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Mixed Protein Preparations In The Production Of Meat Products.

Ivan Vyacheslavovich Atanov, Shaliko Zhorayevich Gabriyelyan, Irina Anatol'evna Bogolyubova, Lubov Fedorovna Maslova, and Maxim Alekseevich Mastepanenko*.

Stavropol State Agrarian University, Zootekhnicheskiy lane 12, Stavropol 355017, Russia.

ABSTRACT

This article presents the results of the study of the chemical composition, amino acid composition and functional-technological properties of various preparations of animal protein. The effect of temperature on the thermal stability of the protein gels. Outline the rationale the prospects of the use of mixed protein preparations.

Keywords: animal proteins, blood plasma, collagen, meat products

Corresponding author

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INTRODUCTION

Special attention in the production of meat products deserve animal proteins having the ability to stabilize the quality of the finished product by using raw materials with reduced functional characteristics and high content of fat tissue. Animal proteins are well balanced amino acid composition that forms their high biological value [1, 3, 8, 10].

The use of protein supplements has long been an essential attribute of the meat processing industry, can effectively influence functional properties and nutritional value of products. Particular importance are protein supplements with high gelling properties, the most effective of which are products of connective tissue proteins. However, collagen proteins are defective, that could adversely affect the nutritional value of products, in the light of what seems appropriate to their use in combination with high-grade protein [4, 7, 9].

MATERIALS AND METHODS

The objects of study were protein preparation: Based on the connective tissue proteins (SCANPRO BR95) and a combination of preparations that are based on the collagen protein and porcine plasma (AproPORK HF85 and SCANPRO 730 / SF).

The chemical composition of protein preparations was determined by standard techniques. The critical concentration of the gelling (CCG) was determined by the method of the Moscow State University of Food Production. The evaluation of the balance of essential amino acids was carried out is calculated by the method of academician N. N. Lipatov. The amino acid composition was determined on an amino acid analyzer AAA 400 by standard techniques [2, 5, 6].

RESULTS AND DISCUSSION

To justify the choice of a particular protein supplement, a series of studies on their composition and properties. The chemical composition of the studied protein products of animal origin is shown in Table 1.

Table 1: The chemical composition of preparations of animal protein

Mass fraction, %	Values		
	SCANPRO BR95	SCANPRO 730/SF	AproPORK HF85
- protein	89,23	76,37	79,71
- moisture	2,74	8,62	5,59
- fat	6,31	7,78	2,9
- ash	1,55	6,26	10,85
pH (1% dispersion)	7,11	6,89	7,71

Comparing the composition of protein concentrates is obvious that a protein preparation SCANPRO BR 95 has an advantage because of the high concentration of protein. However, given the set of indicators is to provide a preparation AproPORK HF85. The high protein content and low fat positively characterizes this protein supplement. The relatively high value of active acidity (pH) will have a positive impact on properties of meat systems by increasing the hydrophilic properties of the muscle proteins. To assess bioavailability considered additives were studied their amino acid compositions shown in Table 2.

Assessment of the quality of the protein considered drugs revealed the advantage of the drug AproPORK HF85. It is characterized by a full and well balanced amino acid composition of the total protein, due to the content of all the essential amino acids. This distinguishes it from preparations of pure collagen proteins (SCANPRO BR95), which along with the overall amino acid composition of poverty noted the absence of the essential amino acid tryptophan. Odds Comparison utilitarian amino acid composition of the same drug SCANPRO 730 / SF showed that AproPORK HF85 is much better balanced in essential amino acids, which appear to be associated with a high content in it plasma proteins.

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One of the most important indicators of the functionality of this type of protein preparations is a characteristic of the gel-forming ability, which can estimate by determining the values of the critical concentration of the gelling (CCG). The research for the study of the indicator shown in Figure 1.

Table 2: The amino acid composition of protein preparations

Amino acid	Reference FAO / WHO	Content, g / 100 g protein		
		SCANPRO BR95	SCANPRO 730/SF	AproPORK HF85
Valine	5,00	2,42	3,18	4,44
Threonine	4,00	2,24	2,57	3,47
Tryptophan	1,00	0,01	0,28	0,50
Isoleucine	4,00	1,54	1,66	2,31
Leucine	7,00	2,82	4,41	5,20
Lysine	5,50	4,11	4,32	5,92
Methionine + cystine	3,50	1,27	1,49	1,88
Phenylalanine + tyrosine	6,00	3,26	4,62	5,00
The amount of essential amino acids	36,00	17,67	22,53	28,72
The coefficient of utility amino acid composition	1,00	0,02	0,45	0,63

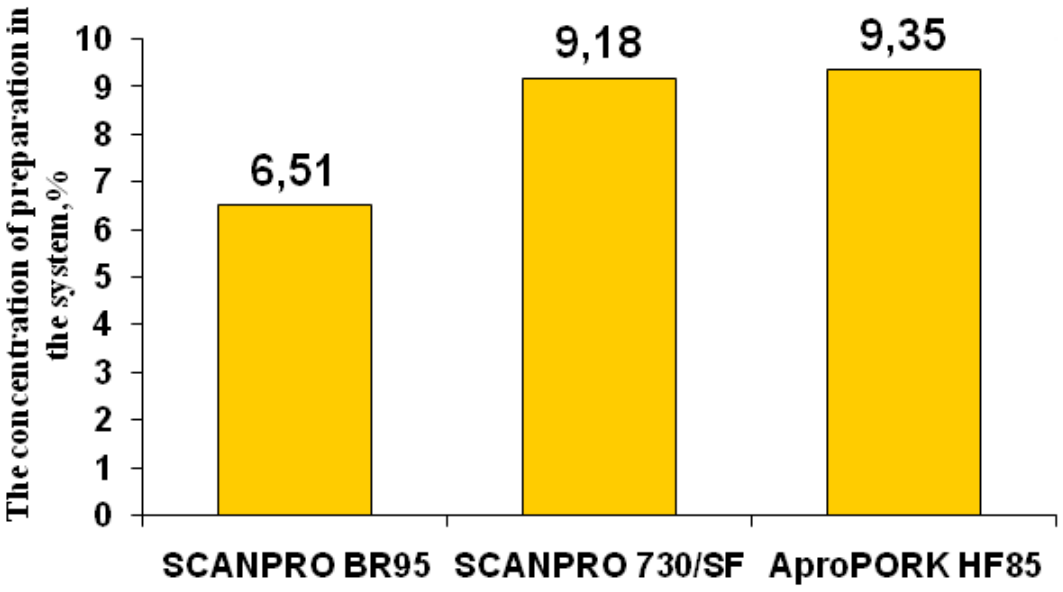

Figure 1: CCG of studied protein preparations

The experimental results show that the best preparation gelling capability has SCANPRO BR95, which is capable of forming strong gels at lower concentrations in the system. The indicator for the CCG SCANPRO 730 / SF and AproPORK HF85 differ insignificantly, with a slight advantage of the former. In general, studies have shown that the combination of drugs and although inferior to the gelling properties of the drug pure collagenous proteins, have generally high gelling properties, and can be used in the production of restructured meat products.

Along with the gelation, an important indicator of functional protein drugs is the stability of the gels formed by them. Collagen proteins provide dense gels, which, however, are not stable at higher temperatures,

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which is not always possible to guarantee the quality of the finished product. The distinguishing feature of the combined drugs is their greater thermal stability due to the presence of plasma proteins which are termo nonreversible. To establish the legitimacy of suggested studies have been conducted to study the dynamics of the influence of temperature on the strength properties of the gels formed by the study medication of animal protein.

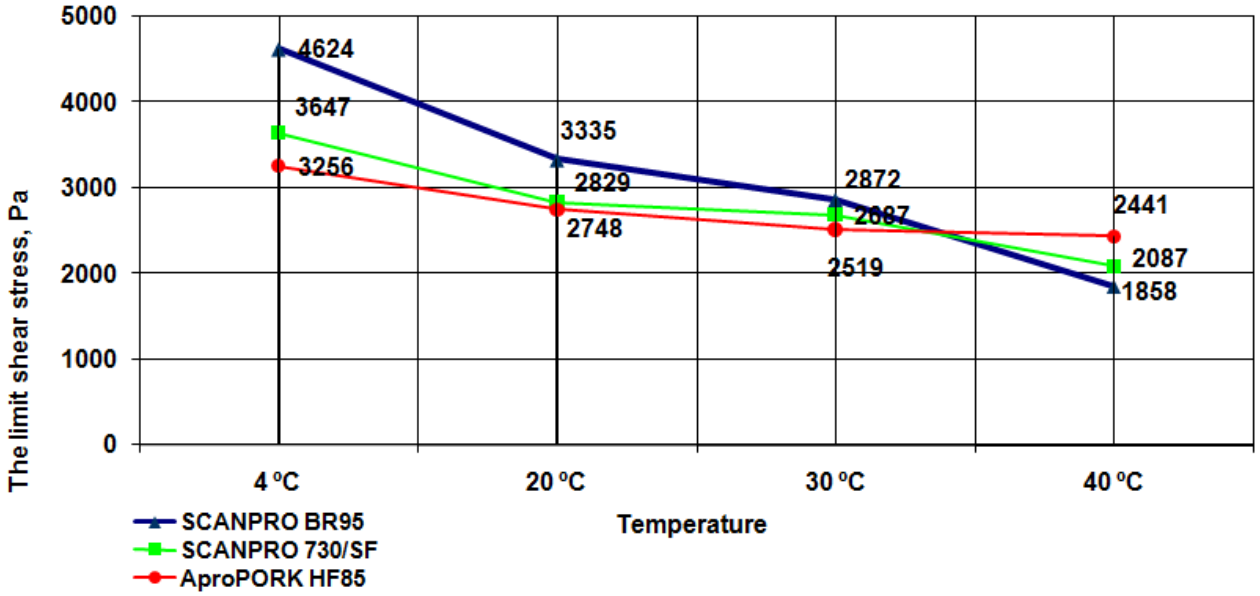

Figure 2: Dynamics of changes in the strength characteristics of gel preparations of animal protein

Analysis of the graphs showed that the best thermal stability has a protein preparation AproPORK HF85, characterized by a lower degree of reduction of the strength characteristics of the entire temperature range studied. This is probably also due to the high content of proteins of blood plasma, promoting the formation of more stable spatial network of the gel. This property is a positive impact on the stability of the quality of the finished product, including create preconditions to prevent the emergence of syneresis.

CONCLUSION

Summarized results of the comparison drugs collagen proteins - SCANPRO BR 95 and combined preparations of collagen and plasma protein SCANPRO 730 / SF and AproPORK HF85 showed the advantage of the latter in view of its high-FCS, biological value, as well as better thermal stability.

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