Die Wirkung der Zugabe von texturierten Sojaproteins auf gewisse physikochemische und sensorische Eigenschaften der Rohwurst

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In den Produktionsverhältnissen haben wir die Anwendungsmöglichkeiten von den texturierten Sojaproteins (TVP) des Typs "Corned Beef" untersucht. Diesen Typ von texturiererten Sojaprotein haben wir bei der Herstellung von zwei Sorten der Rohwurst angewendet, aber so dass wir einen Teil vom gefrorenen Rind- und Schweinfleisch, das bei ihrer Herstellung gebraucht wird, durch den hydrierten TVP ersetzt haben.

Aufgrund der erhaltenen Ergebnissen haben wir folgende Schlussfolgerung gezogen:

1. Physikalisch-chemische Untersuchungen zeigen dass die Versuchowürste mit TVP cca 2% weniger Gewichtsverlust aufweisen, haben aber mehr Eiweiss und weniger Fett als es bei den Kontrollproben der Fall war.
2. Sensorische Untersuchungen haben gezeigt dass die Qualität von Wurst mit TVP-Zusätzen gleich der Qualität der Versuchswurst. Das gebrauchte TVP konnte man visuel nicht von den Fleischstückchen unterscheiden. Es war auch nicht möglich den Geschmack und Geruch der Versuchswurst von der Kontrollwurst zu unterscheiden.
3. Aufgrund der Konsistenz- und Trockenwerdenbeurteilung war es möglich die Wurst 1 bis 2 Tage schneller auf den Markt zu bringen, was von ekonomischer Bedeutung ist.

Influence of the Addition of Textured Soy Proteins on Some Physico-Chemical and Organoleptic Properties of Dry Sausages

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The application of textured soy proteins (TSP) of "Corned beef" type was examined in production conditions. This type of TSP was applied in the manufacture of two kinds of domestic dry sausages, by replacing a part of frozen beef and pork with the hydrated TSP.

On the basis of the obtained results, the following conclusions were drawn out:

1) Physico-chemical examinations have shown that experimental sausages with TSP had lower weight loss for 2%, more proteins and less fat in relation to the controls.
2) Organoleptic evaluations have shown that the quality of sausages with added TSP was equal to the quality of control sausages. The used TSP could not visually be distinguished from meat pieces. Regarding the taste and odour, experimental sausages could not be distinguished from the control ones.
3) According to consistency and dryness, sausages with TSP could be sent to trade 1-2 days earlier, what is of economic importance.

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Effet produit par l'adjonction de protéines de soja texturées sur certaines propriétés physico-chimiques et organo-leptiques des saucissons de longue durée.

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Nous avons, dans les conditions de production, étudié la possibilité d'application des protéines de soja texturées (PST) de type " Corned Beef ". Nous nous sommes servis de ce type de protéines pour la fabrication de deux sortes de saucissons à longue durée de production yougoslave, et de façon telle que nous avons échangé la partie de viande de boeuf et de porc congelée utilisée pour leur fabrication par des protéines de soja texturées hydratées.

Sur la base des résultats obtenus nous en sommes arrivés aux conclusions suivantes :

1. Les examens physico-chimiques montrent que les saucissons d'essai traités au PST contenaient davantage d'albumines, moins de graisse par rapport aux échantillons de contrôle et la perte de poids était d'environ 2 % moindre.
2. Les examens organo-leptiques ont montré que la qualité des saucissons avec adjonction de PST était égale à celle des saucissons d'essai. Il n'est pas possible de différencier à l'oeil nu le PST utilisé des morceaux de viande ni même de différencier suivant leur goût et leur arôme les saucissons d'essai de ceux de contrôle.
3. Sur la base de l'évaluation du degré de consistance et de la rapidité de séchage, il s'est avéré que les saucissons avec adjonction de TSP ont pu être mis en vente un à deux jours plus tôt, ce qui est d'une importance économique indiscutable.

Влияние прибавления текстурированных протеинов сои на некоторые физико-химические и органо-лептические свойства копченых колбас

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В условиях производства мы исследовали возможность применения текстурированных протеинов сои (ТПС) типа " Corned Beef ". Этот текстурированного протеина сои мы применили при изготовлении двух сортов копченых колбас домашнего производства, так что часть замороженного говяжего и свиньского мяса, употребленного для их производства, заменили гидрированным ТПС.

На основании полученых результатов мы сделали следующий вывод:

I. Физико-химические исследования показывают что опытные колбасы с ТПС имели около 2% меньше потер в весе, больше белков и меньше жиров в отношении к контрольным образцам.

2. Органо-лептическая исследования показали что качество колбас с прибавлением ТПС было тем же самым как и качество опытных колбас. Не было возможности визуельно различать употребленный ТПС от кусков мяса , а также не было возможным различать опытные от контрольных колбас по их вкусе и запахе.

3. На основании оценки консистенции и просушенности колбасы с ТПС обнаружено что они могли быть на I до 2 дней раньше отосланы в продажу ,что имеет экономическое значение.

Influence of the Addition of Textured Soy Proteins on Some Physicochemical and Sensory Properties of Dry Sausages

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In our previous examinations we used textured soy proteins (TSP) for the manufacture of some kinds of sausages, canned sterilized meat products, ground formed meat products and ready-to-eat meals (1, 2, 3). The obtained results have shown that in the production conditions of our meat industry TSP can successfully and justifiably be used due to their technological, nutritive and sensory properties.

In this work we have set the task to examine the possibilities of the application of TSP in the production of dry sausages. For this examination we replaced a part of meat with hydrated TSP, with the aim of determining their effect on weight losses and changes of pH value and chemical composition during production as well as their effect on sensory properties of dry sausages containing TSP.

Materials and methods

Each kind of the examined experimental and control sausages was prepared in the quantity of 1000 kg, in production conditions. TSP used for experimental sausages was "Corned beef, minced" (manufacturer: "ADM" - USA). TSP was hydrated so that its content of water as well as the content of water of the used meat was about 65%. The dark-red colour of TSP was very similar to the colour of cured beef and pork used in sausages.

The examinations were performed with two kinds of dry sausages of narrow diameter - "tea" sausage and "Sremska" sausage, which are highly appreciated by our consumers. Experimental and control sausages were prepared in identical way in common production conditions, whereby 8% of frozen beef and pork was replaced with hydrated TSP in the case of experimental sausages. All sausages were subjected to usual technological procedure lasting for 20 days (draining -1 day; smoking - 2 days; drying - 17 days), in the chambers with automatically regulated microclimatic conditions. After the completion of the process, a part of sausages was left in chambers and dried for additional 10 days.

Experimental and control sausages were examined for weight loss, changes of chemical composition and pH value as well as for sensory properties (appearance of the surface and cut surface, consistency, colour, taste and odour). The examinations were performed with samples taken on the lst, 3rd, 8th, 14th and 20th day of regular production as well as after the prolonged drying period, i.e. on the 30th day from the beginning of the production.

Weight losses in experimental and control sausages were determined from differences between the weights of sausages immediately after their filling into casings and their weights taken during examination at certain production stages. They were expressed in percents in relation to initial weights. The contents of protein, water, fat and ash were determined by usual chemical methods (4), and the pH value was determined directly in the sausage stuff, using the pH-meter model PHM-29 (Radiometer - Copenhagen). Samples for chemical examinations were prepared by making average samples from 10 pairs of each experimental and control group of sausages. Sensory evaluation was performed by comparing properties of experimental sausages with those of control samples.

Results and discussion

The results presented in table 1 show that sausages with TSP had considerably lower weight losses in relation to control samples.

Weight Losses of control and experimental dry sausages

Table 1.

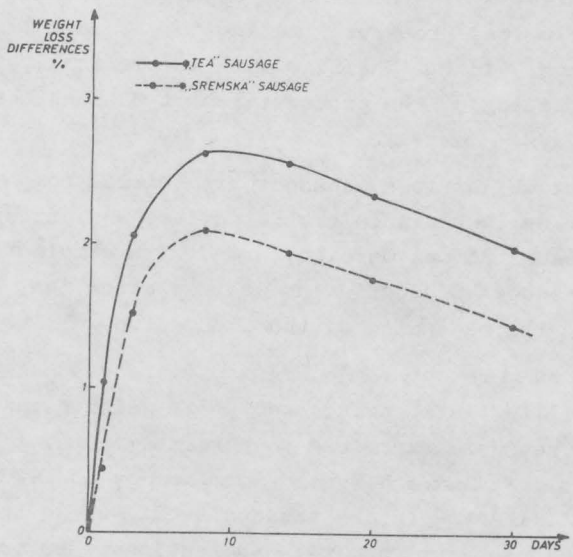
Dry sausage		after draining (1st day)		after smoking (3rd day)		during drying (8th day)		during drying (14th day)		at the end of process (20 th day)		prolonged drying (30 th day)	
		G,%	ΔG,%	G,%	ΔG,%	G,%	ΔG,%	G,%	ΔG,%	G,%	ΔG,%	G,%	ΔG,%
"Tea"	control	8,86	1,04	21,95	2,06	34,01	2,63	39,54	2,56	42,39	2,34	44,61	1,97
	experim.	7,82		19,89		31,38		36,98		40,05		42,64	
"Sremska"	control	8,89	0,44	22,44	1,51	34,09	2,09	39,18	1,95	41,79	1,76	44,05	1,44
	experim.	8,45		20,93		32,00		37,12		40,03		42,61	

Legend: G - Weight losses (%) of sausages in relation to initial weight immediatelly after stuffing
G - Differences in weight losses between control and experimental ssusages

The obtained differences in weight losses between experimental and control sausages are presented in figure 1. The highest difference in weight loss was observed 8 days after the beginning of the production when it began to decrease continuing to decrease gradually till the end of the production process. In "tea" sausages, this difference was 2.63% on the 8th day of the production, 2.34% at the end of the production and 1.9% after the prolonged drying period, i.e. on the 30th day of the production process. Similar data were obtained in the case of "Sremska" sausages, too. These data are in connection with biochemical changes of meat proteins during ageing of sausages, namely with the decrease of pH value of the stuff, resulting in the decrease of water holding capacity of meat proteins. In spite of their low pH value, sausages with TSP showed somewhat higher water holding capacity, because their proteins continued to hold efficiently water absorbed during hydration and at the same time they absorbed a part of water released by meat proteins.

As it is seen from figure 1, weight losses decrease gradually after the 8th day of the production process, but they are still considerable even after 30 days from the beginning of the production. This means that in the conditions of prolonged keeping in store-houses and shops, sausages with TSP will show lower weight losses, what is not only economically important but it has also influence on the juiciness and consistency of the stored products.

FIG 1 DIFFERENCES IN WEIGHT LOSSES BETWEEN CONTROL AND EXPERIMENTAL „TEA" AND „SREMSKA" SAUSAGES



The results of chemical examinations, presented in figure 2, show correlation between weight losses and water content losses in the examined dry sausages.

In relation to control sausages, experimental sausages had higher content of water, more proteins and less fat.

At the end of the production process, experimental "tea" sausages had more water by 6%, more proteins by about 1.5% and less fat by more than 3% than the control samples. Although the stuff of control samples of "Sremska" sausage had at the time of filling more water by about 1%, experimental samples of "Sremska" sausages had 20 days later more water by 1%, more proteins by more than 2% and less fat by 1%. On the basis of these indices it can be concluded that TSP effected considerably the chemical composition of dry sausages, during production, by retardation of the stuff dehydration, by increasing the protein content and by decreasing the fat content.

Changes of pH values during the production of experimental and control sausages are presented in figure 3.

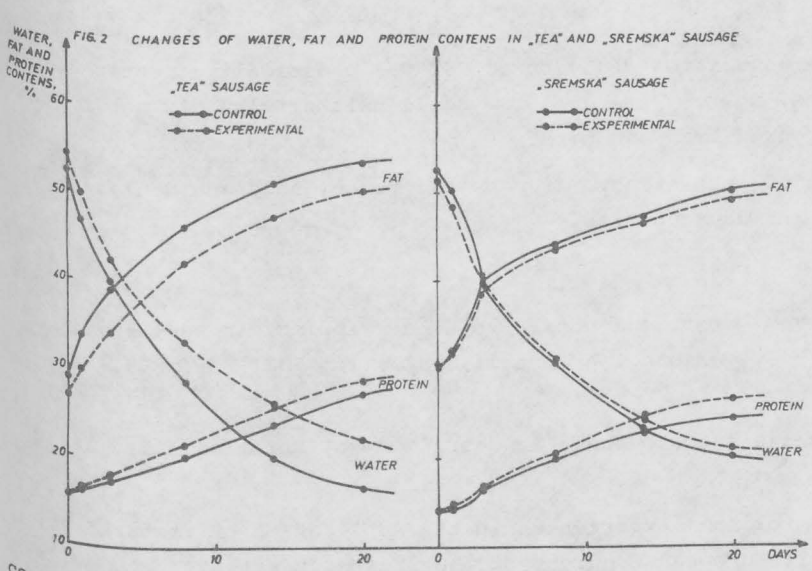


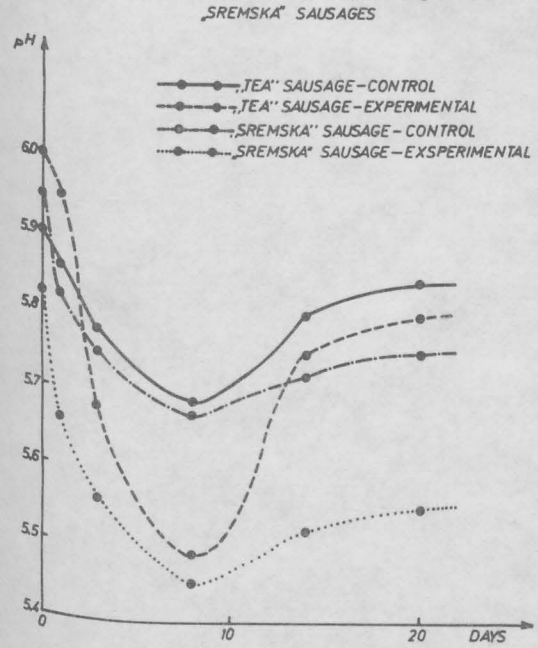
FIG. 2 CHANGES OF WATER, FAT AND PROTEIN CONTENS IN „TEA" AND „SREMSKA" SAUSAGE

The lowest pH value was obtained after 8 days from the beginning of the production, when sausages with TSP had lower pH values by about 0.2 than the controls. For that reason we have presumed that TSP, due to its content of carbohydrates, accelerates the decrease of pH value in the sausage stuff and contributes to quicker ageing of sausages.

The results of sensory evaluation of experimental and control sausages are in correlation with the results of weight losses and changes of pH value and chemical composition. It was established that experimental sausages (with TSP) had better appearance because their casings were less wrinkled in relation to control samples. At the end of the production process, consistency of both experimental and control sausages was rigid-elastic. However, sausages with TSP obtained the consistency characteristic for finished products 1-2 days earlier than the controls, meaning that they are ready for market earlier. Savings in time obtained by quicker ageing of control sausages were about 5-10% in relation to the entire production period, what probably should not be neglected.

The pieces of TSP on the cut surface of experimental sausages did not differ from the pieces of cured beef and pork. On the other hand, due to their dark-red colour and good distribution in the stuff, sausages with TSP gave impression that they had somewhat higher content of meat than controls. The ingredients of the stuff of both experimental and control sausages were mutually well bound so that they could be sliced without difficulties.

FIG. 3 CHANGES OF PH VALUES IN „TEA" AND „SREMSKA" SAUSAGES



Taste and odour of experimental and control sausages did not differ more essentially and they were characteristic for the examined meat product kinds. Nevertheless it has been established that sausages with TSP have somewhat more pronounced mild sour taste, characteristic for aged sausages. This was more markedly expressed in "tea" sausage in relation to "Sremska" sausage, where the taste of the used spices predominated. On the basis of the obtained results, it can also be concluded that the use od TSP in the production of dry sausages has economic advantages as well.

Conclusions

On the basis of the performed physico-chemical and sensory examinations, the following conclusions can be drawn out:

1) In relation to control sausages, experimental sausages with 8% of hydrated TSP had, at the end of the production process, lower weight losses by about 2% as well as somewhat

lower pH values.

2) The quality of sausages with the addition of hydrated TSP was practically identical to the quality of control sausages, whereby the used TSP could neither visually nor by taste be differed from the used cured beef and pork.

3) On the basis of the evaluation of consistency, dryness and taste, sausages containing TSP could be shipped for sale 1-2 days earlier.

Literature:

1. Proceed. of the Symp. on Tex. Veg. Prot. and possib. of their applic. in meat ind., Arandjelovac, Febr. 22 - 23, 1973, Tehnologija mesa 11, 1973, (pp.332, 336, 339, 344, 346, 366).

2. Zbornik radova sa XXVI savetovanja jugoslovenske industrije mesa, Subotica, Okt. 14-15, 1976, (radovi br.13, 14 i 15).

3. P. Modić, Milica Polić, Ž. Trumić: Some experiences in the application of textured soy proteins in meat products, XXIII European Congress of meat research workers, Moscow, 1977, Sess. O.

4. Off. Meth. of Anal.. of the AOAC, 1970, Washington.