

STUDY OF A "UŽICE BACON" – TRADITIONAL FERMENTED MEAT PRODUCT : PROCESSING AND CHARACTERISTICS

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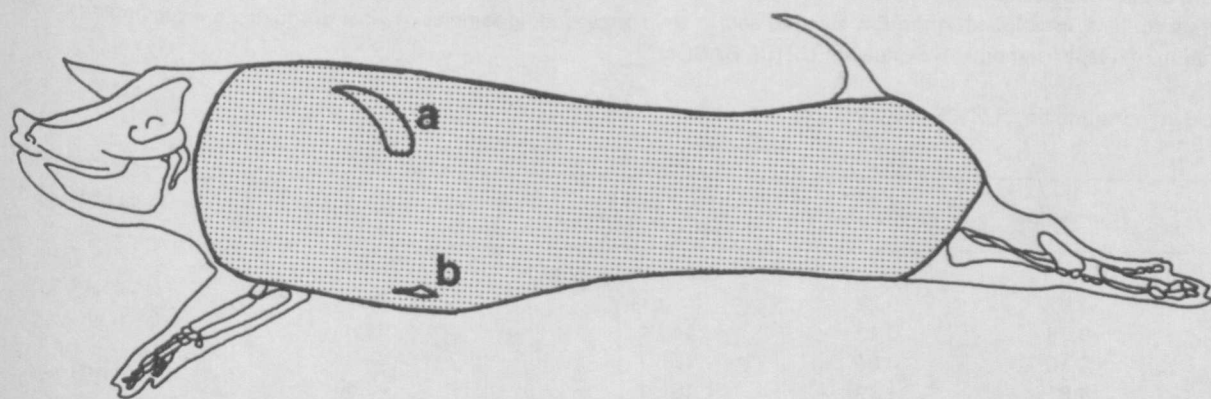
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SUMMARY: The aim of our study was "UŽICE BACON", shelf-stable fermented meat product. It is made of whole, boneless and formed pork sides with skin, including bladebone cartilage and tip of breast bone, but without head, forequarter hock, hindquarter hock and tail. "UŽICE BACON" is processed according to the traditional technology that has been used for many decades in the region of mountain Zlatibor in Yugoslavia (southwest Serbia). Processing lasts approximately four weeks (7–10 days salting; 21 days drying and smoking) and during that period weight loss of processed pork sides is usually from 17 to 20%. Final product has extraordinary favourable sensory characteristics and optimum salt (NaCl) content of about 3%.

INTRODUCTION: It is well known that preserving meat in parts through combined salting, drying and smoking has very long tradition all over the world. Already acquired experiences and processing used in various parts of the world, or even within regions in some countries, regarding the type of muscle that are used, type of muscle preparation, composition and quantity of salt, conditions and duration of salting, drying and smoking, influenced appearance of numerous specific products: South American "Sharaqui" – NORMAN and CORTE (1985), Central American "Tasajo" – ANDUJAR and VALLADARES (1989), North American "Pemmican" and "Jerky" – ACTON and DICK (1976), South African "Biltong" – VAN der RIET (1982), European "Bindenfleisch" – Souci et al (1968), etc. Product of similar shelf-stable products of beef, pork or mutton meat called "PRSHUTA", also has long and rich tradition in Yugoslavia – SAVIĆ, T. and SAVIĆ, N. (1962); JOKSIMOVIĆ et al (1985), especially in the region of mountain Zlatibor in the south-west of Serbia – RADOVANOVIĆ et al, a; b; c; (1990). Processing of this products is seasonal (November–February) and, usually, it is an additional activity for farmer's households, but it is also a part of manufacturing program of export slaughterhouse IM "Čajetina", situated in the small mountain town of Čajetina. All these well-known fermented meat products are of high quality, appreciated widely and demanded by domestic consumers but, consequently, they are not examined enough. In our previous papers we have reported about processing, main quantitative and qualitative characteristics of "Užice Beef Prshut" – RADOVANOVIĆ et al, d (1990) and "Užice Pork Prshut" – RADOVANOVIĆ et al (1992). The object of the present study is to represent processing and characteristics of "UŽICE BACON" another traditional fermented meat product from the same mountainous region, whose participation in the production structure of those types of product is about 25%.

MATERIALS AND METHODS: As a raw material for production of "UŽICE BACON" the whole pork sides are used, originating from hogs whose live weight is from about 62 to 68 kg (average 65 kg). After slaughtering and cooling (24 h/0–4°C), head, forequarter hock, hindquarter hock and tail is divided first, and then detailed deboning (except cartilago scapulae and cartilago xyploidea) and forming of pork sides (musculature thinning on 5–8 cm; dividing of superficial fat and connective tissues) is done. It means that "UŽICE BACON" is made of whole, boneless and formed pork sides with skin, including bladebone cartilage (cartilago scapulae) and tip of breast bone (cartilago xyploidea) but without head, forequarter hock, hindquarter hock and tail (fig. 1). After preparation, thirty formed pork sides (average weight 17, 160 kg – Sd = 1,550) are processed according to the traditional technology that has been used for at least 150 years in the region of mountain Zlatibor and passed on from generation to generation.

Fig. 1.: "UŽICE BACON" – scheme of pork side view, including bladebone cartilage (a) and tip of breast bone (b)



Pork sides are salted with pure salt – NaCl (without any other ingredients), rubbed with 3% of salt on raw weight and then arranged in about 10 lines in plastic containers. Salting is done at the temperature of about 4°C, for 7–10 days. During salting, meat juice is singled out so that after 3–4 days almost whole quantity of pork sides is covered with meat juice. Because of that, when singling becomes lesser once arranged sides are 2–3 times rearranged so that drying of upper parts that are not in meat juice is prevented. After salting, pork sides are desalted by rinsing in cold water which is running through plastic containers for about 24 h. Then, pork sides are hanged on sticks and placed in a room with good air circulation. There they leak (2–3 h) and then drying and smoking is done. The sticks with hanging pork sides are arranged in 3–5 lines (depending on the height of the room), whereas the distance of the first line from the heat and smoke source usually is about 230–250 cm, but never less than 200 cm. about five regularly arranged fire-boxes and only hard types of wood

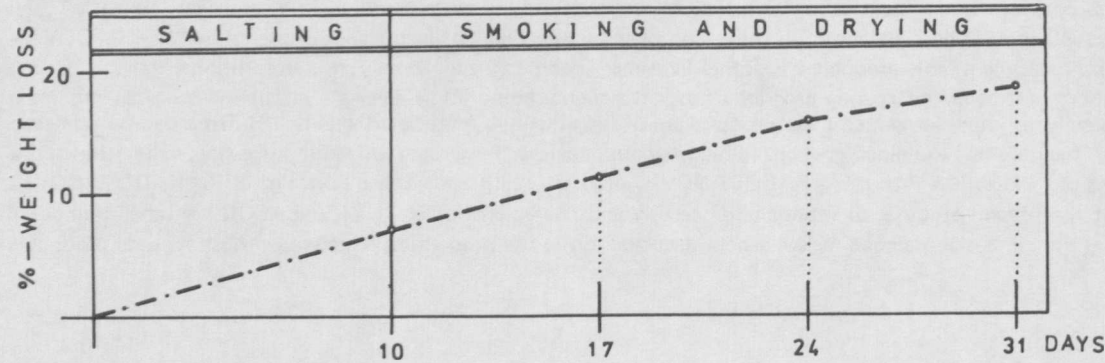
are used as a heat and smoke source. During this stage of the process (drying and smoking) temperature should be 8–10 °C (max 12°C), and relative humidity 70–75%. Since processing of "UŽICE BACON" is done in the winter period (November–February), mentioned values are obtained by occasional heating (according to the acquired experience). Ahyhow, the process of drying and smoking lasts for about 3 weeks and during that period sticks with pork sides are 2–3 times rearranged (lower lines are put up and opposite) so that all quantities of pork sides have similar treatment.

During procesing (10 days salting; 21 days druing and smoking) dehydration (weight loss) was observed, and in the raw samples and final products moisture, crude protein (N x 6,25) and fat content was examined (AOAC, 1980). In final products NaCl content was determined (KARAN–DJURDJIC S., 1968). In raw samples and final products content of fatty–acids (gas chromatograph Varian – 1400 with Fid detector) was also determined and the results were represented in grams on 100 g of fat. Sensory evaluation of final products was done by five member evaluation board.

Average monthly data of main climate characteristics (t° and relative humidity of air) on mountain Zlatibor during the last 40 years were obtained from the weather station on Zlatibor. These data were important because they are factors that determine natural conditions under which processing of "UŽICE BACON" is done.

RESULTS AND DISCUSSION: Dynamics of dehydration, referred to data of weight loss of examined samples in observed phases of processing of "UŽICE BACON", are represented in Fig. 2. Average weight loss after salting (10 days) is 7,15%; during the first week of drying and smoking (10 th – 17 th day) – 11,23%, after the second week (17 th – 24 th day) – 15,89%, while at the end of processing (31 st day) average weight loss is 18,50%. All mentioned values (%) are calculated on the weight of raw samples and they are mostly equalized.

Fig. 2. : Average weight loss during processing of " UŽICE BACON"



Results of chemical analysis of examined samples showed that average moisture content in the final product ("UŽICE BUCON") is 33,12% (Sd = 3,28) crude protein – 18,25 (Sd = 2,17), fat – 44,63% (Sd = 2,89) and NaCl – 2,88% (Sd = 0,14). We would like to emphasize that all analyses were performed just after the end of processing which caused some greater moisture content in regard to smaller content of salt from what is their usual participation in the finally consumed product. Namely, during storage and distribution of final product moisture content in the "UŽICE BUCON" decreases to optimum level of about 30–31%, while the content of salt (NaCl) increases to about 3,5–4%. Otherwise in the conditions of our experiment values of variation coefficient all examined indicators are relatively small and they are within range from 4,8% (NaCl) to 11,9% (crude protein). On such equalized series of data, homogeneously chosen samples and controlled contitions of processing influenced that what certainly in industrial processing, particularly in individual households, is not always possible – so that variations are certainly some what greater.

Data of fatty–acids content, established in the raw samples and in the corresponding samples of final products, are presented just as an additional illustration of quality and nutritive value of "UŽICE BACON".

Tab. 1.: Fatty acid composition of " UŽICE BACON"

Fatty acid (g/100g fat)	Raw sample	Final product	Faty acid (g/100g fat)	Raw sample	Final product
Saturated,			Monounsaturated,		
total	33,02	33,27	total	48,54	47,14
10 : 0	0,18	0,13	14 : 1	trag	trag
12 : 0	0,10	0,06	15 : 1	–	–
14 : 0	1,85	1,79	16 : 1	3,60	1,68
15 : 0	trag	trag	17 : 1	0,29	trag
16 : 0	20,81	21,20	18 : 1	44,28	45,01
17 : 0	0,14	trag	20 : 1	0,37	0,45
18 : 0	9,48	9,38	Polyunsaturated,		
20 : 0	0,46	0,71	total	18,22	19,40
			18 : 2	18,09	19,35
			18 : 3	0,13	0,05
			20 : 4	–	–

Regarding sensory (organoleptical) quality indicators, on the basis of summarized opinion of five member evaluation board and existing opinion of consumers, it can be said that "UŽICE BACON" has very favourable as well as specific sensory characteristics. The product has moderately firm consistency, favourable juiciness and brown-red colour on the surface. On the cross section muscle tissue is red and fat tissue is white-yellow. It also has pleasant smell and taste and very specific pleasant aroma.

Finally, at the end of this discussion, we would like to emphasize that in the region of the mountain Zlatibor in Serbia there are exceptionally favourable climatic conditions for the production of shelf-stable meat products, consequently for "UŽICE BACON" too. In winter time, when these products are processed (November-February), in the last 40 years average air temperature ranged from 3,5 to -2,2°C, and relative humidity from 81 to 85%. In the same period more intensive air movements were not recorded either. Owing to that type of climate, rooms in individual households (in which by moderate heating and production of "cold" smoke temperatures from 8 to 10°C are obtained and relative humidity of air from 70 to 75%) are natural "climatechambers" for drying, smoking and ageing of products.

CONCLUSION: On the basis of our study and many years experience, acquired in industry and on farmers households, we draw the following conclusions:

"UŽICE BACON" is shelf-stable fermented product from pork that is produced according to the traditional technology in the region of mountain Zlatibor in Yugoslavia (south-west part of Serbia). Processing of whole, boneless and formed pork sides with skin, including bladebone cartilage and tip of breast bone, but without head, forequarter hock, hindquarter hock and tail, lasts approximately for four weeks (10 days salting, 21 days drying and smoking). During that period weight loss of processed pork sides is usually from 17 to 20%. Final product has extraordinary favourable sensory characteristics, optimum moisture content from 30 to 31% and salt (NaCl) of about 3,5 to 4%.

At the end we would like to point out that supreme recognition for the quality of this product and the way that cherishes traditional processing comes in 1990 when the Federal Patent Institute of Yugoslavia issued protected trade mark of original geographical origin for the "UŽICE BACON" (Pat.no.5689/90-1).

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