12	1.24	0.17
III	10	0.89	0.07	1.24	0.18
IV	10	1.18	0.06	1.33	0.04

As far as water content is concerned, both lean and semi-fat pork from group I pigs differ significantly from the remaining groups: water content in the raw materials derived from group I pigs is higher. A trend is observed towards a decrease in the water content of the meat raw materials obtained from pigs with a great back fat thickness, although that the difference between the values for any two adjacent groups is not always significant.
The raw materials obtained from group I pigs contain also less fat, the difference being reliable. Back fat thickness in the pig groups from which sausage manufacturing pork was obtained, has a smaller impact on protein content determined by both methods. Nevertheless, a pronounced trend is present, towards a reduction of protein content with the increase in the fat level in the raw materials. In the semi-fat pork the protein obtained from groups I and II is significantly more than the one in groups III and IV. In the lean, there is practically no difference in the protein content among the four groups. The data on the content of connective tissue in the lean and in the semi-fat pork indicate, that its content is lower in lean compared to the semi-fat meat. No significant difference was found among the raw materials obtained from the four groups of pigs.
The results obtained enable the correct utilization of the raw materials, with a view to the improvement of meat product quality.