

## Varieties and Quality of Dairy Products, Especially Cheeses in Turkey\*

### (Vrste i kakvoća mlječnih proizvoda, osobito sireva u Turskoj)

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#### Summary

The milk production in Turkey amounts 5.5 million ton/year. This production comprises cow's, sheep's, goat's and buffalo's milk. These milk either of one species or more are used for production of milk products. In Turkey, butter and yoghurt production are on very high level. Yoghurt is the best known and very popular milk product. Generally set yoghurt is produced. There is very low production of flavoured yoghurt. A dried type of yoghurt is called Kurut. In Marmara district, Siliври yoghurt is produced from sheep's milk. This type has a very good consistency. Ayran is typical milk product, produced from yoghurt. In production of Ayran, the equal amount of water and yoghurt are mixed, and 1—1,5% NaCl is added. Butter is one of the oldest milk products. Cream is used as raw material for butter production. In villages, butter can be home-produced from yoghurt also. Some important cheese varieties native to Turkey, classified in descending order of consumption quantity, are listed below:

*Beyaz peyniri*: soft cheese originally made of sheep's milk. However, it is produced nowadays of cow's milk too, especially in winter period.

*Kasar peyniri*: hard cheese, the production process resembles to Kashkaval cheese manufactured in Bulgaria.

*Tulum peyniri*: soft cheese made from goat's and sheep's milk. Heat treatment is not applied. After milking, rennet extract is added. Ripening is carried out in the skin bag.

*Mihalic peyniri*: hard cheese, it is produced from sheep's milk.

*Cerkež peyniri*: it is made from sheep's, goat's, buffalo's milk.

*Otlu peyniri*: made from sheep's and goat's milk. Some herbs are added into the curd (soft cheese).

*Lor*: it is produced from Ayran and soured milk (soft cheese).

*Dil peyniri*: made from sheep's milk. Process is similar to the production on *Kasar*.

In Turkey, minor quantities of following well-known cheese varieties are produced too: Camember, Emmental, Edam, Gouda, Cheddar.

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## Sažetak

Proizvodnja mlijeka u Turskoj doseže 5,5 miliona tona na godinu. Obuhvaća proizvodnju kravljeg, ovčjeg, kozjeg i bivoljeg mlijeka. Jedna ili više vrsta mlijeka upotrebljava se u proizvodnji mlječnih proizvoda. Proizvodnja maslaca i jogurta u Turskoj su na vrlo visokoj razini. Najpoznatiji i vrlo popularan mlječni proizvod je jogurt. Općenito se proizvodi obični jogurt. Proizvodnja začinenog jogurta vrlo je mala. Osušena vrsta jogurta naziva se Kurut. U predjelu Marmara proizvodi se Silivri jogurt, od ovčjeg mlijeka. Ova vrsta ima vrlo dobru konzistenciju. Ayrana je tipičan mlječni proizvod, dobiva se od jogurta. Za izradu Ayrana miješa se jednaka količina vode i jogurta i dodaje se 1—1,5% NaCl.

Maslac je jedan od najstarijih mlječnih proizvoda. Sirovina za proizvodnju maslaca je vrhnje, a u seoskim kućama izrađuje se i od jogurta.

Dolje su navedene neke glavne vrste sireva podrijetlom iz Turske, podijeljene po učestalosti upotrebe, od češćih do manje čestih:

*Beyaz peyniri*: meki sir, izrađen izvorno od ovčjeg mlijeka, ali se danas proizvodi i od kravljeg mlijeka, osobito zimi;

*Kasar peyniri*: tvrdi sir čija je izrada slična izradi Kashkaval sira iz Bugarske;

*Tulum peyniri*: meki sir izrađen od kozjeg ili ovčjeg mlijeka, bez postupka grijanja. Nakon mužnje dodaje se ekstrakt sirila. Sir zatim zrije u kožnatoj vreći;

*Mihalic peyniri*: tvrdi sir, izrađen od ovčjeg mlijeka;

*Cerkez peyniri*: izrađen je od ovčjeg, kozjeg ili bivoljeg mlijeka;

*Otlu peyniri*: meki sir, izrađen od ovčjeg i kozjeg mlijeka. U skutu se dodaju neke trave;

*Lor*: izrađen je od Ayrana i kiselog mlijeka;

*Dil peyniri*: izrađen je od ovčjeg mlijeka. Proces je sličan kao kod proizvodnje Kasar sira.

U Turskoj se proizvode i manje količine dobro poznatih vrsta sireva, kao na primjer Camember, Emmental, Edam, Gouda, Cheddar.

Turkey is situated between Europe and Asia. Because of this peculiarity, some milk products which being produced in Europe and Asia, can be seen in Turkey. In addition to, this peculiarity in main reason for manufacturing various milk products.

Generally, the milk production amounts 4.5 million ton/year. This production comprises cow's, sheep's, goat's and buffalo's milk (Table 1).

**Table 1. Milk Production Amount in Turkey**  
**Tablica 1. Količina proizvodnje mlijeka u Turskoj**

Cow's milk	2.804.705 t/year
Sheep's milk	981.065 "
Goat's milk	434.525 "
Buffalo's milk	158.975 "

Source: D.I.E 1986

These milk, either of one species or more, are used for manufacturing the milk products.

In Turkey, producing the yoghurt and butter is of very high level. The amount of milk separated for yoghurt and butter is 50% of the total produced milk.

Yoghurt is the best known and very popular milk product. Generally, set yoghurt is produced. There is a very low production of flavoured yoghurt. The increase of total solid is achieved by evaporation and adding the skim milk powder. UF and HF processes have not been applied yet.

A dried type of yoghurt intended for prolonging the storage yoghurt is called Kurut. For manufacture of Kurut (yoghurt produced in traditional way), skim milk is put into special bag to drain the whey. Afterwards NaCl is added into concentrated yoghurt to obtain small balls by kneading. They are dried at the sunshine for one or two weeks. The composition of Kurut is given Table 2.

**Table 2. The Composition of Kurut**

**Tablica 2. Sastav Kuruta**

Mineral content	4.80%
Salt (NaCl)	9.11%
Fat	11.07%
Water	19.97%
Protein	52.35%
Other constituents	2.70%

**Kis yogurdu** (winter yoghurt) is a traditional product. It is produced in summer for winter consumption. Its production process includes: straining, heat treatment and salting of fresh yoghurt, which is afterwards hermetically packaged. In Marmara district, Silivri yoghurt is produced from sheep's milk. This type has a very good consistency.

**Ayran** is a typical milk product which is produced from yoghurt. In production of this product, the equal amount of water and yoghurt are mixed with each other, and 0,5—1,0% of salt is added.

**Butter** is one of the oldest products. Cream is used as raw material for its production. In villages, butter can be home produced from yoghurt. Process is very simple. At first, yoghurt is diluted and cooled, then it is placed into the hand churn for churning.

**Lule Kaymagi** is a very popular milk product of Turkey. It is produced in some of the neighbour countries but it is not known in Europe and America. Buffalo's milk is more suitable for production of Lule Kaymagi. Production process is very simple. Firstly, milk is put into the kettle and heated to the boiling temperature, and then, in order to obtain cream layer on the surface, heated milk is poured into a shallow and large pot.

Afterwards the milk is left cooling 40°—50° C. Milk is heated again at 75°—80° C and then cooled. Next morning the cream layer is cut and formed like curls.

Some important cheese varieties native to Turkey, classified in descending order of consumption quantity, are listed below;

**Beyaz Peyniri:** soft cheese Teleme type. Originally made from sheep's milk. However, it can be produced and from cow's milk only. Sometimes, cow's, sheep's and goat's milk mixes may be used. For production of Beyaz Peynir, cheese milk is firstly heated at 68°—70° C for 10 min, and cooled to coagulation temperature: 28°—30° C. Rarely mixed cultures *Str. lactis* — *Str. cremoris* or *L. bulgaricus* — *Str. thermophilus* are used at 1%; 20—30 min. after rennet is added. Coagulation is completed in 90 min. The curd is cut is cut into 1—2 cm<sup>3</sup> and poured into special cloth to drainage the whey. The curd is enclosed in cloth and pressed by weights. Press is stopped when the whey acidity reaches at least 10° SH. At this time, Teleme is cut into 7 × 7 × 7 cm<sup>3</sup>, and immersed in 15—16% brine at 10°—12°C for overnight. Cheeses are packed in container, filled with the same brine. Ripening takes place for 3 months at 5°C.

**Kasar Peyniri:** hard cheese. It is made from sheep's or sheep's and cow's mixed milk. The production process resembles to Kashkaval cheese, which is produced in Bulgaria. During the Kasar cheese making, normally raw milk is used; however sometimes heat treatment is applied.

**Tulum Peyniri:** it can be produced from every kind of milk. Heat treatment isn't applied. After the milking rennet extract is added immediately at 28°—35°C. Coagulation is completed in 1 or 1.5 hours and curd cut with the knife. The curd is poured into special cloth to drainage the whey, left for 0,5—1 hours. After then, curd is pressed until water hasn't been observed on the surface of special cloth. Curd is crumbled by hands to very little pieces and 4—5% NaCl is added. The curd is filled into animal skin (made of goat's and sheep's skin). In the skin, the curd is pressed again. Ripening takes for 2 to 4 months at 6°—8°C.

**Mihalic Peyniri:** hard cheese. It is a traditional cheese which is being produced in Bursa, Balikesir. To obtain the best quality, for Mihalic making must be used Kivircik milk (Kivircik is a kind of sheep). Heat treatment isn't applied. Milk is warmed to renneting temperature (30°C). Rennet is added in the quantity sufficient to give firm curd in 1.5 hours. Curd is cut to 2 cm size. Curd size is reduced to 2—3 mm like a rice, using the stirrer for 10 min. Hot water is poured into the curd for scalding under constant stirring. This process goes on for 5—10 min. Scalding temperature is 42°—45°C. After drainage of whey, pressing is carried out. This curd is cut to 2.5—3.0 kg of pieces by knife. Salting is realized at three stages. Firstly, the curd is immersed in 15% brine for 2 days, secondly, in 16—17% brine for 2—3 days, finally in 18% brine for 4—5 days (sometimes for 10—15 days). After salting, cheese is ripened for 3 months.

**Lor:** whey is used for production of Lor. Sometimes, whole milk (about 20—30%) is added to the whey to improve the aroma and taste. Whey is heated at 80°—85°C. After heating, whey proteins rise to the surface and pro-

tein granules are collected by spoon. If the Lor is intended for long time storage, 2—3% of NaCl must be added, and kept in cold place.

**Civil Peyniri:** made from skim milk. Skim milk is heated to 70°—80° C and rennet is added. Heating, under constant stirring, continued until the coagulation of milk. When the coagulation is completed, curds are kneaded in the tanks.

**Diş Peyniri:** made from sheep's or mixed sheen's and cow's milk. Process is similar to production of Kasar. It is consumed without ripening.

**Otlu Peynirler:** Otlu cheeses are made in east Turkey. For production of Otlu cheeses, any kind of milk can be used. Some herbs are added into the cheese milk or curd.

**Cökelek:** Ayran obtained from butter making, is used for production of Cökelek. It should be consumed in a very short time. However, if the salt is added, it can be stored for two months. Cökelek has a very sharp acidic taste and aroma.

**Abaza Peyniri:** it belongs to Pasta filata family of cheeses. The primitive method is being applied in villages for Abaza cheese making. It is usually processed in Marmara region. Generally, sheep's and cow's milk or cow's and buffalo's milk are used. However, goat's milk can be added too. For production of Abaza cheese, heat treatment isn't applied: cheese milk is warmed to 30°—33°C and rennet extract added (10 g rennet for 100 kg milk). Coagulation of milk appears after 2—2.5 h. At the end of the coagulation, curd is cut in to little pieces and pressed to get the whey out. For curd ripening, curd is packed in cloths and placed in the special room at 35°—40°C. When the curd acidity reaches 5.1—5.4 pH, the curd is tested by the stretching test (a little piece of curd is put into hot water at 75°—80°C. If the curd acidity is correct, the curd can be stretched out to 1 m long). Before stretching, salt can be mixed with the curd. The curd is taken out of the cloths and chopped into small pieces. These are immersed in hot water, left for a while for the curd to be warmed. Afterwards, the curd is treated with wooden spoon to obtain a smooth long pliable plastic mass. Plastic mass is formed in oval or ball shape. Abaza cheese is usually eaten fresh.

Minor quantities of following well known cheese varieties are also produced in Turkey — Camember, Emmental, Edam, Gauda, Cheddar.

**Table 3. Cheese Production Amount (1984)**  
**Tablica 3. Količina proizvedenih sireva (1984)**

Cheese type	Quantity t/year
Beyaz P.	121.600
Kasar P.	29.500
Tulum P.	26.000

Source: D.P.T. 1986

Table 4. Composition of Some Important Cheeses

Tablica 4. Sastav nekih važnih sireva

Cheese type	TS (%)	Water (%)	Fat* (%)	NSF* (%)	Protein* (%)	Ash* (%)	Salt* (%)
Beyaz P.	41.52	58.48	19.25	22.27	15.75	1.02	3.94
Kasar P.	66.19	33.82	27.80	38.48	27.71	1.72	3.90
Tulum P.	59.32	40.68	22.90	36.42	28.40	1.58	4.49
Mihalic	66.55	33.45	30.65	35.90	26.48	1.40	7.98

x — In total solid.

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