

## TRADITIONAL MANUFACTURING OF HARD CHEESE – KACHKAVAL ON STARA PLANINA MOUNTAIN

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### ABSTRACT

Nomads from Greece implemented the tradition of kachkaval cheese making on Stara Planina, 100 years ago. At the beginning, the kachkaval was made exclusively from sheep's milk, during the grazing period. In the past, kachkaval was made on «bačija» dairies, and besides the kachkaval the significant by-products were ghee and «urda». The historical data showed that in the year 1903, 160 wagons of kachkaval were exported to Vienna and Budapest. The changes in animal breeding conditions and increasing number of cattle in this region lead to significant reduction in number of sheep, and consequently caused the discontinuance in production of kachkaval. Nowadays, there are few «bačija»-dairies on Stara Planina Mountain which are producing kachkaval in the traditional way. The characteristics of chemical content of traditionally produced kachkaval are:  $60.79 \pm 3.37\%$  dry matter,  $29.50 \pm 2.25\%$  milk fat,  $55.57 \pm 3.55\%$  moisture on a fat-free basis,  $48.52 \pm 2.41\%$  fat in dry matter,  $24.99 \pm 1.60\%$  proteins,  $3.8 \pm 2.57\%$  NaCl and pH value  $5.62 \pm 0.09$ . The traditionally made kachkaval has a shape of a flatten cylinder, with the weigh of 6–7 kg, bright-yellow crust and firm dough. The traditional cheese making of kachkaval comprises the hand made process of «pasta filata» cheese and for the end product a spicy and salty taste are typical. Revitalizing the traditional kachkaval production also means the preservation of cultural identity of the region of Stara Planina.

Key words: milk products / cheese / kachkaval / Stara Planina / traditional cheese making / Serbia

## TRADICIONALNA IZDELAVA TRDEGA SIRA KAČKAVALJ NA STARI PLANINI

### IZVLEČEK

Tradicija proizvodnje sira kačkavalj na Stari Planini izvira od nomadskih pastirjev iz Grčije, ki so jo tja prinesli pred več kot 100 leti. Na začetku so kačkavalj izdelovali izključno iz ovčjega mleka v pašnem obdobju. Kačkavalj so izdelovali v mlekarnah – «bačijah», poleg sira pa sta bila tipična stranska proizvoda še malso in «urda». Po zgodovinskih podatkih so leta 1903 izvozili 160 vagonov kačkavalja s Stare Planine na Dunaj in v Budimpešto. S spremembo pogojev v živinoreji in s povečanjem staleža govedi, se je število ovac na Stari Planini bistveno zmanjšalo, zato je tudi proizvodnja kačkavalja skoraj zamrla. Danes še obstoja nekaj mlekarn – «bačij» na področju Stare Planine, ki še vedno proizvajajo kačkavalj po tradicionalnem postopku. Kačkavalj, izdelan na tradicionalen način, vsebuje  $60,79 \pm 3,37\%$  suhe snovi,  $29,50 \pm 2,25\%$  maščobe,  $48,52 \pm 2,41\%$  maščobe v suhi snovi,  $24,99 \pm 1,60\%$  beljakovin,  $3,8 \pm 2,57\%$  NaCl, in ima pH vrednost  $5,62 \pm 0,09$ . Tradicionalna oblika kačkavalja je sploščen cilindar, ki tehta 6–7 kilogramov, ima svetlo rumeno skorjo, in čvrsto testo. Tradicionalna izdelava kačkavalja temelji na ročni pripravi pasta filata sira (kuhan sir), za končni izdelek pa je značilen pikanten in slan

okus. Oživljanje tradicije izdelave kačkavalja na področju Stare Planine je pomembno tudi zaradi ohranjanja kulturne identitete te regije.

Ključne besede: mlečni izdelki / sir / kačkavalj / Stara Planina / tradicionalna izdelava sira / Srbija

## THE HISTORY

Hard cheese, so called kachkaval, is produced in Mediterranean region, including Adriatic and Black Sea regions, in other words territory once under the rule of Ancient Greece, Roman Empire and their eastern and southern colonies. Based on written historical monuments, we can conclude that kachkaval has a very long history. Columella, the roman writer (Pejić, 1956) from 68 AD described the process of cheese making »manum pressum«, which is almost identical to the production of kachkaval.

The region where kachkaval was manufactured in the past and where it is manufactured today is in the fact the region where during the second century BC and all up to the seventh century of the new era great migrations of nomadic tribes have occurred. Their major agricultural activity was cattle and sheep breeding.

On the Balkan Peninsula, especially in Romania, Bulgaria, Greece and Serbia, the animal breeding was mostly in the hands of Tzintzars, who were manufacturing predominantly hard cheese – kachkaval. According to historical data Tzintzars were natives of Balkan Peninsula, who settled there before Romans, and even perhaps before the ancient Greeks.

According to the historical material (Pejić, 1956), it can be most certainly presumed that the manufacturing of cheese was brought to the Balkan Peninsula by nomadic tribes from the East. Later, the manufacturing of this cheese was brought to Italy and from there to Britain during the period of Julius Caesar. In Britain, the technology of making cheese has been adapted to climatic conditions and leading to the development of the technology for Cheddar cheese production.

This ancient technology of cheese making is mostly spread on the Balkan Peninsula and in Italy, as well as in the southern regions of Russia (the Crimea, Be Arabia, South Ukraine), in Turkey, Algeria, Tunisia, Egypt and Morocco, that is in the regions with warm and dry climate, hilly relief and developed sheep breeding (Pejić, 1956).

In each of these countries with developed manufacturing of hard cheese during the time some varieties or types of hard cheese developed distinguishing themselves according to the properties and quality, such as hard cheese from Šarplanina Mountain, Pirot hard cheese in Serbia, Pirdop cheese from Bulgaria, Penlu from Romania and Tesalia and Epiria cheese from Greece.

The origin of the name kachkaval can be found in the language of the people who most probably brought kachkaval to the Balkan Peninsula from where it spread further. In the Tzintzar language the word "kač" means cheese.

The story about hard cheese production on Stara Planina Mountain necessarily includes the nomadic sheep breeders, who are known as "Crnovunci" (Blackwool people). They were named after the black colour of the wool of their sheep. In the period from the end of the 19<sup>th</sup> century up to the third decade of the 20<sup>th</sup> century "Crnovunci" populated the pastures of Stara Planina Mountain with their flocks of 500–1000 sheep. Large quantities of sheep milk, which gave their flocks, "Crnovunci" processed into white cheese and kept it in bellows. In order to prolong the durability of this cheese, it was soaked into hot water, mixed and salted, that is, in other words, the processing of milk into hard cheese – kachkaval had started. The skill of making kachkaval "Crnovunci" have passed on to the people of Dojkinci village, who improved it to the perfection and kept until today (Petrović, 1997).

Production of kachkaval on Stara Planina Mountain is connected with small dairies called «bačija». «Bačija» dairy represents cooperative organization for joint sheep keeping, pasture, production and processing of all products – wool, meat and milk. Peasants realized that small

number of sheep is of no use, therefore they associated in all activities relating to sheep breeding and production at dairies – «bačije» (Stojanović et Katić, 2003).

Manufacturing of hard cheese – kachkaval and other products was the same at all “bačija” dairies on Stara Planina Mountain. It is known that they were made from light material that could be transported, premises were exposed to draft, and their size varied depending on the quantity of milk. Processing of milk was carried out in wooden tubs containing warm water where the «baskia» was fumed, and also dairies – «bačija» had tables for casting and salting as well as a table for cheese ripening (Pejić, 1956).

### **PRODUCTION STAGES IN MANUFACTURING OF HARD CHEESE – KACHKAVAL IN DAIRY PLANT IN THE VILLAGE OF DOJKINCI ON STARA PLANINA MOUNTAIN**

On Stara Planina Mountain, in the village of Dojkinci, dairy plant has a daily capacity for processing of 2000 l of milk into kachkaval. Altogether there are 7 similar dairies on Stara Planina Mountain at present that are processing larger or smaller quantities of milk. Milk is combined sheep's and cow's milk, although according to the original technology of kachkaval production only sheep milk is to be used. Prepared quantity of milk (800 l) from Dojkinci is heated until the temperature of 65–70 °C is achieved. This temperature is achieved in approximately two hours and subsequently warmed milk is mixed with remaining milk coming from other villages. Temperature of mixed milk is 30 °C and acidity 8–8.2 °SH. The curdling temperature does not change during the whole phase of curdling which lasts for 60 minutes. The phase of processing curd starts by curd chopping up by means of the cross and lasts for 5 minutes, the temperature of separated whey is 29.6 °C and acidity 6.6°SH, while the temperature of the curd is 29 °C and acidity 5.2 °SH. After separating a part of whey, the curd is again intensively mixed to separate the grains and again a part of whey is being separated, with acidity of 6.4 °SH, and temperature 29.9 °C, while the curd has acidity of 10.8 °SH and temperature of 29.5 °C. After that the warm water from the boiler is added and the temperature of curd is lifted to 34.9 °C. The duration of the phase of drying the curd is 10 minutes, until the required strength of the grains has been reached. The acidity of whey is 9.6 °SH. The curd is then left in the bath, pressed for 10 min to separate whey and then cut, taken out from the bath and transferred to the drainer on to the cheese-making table, grained, allotted and pressed for 20 minutes, the pressing being achieved by screwing the press according to the experience. After pressing the lump is cut into pieces, taken out from the drainer and left on the draining table until the next day. The temperature of the room is 20.7 °C, and the period of ripening of baskia is 19–20 hours. The room temperature during the night is 15–16 °C. After the acidity has been inspected by spreading (Fig. 1), “baskia” is chopped on the cutter like that for cabbage and steamed in the water whose temperature is 75 °C. Steaming is performed in weaved baskets (Fig. 2), containing about 6 kg of baskia, devaporated and put onto the cheese-making table (Fig. 3), salted (Fig. 4), formed into the ball (Fig. 5) and put into casts (Fig. 6). The cheese remains in the casts until the next day. Than it is taken out, weighed and transferred into the room at 20 °C for drying. After drying for 1–2 days, it is transferred into the room for cheese ripening. The temperature in the ripening room 20 °C, and the cakes of cheese are put one onto the other and salted with dry salt. Finally, the ripened kachkaval is packed into vacuum bags.

Major characteristics of chemical composition of hard cheese from Stara Planina Mountain are shown in Table 1.

Chemical composition of the kachkaval from Stara Planina Mountain varied and ratio between the minimum and maximum value of dry matter was 10%. It must also be pointed out

that percentage of salt in certain kachkavals also varied and that there were samples of cheese with over 7% of salt.

Table 1. Chemical composition of kachkaval from Stara Planina Mountain (Mijačević *et al.*, 2003)

Preglednica 1. Kemična sestava sira kačkavalj s Stare Planine (Mijačević in sod., 2003)

Parameters / Parametri	n	X±s	min	max
% dry matter % suhe snovi	7	60.79±3.37	54.55	64.05
% fat % maščobe	7	29.50±2.25	25.00	32.50
% water without fat % vode brez maščobe	7	55.57±3.55	50.07	60.60
% fat in dry matter % maščobe v suhi snovi	7	48.52±2.41	45.83	53.03
% protein % beljakovin	7	24.99±1.60	25.07	27.38
% dissolved protein % raztopljenih beljakovin	7	5.72±0.22	5.42	6.02
% NaCl	7	3.80±2.57	1.66	7.67
pH	7	5.62±0.09	5.50	5.75
oSH	7	37.82±8.41	23.20	51.20

Table 2. Sensory evaluation of cheese in different ripening stages

Preglednica 2. Senzorična ocena sira v različnih fazah zorenja

Ripening period of cheese Čas zorenja sira	Crust Skorja	Cross section Prerez	Consistency Konzistenca	Smell Vonj	Taste Okus
2 days 2 dneva	Characteristic for young cheese	Technological holes, grain of not devaporated baskia, layers well expressed	Soft, elastic	Smells like milk	Bitter
30 days 30 dni	Yellow crust, integrity preserved	Technological holes, layers preserved	Firm	Smell of sheep and cow milk	Salty, bitter, fine melting in the mouth
60 days 60 dni	Yellow crust, integrity preserved	Technological holes	Firm	Smell of sheep and cow milk	Salty, bitter, fine melting in the mouth

## THE ANALYSIS OF SENSORY CHARACTERISTICS OF KACHKAVAL FROM STARA PLANINA MOUNTAIN

Sensory evaluation of 2 days old cheese in drying process, cheese that ripened for 30 and 60 days, respectively, was carried out by three evaluators. Sensory evaluation of investigated cheese is presented in Table 2.

Sensory evaluation indicates that 30 days old cheese can be placed on the market labeled as cheese, ripe for consumption. However, true ripeness is achieved after the period of 60 days. In general, cheese is salty, and the cross section shows technological holes. Occurrence of technological holes is characteristic for manual processing of steamed dough, however, number of holes should be low and their size relatively small.

Analysis of cheese, ripe for consumption and ripe cheese has revealed the absence of coliform bacteria and *E. coli*. However, some useful microorganisms were isolated that are responsible for specific taste of the cheese. In the cheese, originating from Stara Planina Mountain, the most often isolated bacteria are *Enterococcus spp.*, *Lactococcus spp.*, *Leuconostoc spp.* and *Lactobacillus spp.*, with specific characteristic being able to grow in conditions of high and low temperatures and in the broth with increased quantity of salt.

### CONCLUSION

Since there is preserved tradition of manufacturing hard cheese – kachkaval on Stara Planina Mountain, with already famous Senokos, Dojkinci, and Pirot kachkaval, this is also the justification of the necessity for protection of kachkaval produced in this region with certain label defining geographical origin of the product. Preservation of the tradition of cheese manufacturing means at the same time also preservation of the cultural identity of the region (Dozet *et al.*, 1996, Mijačević *et al.*, 2003a and 2003b)

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