

CHANGES OF LIPID FRACTIONS DURING THE PROCESSING AND MATURING OF THE "UZICE BEEF PRSHUTA" - TRADITIONAL MEAT PRODUCT

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INTRODUCTION

"Uzice Beef Prshuta" is one of the shelf stable meat products, traditionally processed in the area of mountain Zlatibor (western part of Yugoslavia) during winter months (November-February). The main characteristics of processing procedure and physico-chemical quality factors of this appreciate product, are in detail presented in our previous papers (Radovanović *et al.*, 1990-a, 1990-b, 1993).

Besides all other quality factors, nutritive and sensory characteristics of meat and meat products, including the "Uzice Beef Prshuta", depend a great deal on the composition of their lipids (Dryden *et al.*, 1970; Vukovic, 1992). It is determined by the content of major lipids fractions (neutral lipids, phospholipids and glucolipids), as well as by the fatty acids composition. As the qualitative characteristics of the lipids from "Uzice Beef Prshuta" are still not determined, we have decided to examine the lipid composition during the processing and maturing.

MATERIALS AND METHODS

This study is conducted during the processing and maturing of "Uzice Beef Prshuta", which are realised according to the traditional technology described by Radovanović *et al.*, 1990-a. Namely, two different parts of meat, obtained from beef round and loin, are analysed: "sol" - *m.gracilis* with part of *m.semimembranosus* and "rozbratna" - cranial part of *m.longissimus lumborum*. From both part of meat, lipids are isolated in five different phases of processing and maturing: I phase - just before salting; II phase - the last (7th) day of salting; III phase - the last (21st) day of drying and smoking; IV phase - 15th day of maturing; V phase - 30th day of maturing.

Extraction of total lipids is done according to Folch *et al.*, 1957, at 15°C. Separation of total- and neutral lipids is realised according to the procedure described by Johnston *et al.*, 1983. After the evaporation of solvent in a nitrogen gas stream, the mass contents of fractions are determined gravimetrically and expressed as a percentage of total and neutral lipids.

RESULTS AND DISCUSSION

The lipids composition from "sol" and "rozbratna", isolated during the processing (phases I, II, III) and maturing (phases IV, V), are presented in table. It can be noticed that total lipids extracted from "sol" are, in average, composed of 82.08-83.92% of neutral lipids, 14.70-16.76% of phospholipids and 1.16-1.81% of glucolipids. Within the fractions of neutral lipids, the quantity of triglycerides is much higher (85.46-88.70%), compared to diglycerides (3.59-5.59%), monoglycerides (2.01-3.71%), free fatty acids (1.32-3.31%), cholesterol (1.50-2.48%), cholesterol esters (1.59-2.31%) and hydrocarbons (0.44-0.89%).

In accordance with "sol", total lipids extracted from "rozbratna" contain more neutral lipids (87.16-88.61%), less phospholipids (10.10-11.38%) and almost equal amount of glucolipids (1.23-1.55%). The share of cholesterol in the neutral lipids from "rozbratna" is higher (3.57-4.78%) and the content of diglycerides lower (2.28-3.00%). Finally, as for the percentage of other fractions, the content of neutral lipids in "rozbratna" equals the composition of neutral lipids in "sol", and the amounts are as follows: 85.43-87.10% - triglycerides, 2.07-3.01% - monoglycerides, 1.55-3.15% - free fatty acids (FFA), 1.42-2.16% - cholesterol esters and 0.39-0.91% - hydrocarbons.

Content of total lipids slightly changes during the processing of the "Uzice Beef Prshuta" (phases I, II, III). Compared with the composition of total lipids isolated from raw "sol" prior to salting - phase I (82.08% of neutral lipids, 16.76% phospholipids, 1.16% glucolipids), and those isolated from "rozbratna" (87.16% of neutral lipids, 11.38% phospholipids, 1.46% glucolipids), total lipids in the final product - phase III, contain a slightly larger amount of neutral lipids (83.20% - "sol"; 87.49% - "rozbratna") and less phospholipids (15.29% - "sol"; 11.13% - "rozbratna"). In the final phase (III), the content of glucolipids isolated from "sol" is larger (1.51%), and lesser from "rozbratna" (1.38%), compared with both mentioned raw samples (phase I). During the maturing or storage period (phase IV and V), the composition of total lipids from the "Uzice Beef Prshuta" is fairly stable and no regularities in varying of the achieved results have been established.

Among all the observed phases of the processing and maturing, the content of diglycerides, monoglycerides and FFA - rise gradually. Some exceptions to this general rule can be observed for content of diglycerides and monoglycerides. The content of diglycerides drops during the drying and smoking of "sol" (3.84% - phase II; 3.80% - phase III), and during the salting (2.40% - phase I; 2.28% - phase II) and maturing of "rozbratna" (2.90% - phase III; 2.54% - phase IV). The amount of

COMPOSITION OF LIPIDS ISOLATED FROM "UZICE BEEF PRSHUTA" ("sol" - A and "rozbratna" - B)
DURING THE OBSERVED PHASES OF PROCESSING (I, II and III) AND MATURING (IV and V)

Lipid fractions (%)		I phase		II phase		III phase		IV phase		V phase	
		A	B	A	B	A	B	A	B	A	B
NEUTRAL LIPIDS	total	82.08	87.16	82.49	87.42	83.20	87.49	83.92	88.61	83.44	88.35
	hydrocarbons	0.89	0.91	0.70	0.69	0.67	0.55	0.51	0.60	0.44	0.39
	cholesterol	1.59	1.65	1.67	1.80	2.02	1.95	2.31	2.16	1.59	1.42
	triglycerides	88.70	87.10	87.50	86.80	87.46	86.67	85.53	85.51	85.46	85.43
	cholesterol	1.90	4.30	2.48	4.78	1.50	3.81	1.55	3.57	1.52	3.60
	diglycerides	3.59	2.40	3.84	2.28	3.80	2.90	4.13	2.54	5.59	3.00
	monoglycerides	2.01	2.09	2.41	2.07	3.01	2.12	3.71	2.84	3.09	3.01
	free fatty acids	1.32	1.55	1.40	1.58	1.54	2.00	2.26	2.78	3.31	3.15
PHOSPHO LIPIDS		16.76	11.38	16.20	11.35	15.29	11.13	14.70	10.14	14.75	10.10
GLUCO LIPIDS		1.16	1.46	1.31	1.23	1.51	1.38	1.38	1.25	1.81	1.55

monoglycerides in neutral lipids decrease in the period between 15th and 30th day of maturing of "sol" (3.71% - phase IV; 3.09% - phase V), as well as during the salting of "rozbratna" (2.09% - phase I; 2.07% - phase II). Constant, but opposite, trend of decreasing content in neutral lipids can be noted within fractions of triglycerides and hydrocarbons. In this case, some exceptions exist only during the first 15 days of maturing, when the amount of hydrocarbons of "rozbratna" increases from 0.55% (phase III) to 0.66% (phase IV).

At last, during the processing and maturing of the "Uzice Beef Prshuta", concentration of cholesterol generally decreases for about 20% in "sol" and 16% in "rozbratna". Still, no regularities have been established within cholesterol amount variations in the observed phases (I - V).

CONCLUSIONS

On the basis of the research results which was done on the lipids isolated during the processing and maturing of the "Uzice Beef Prshuta", following conclusions should be emphasized:

- The total lipids are composed of 82.08-83.92% of neutral lipids, 14.70-16.76% of phospholipids and 1.16-1.81% of glucolipids ("sol"), and 87.16-88.61% of neutral lipids, 10.10-11.38% of phospholipids and 1.23-1.55% of glucolipids ("rozbratna");
- The content of triglycerides decreases from 88.70% (phase I) to 85.46% (phase V) - "sol", and from 87.10% (phase I) to 85.43% (phase V) - "rozbratna";
- The share of FFA increases from 1.32% (I) to 3.31% (V) - "sol", and from 1.55% (I) to 3.15% (V) - "rozbratna";
- The neutral lipids isolated from "rozbratna", compared with "sol", contain more than twice as big a quantity of cholesterol; during the observed phases (I-V), the concentration of cholesterol drops from 1.90 to 1.52% - "sol" and from 4.30 to 3.60% - "rozbratna".

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