

## Application of Milk-Protein Concentrate to the Production of Cooked Short-Lived Sausages. V. Influence of the Protein Concentrate on the Nutritive Value

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### Introduction

The most important condition in the production of meat products is their digestibility and biological value, i.e. they should meet the requirements of rational nutrition to the greatest possible extent (1). In order to ensure these requirements, it is expedient to orientate their production to products with a higher protein content and a relatively lower fat content. In this respect, the great influence of too much and various and not always favourable raw materials available on the technology of meat products stated reasons for the utilization of different protein additives (2). Upon using protein additives, it is of great importance to know their influence on the technological and organoleptical properties of the product to be obtained, as well as on their digestibility and biological value.

In connection with this we made it our task to follow the influence of a protein additive obtained from sour buttermilk (3) on the chemical composition of cooked short-lived sausages, being characteristic of their nutritive value to some extent, and on their aminoacid composition giving a general idea of the biological value of the products.

### Material and Methods

The studies were carried out on the sausages 'Hamburgsky' and 'Ruen' as characteristic representatives of the groups of structural and non-structural cooked short-lived sausages. In addition, the sausage 'Hamburgsky' was produced using a predominant amount of cattle meat while the sausage 'Ruen' was prepared with pork only. The sausages were produced according to the technological standard requirements with the addition of 10% protein additive of sour buttermilk having a pH 6.5 and a dry matter content of 20-25%.

The water content, the proteins, the fats, the mineral substances, the aminoacid composition and the ratios of proteins (fats and tryptophane) to oxyproline were determined in the finished products.

The results obtained were processed by the methods of mathematical statistics (4,5). In the Tables enclosed the end results are only given as  $\bar{M} \pm tm$ , where  $\bar{M}$  is the arithmetic mean value from  $n = 15$ ,  $m$  - average square error of the mean result, and  $t$  - the Student criterion for a 95% confidence interval adopted by us.

### Results and Discussion

The results obtained for the chemical composition of the sausages are shown in Table 1. As is seen, the addition of protein additive resulted in no essential changes in the water content and the mineral substances. The differences reported in the values for these indexes were within the limits of the confidence interval. The influence of the protein concentrate on the protein and fat content was more important, the two main components being determinative to the nutritive value of the sausages. It was found that the protein content was increased by 2.4% and 1.91% for the sausages 'Hamburgsky' and 'Ruen' respectively, as shown by the samples produced with protein

additive (test samples). Meanwhile, the fat content was decreased by 3.87% and 4.08% in the sausages 'Hamburgsky' and 'Ruen', respectively. This also resulted in changing the proteins:fats ratios in favour of the proteins as is seen from data in Table 1.

Table 1  
Chemical Composition of the Sausages 'Hamburgsky' and 'Ruen' Produced with 10% Protein Additive of Sour Buttermilk

Indexes	Sausage 'Hamburgsky'		Sausage 'Ruen'	
	Controls	Test Samples	Controls	Test Samples
Water, % of total mass	57.30±0.67	58.85±0.81	66.57±0.81	67.22±0.63
Proteins, % of total mass	14.06±0.43	16.46±0.43	10.71±0.86	12.62±0.36
Fats, % of dry matter	58.64±0.64	54.77±1.14	62.21±0.78	58.13±0.82
Mineral substances, % of total mass	1.34±0.09	1.36±0.04	1.27±0.04	1.26±0.06
Tryptophane:oxyproline ratio	1.18±0.06	1.68±0.09	0.93±0.09	1.31±0.04
Proteins:fats ratio	0.56±0.04	0.73±0.06	0.52±0.08	0.66±0.06

This condition is of importance with a view to improving the nutritive value of the sausages. This in conformity with the modern requirements of the science of nutrition. Besides the sausages produced with a protein additive possessed also higher values of the tryptophane:oxyproline ratio which revealed the definite increase in their biological value.

Table 2 show the results obtained for the aminoacid composition of the sausages 'Hamburgsky' and 'Ruen' produced with 10% protein additive of sour buttermilk.

It is obvious that the amount of each of the 17 aminoacids established was greater in the sausage products obtained with the additive. It is worth noting that the ratio between the individual aminoacids was maintained, irrespective of the increase in the amount. Therefore, the protein additive contributed to the production of a finished product having a more favourable aminoacid content and a higher biological value.

Table 2  
Aminoacid Content of the Sausages 'Hamburgsky' and 'Ruen' Produced with 10% Protein Additive of Sour Buttermilk (g aminoacids/100 g protein)

Aminoacids	Sausage 'Hamburgsky'		Sausage 'Ruen'	
	Test Samples	Controls	Test Samples	Controls
1. Lysine	3.39	2.53	4.18	2.34
2. Histidine	1.42	1.25	1.06	0.78
3. Arginine	2.51	1.65	3.01	1.91
4. Asparaginic acid	1.83	1.39	2.20	1.44
5. Threonine	1.30	0.89	1.06	0.68
6. Serine	0.81	0.58	1.03	0.63
7. Glutamic acid	3.61	2.67	4.18	3.44
8. Proline	0.98	0.94	1.21	0.80
9. Glicine	3.29	2.64	4.69	2.50
10. Alanine	1.28	0.91	1.62	0.97
11. Cystine	traces	traces	traces	traces
12. Valine	1.12	0.83	1.18	0.98
13. Methionine	0.48	0.24	0.47	0.27
14. Isoleucine	0.93	0.82	1.19	0.77
15. Leucine	1.68	1.39	1.51	1.34
16. Tyrosine	0.65	0.46	0.67	0.57
17. Phenylalanine	0.76	0.77	1.01	0.71

The data reported in the Tables for the total chemical and aminoacid content of sausages indicated that the protein additive obtained from sour buttermilk increased the nutritive and biological value of the finished product as well as the efficiency of production due to its low prime cost.

### Conclusions

1. The application of a protein additive of sour buttermilk in amounts up to 10% to the production of cooked short-lived sausages increased favourably the ratio of proteins to fats and the ratio of tryptophane to oxyproline in the finished product.
2. The utilization of a protein additive of sour buttermilk in amounts up to 10% in the production of cooked short-lived sausages improved the aminoacid content of the protein fraction in the finished product and the quantitative ratio between individual aminoacids was also maintained.

### References

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