

## Fatty Acid Composition Of Pork Fat From The Standpoint Of Nutritional Value And Technological Suitability (#563)

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### Introduction

The fatty acid composition is important characteristic of the pork back fat quality, determining its nutritional value and potential value for meat production. This article presents the quality evaluation results of local pork back fat for fatty acid composition using quality criteria. The aim of the research was to study the fatty acid composition of pork back fat produced in the 4 livestock regions in Russian Federation, and its evaluation on the criteria of nutritional value and technological suitability.

### Methods

Pork back fat samples were taken from pig carcasses at the level of 5-7 thoracic vertebrae 24 hours after slaughter. Selection of pork back fat was carried out at industrial enterprises. Paired carcasses that had a mass of over 90 kg and fat thickness over 2 cm were selected. After cooling, when cutting the selected half-carcasses, a sample of pork back fat in the skin weighing about 0.5 kg was isolated. In the laboratory, the skin was removed, the fat was crushed on a microgrinder and stored in a refrigerator at 0...5 ° C for no more than 24 h. To determine the fatty acid composition of the crushed back fat, 3 samples weighing 10 g each were taken. Extraction of lipids was carried out by chloroform/methanol extraction by the Folch's method. The composition of fatty acids was determined on a HP 6890 gas chromatograph [1, 2]. The obtained results were processed statistically and analyzed for compliance with the criteria of nutritional value and technological suitability.

### Results

The ratio of saturated (SFA), monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids (FA) should be 30: (50-60) :( 10-20) according the basic requirements of nutritionists for the nutritional quality of fat in the human diet. In addition, it is believed that the ratio of  $\omega$ -6 and  $\omega$ -3 fatty acids in the composition of PUFA should be (9-10); 1 [3].

Analysis of the ratios characterizing the nutritional value of the pork back fat (Table 1) showed that the actual amount of SFA was 1.6-1.9 times higher than the recommended value. MUFA content was at the level of 70% of the recommended value for the diet. The greatest variability was observed in the content of PUFA, which was 70 ... 120% of the recommended value. This indicated the high nutritional value of back fat as a source PUFA in the human diet.

Table 1 - Ratio of SFA, MUFA and PUFA in the pork back fat

I	Recommended ratio, g/100 g fat	The average value, g/100 g fat, for back fat samples taken in the local livestock regions			
	II	III	IV		
SFA	30	56,1±1,2	57,5±1,0	54,2±0,7	48,8±1,0
MUFA	50-60	35,3±0,8	35,4±0,5	36,9±1,0	35,9±1,0
PUFA	10-20	8,7±0,5	7,1±0,6	8,9±0,3	12,0±1,1

High content of  $\omega$ -9 MUFA - 27...28 g/100 g of fat was found in all samples (Table 2). The ratio of  $\omega$ -6 and  $\omega$ -3 PUFA for the samples from three livestock regions was (9...15): 1. This ratio corresponded to the recommended ratio with slight excess. However, the actual value of the  $\omega$ -6 and  $\omega$ -3 ratio of fourth livestock region samples was 47: 1. It was explained by the low  $\omega$ -3 content while the  $\omega$ -6 content was also increased.

Analysis of fatty acid composition of back fat to assess its technological suitability was carried out according to the criteria [4, 5]: 1 - the minimum content of C18:0 should be 12% of total FA; 2 - the maximum content of C18:2 should be 12-15% of total FA; 3 - the total content of SFA should be over 41% of FA; 4 - the iodine value (IV) is limited to 70 g/100 g (Fig. 1)

Table 2 - Ratio of  $\omega$ -9,  $\omega$ -6 and  $\omega$ -3 of unsaturated fatty acids in pork back fat

I	Recommend- ed ratio, parts	The average value, g/100 g fat, for back fat samples taken in the local livestock regions			
	II	III	IV		
$\omega$ -9 MUFA	-	27,96±1,00	27,04±1,72	29,53±1,33	28,27±1,02
$\omega$ -6 PUFA	9-10	7,73±0,70	6,36±1,63	7,71±0,62	11,27±1,18
$\omega$ -3 PUFA	1	0,54±0,18	0,42±0,21	0,86±0,31	0,24±0,18

All samples meet criteria 1-3. However, in the fourth region, the values of these indicators differed.

The IV was calculated according to ISO 3961 in the modification of the authors, which allows taking into account all unsaturated FA [6, 7]. When calculating the IV formula for triglycerides was used:

$$IV = \sum_{i=1}^n K_{FAi} m_{FAi}$$

$m_{FAi}$  - content of the i-th unsaturated FA, g/100 g of fat;

$K_{FAi}$  - coefficients for i-th unsaturated FA.

The calculation showed that the IV was below 70 g/100 g and met criterion 4 (22-35%).

## Conclusion

The study showed that, despite the opposite requirements of nutritionists and technologists for the quality of fat, a certain compromise can be found.

In order to develop own criteria that ensure the nutritional value and quality of the Russian assortment of meat products, research in this direction will be continued.

## Notes

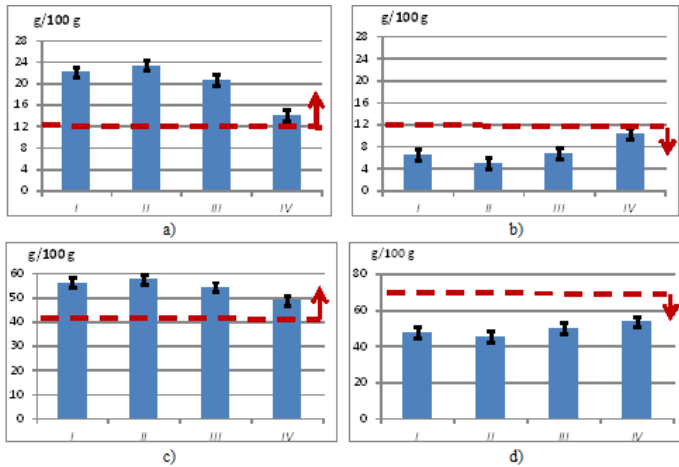


Fig. 1 - Criteria technological quality of back fat: stearic acid (a), linoleic acid (b), SFA (c) and IV (d)

## Criteria technological quality of back fat

stearic acid (a), linoleic acid (b), SFA (c) and IV (d)