HYGIENIC ASPECTS OF SHEEP BREEDING IN SLOVAK AGRICULTURAL REGIONS

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Abstract: *Ewe's milk is also very important source of nutritive and energetic components for humans being. Slovakia is a typical country with mountain and submountain area suitable for sheep breeding. Nowadays, three different methods of ewe's milk processing are used: 1. - hand milking and manufacturing of ewe's milk lump cheese without any heat treatment, 2. - machine milking associated with cooling and storage of raw milk on the sheep farm and milk transport to a dairy plant, and 3. - machine milking, cooling and storage of milk, pasteurisation and manufacturing of ewe's milk lump cheese from heat treated milk. All of these methods have their advantages and disadvantages can affect the quality of raw milk mainly from the microbiological viewpoint.*
Key words: *sheep, milk quality, hygiene*

The advantage of all kinds of milk is predominantly in a fact that it is a food-stuff, which is, in a certain volume, able to provide human organism with all nutritive and energetic components (Podhorský, 1993; Maľa a Dudriková, 2000). Therefore it is important to enrich the dairy market with products of another origin than bovine milk (Burdová, 2002). Slovakia is a country with typical mountain and submountain regions so nowadays there are the best conditions for sheep breeding. The first written records concerning breeding diary ewes from the period of the end of 14th century and the beginning of 15th century indicate this activity. At that time the first chief shepards from Ukraine, Romania and Transylvania came to the region of present day Slovakia. All sheep breeding technology, receiving and processing ewe's milk into ewe's milk lump cheese is kept at many places, so called productive farms (sheepfolds) up to these days.

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Producing of ewe´s milk cheese is an old and traditional activity in Slovakia. There are many unsolved problems from the past which are still topical at present. There are actually a few excellent examples from history, where we can commend ourselves for the world priority as Slovak sheep cheese made of ewe's milk processed under sheepfold conditions. (Herian, 2002). The sheep cheese-works, founded in1797 by the Molecs family in Zvolenská Slatina can serve as an example. They have been producing sheep cheese, the most typical Slovak cheese, since its establishment. The taste and the aroma of sheep cheese are inimitable and predetermine its special place in the market. The products with their traditional taste and quality obtain wide range of customers not only in Slovakia but abroad as well. The sufficient evidence is a fact, that the biggest business partners of above mentioned sheep cheese-works are Hungary and the USA, and the export forms almost one third of the whole production. (Anonymus, 2002). This tradition should be remembered nowadays; advice should be taken and adapted to the present day conditions.

The dairy sheep breeding in Slovakia is an integral part of agriculture and it is included in The Conception of dairy sheep breeding development in Slovakia till 2005, saying not only about the reaching of ewe's milk production but also about export increasing of ewe's milk products, which in 2005 should form 70 % share of its production. Reaching of the expected export of the ewe's milk products and home consumption at the level of population buying ability predicts to produce for one milked ewe 21 kg ewe's milk lump cheese in 2005. Another conception intents is reaching competitive abilities of ewe's milk products.

The increasing of ewe's milk production can be reached by improvement of the breed and cultivation work. In the process of receiving of ewe's milk or processing of the ewe's milk lump cheese it is necessary to reduce loss by keeping technological discipline and increase the quality by using machine milking and provide the accurate milk handling. The demands of the contemporary customers concerning „safe food" supported by regular legislation (Codex Alimentarius of SR, second part, head eighth „Principles of the correct processing practice", 1998) force sheep breeders to improve organizational and mainly hygienic conditions for receiving and further processing of ewe's milk. It is inevitable to keep originality and the first class production of the ewe's milk products as well. With respect to the reality of the most Slovak breeds, ideal solution is represented by machine milking, regarding the restrictive possibilities for keeping optimal hygienic conditions at hand milking (e.g. several days´ raining, occurrence of dew at the end of the summer), can help to eliminate the amount of the negative factors. Practical experiences show the validity of parlours building which are situated in the centre of the farm while the organisation of grazing is adapted to the particular conditions. Introducing of the machine milking complicates original breeding way of grazing in the distant, remote and broken terrains, as well as the dependence on energy and providing sufficient amount of drink water. These grazing or pasture lands can be used for foraging by herds without market production of milk (Dudriková et al., 2004). Basic definitions, hygienic demands on sheepfolds defined as facilities with low capacity, which are productive farms and diaries for milk processing at the same time and as well sensory, physical-chemical and microbiological demands are given in European Union and national legislations representing the demands of all united customs free market including 450 millions of customers. These demands together with arrangements/alternative ways which provide hygienic conditions of the production

in premises with restricted capacity (Košin, 2002) on the basis of the given criteria thus provide receiving and processing high quality input material – ewe's milk to protect its health harmlessness and hygienic soundness.

Nowadays there are three basic groups of receiving and processing of ewe's milk in Slovakia.

1. Hand milking and manufacturing of ewe's milk lump cheese without any heat treatment.
2. Machine milking associated with cooling and storage of raw milk on the sheep farm and milk transport to a dairy plant,
3. Machine milking, cooling and storage of milk, pasteurisation and manufacturing of ewe's milk lump cheese from heat treated milk under sheepfolds conditions.

Each of the above mentioned methods has its own advantages and disadvantages as well. Each of them can affect the quality of products made of ewe's milk.

Regarding the keeping of the hygienic methods while obtaining and processing of ewe's milk there is a pleasant fact, that the processors of ewe's milk know basic hygienic rules of obtaining and processing of ewe's milk and mostly keep them. At hand milking one can meet using towels for udder cleaning before milking, with pumping out the first squirts, sense considering of milk, activities which are routine at machine milking of ewes, as well as disinfection of teats after milking, although, in this case is the activity used only if clinical changes of mammary gland are visible. Microbiological quality of raw ewe's milk is related to the keeping of the hygienic programme of milking which is consequently reflected in the quality of the final product, i. e. ewe's milk lump cheese or sheep cheese. The following groups of microorganisms occurring in the freshly milked milk of healthy ewe's can be determined: micrococci from the ewe's udder; microorganisms, which do not initiate milk changes and they are not dangerous for a human. They can produce colour changes on the milk surface, e.g. *Pseudomonas* spp., *Sarcina* spp., *Saccharomyces* spp in sporadic cases. The important group creates bacteria of lactic fermentation, predominantly genus *Streptococcus, Lactobacillus, Leuconostoc,* which are important in light of providing the correct process of fermentation and ripening of ewe's milk cheese. At over ripe of ewe's milk lump cheese bacteria of *Streptococcus lactis* and *Lactobacillus* spp. types affects and cheese reaches pH 4,9. The ripening itself can be of primary character, when protein splitting occurs and of secondary character , when oxidation of lactic acid occurs and as well fat and protein splitting. Furthermore, during ripening itself, there is a grow and enzymatic activity of microscopic fungi genus *Geotrichum,* leavenings and aerobic bacteria on the surface of cheese and anaerobic bacteria in the inside of cheese. By the activity of all this wide group of microorganisms during the ripening of cheese specific sensorial cheese characteristics are created. In the case of infringing hygienic conditions at receiving, treatment and processing ewe's milk into lump cheese unfavourable microorganisms, which can be characterized as unfavourable from the technological point of view and as well unfavourable from the hygienically point of view could be present in ewe's milk. Their occurrence and activity can initiate different deficiencies of ewe's milk lump cheese. Coliform bacteria as an indicator of hygienic insufficiency received at obtaining and treatment of ewe's milk, saprophytic bacteria,

sporulating aerobic and anaerobic bacteria, fungi and leavenings others than *Geotrichum candidum* could be assigned to this group of microorganisms. The last group is made of pathogenic microorganisms (in particular *Salmonella* spp., *Listeria monocytogenes, Shigella* spp., *E. coli, Staphylococcus aureus*), which can occur in ewe's milk in case of flagrant violation of accurate principles of manufacturing practice and they can become the reason of alimentary toxicoinfection and enterotoxicosis.

Except of coliform bacteria from raw ewe's milk, the most often isolated are staphylococci , mainly S. *capitis, S. caprae, S. cohnii cohnii, S. epidermidis, S. haemolyticus S. hominis, S. chromogenes, S. saprophyticus, S. sciuri, S. simulans, S. warneri, S. xylosus. S. aureus.* Rarely there can be isolated e.g. *Aerococcus viridans, Micrococcus luteus, Lactobacillus lactis lactis, Escherichia coli, Klebsiella oxytoca, Pantotea spp.* etc. in ewe's milk. Genii *Cladosporium*, *Penicillium* a *Acremonium*, *Aspergillus*, *Microsporum, Paecilomyces* a *Scopulariopsis.* are mostly found from microscopic fibrous fungi in ewe's milk.

There is no need to underestimate the above mentioned groups of microorganisms, which form typical and atypical microflora of raw ewe's milk in any case. In the event of occurring unfavourable microorganisms groups there is mostly relation with hygienic conditions in particular sheepfold. The most often faults, which can be traced in sheepfolds, manufacturing areas and ripening stores from hygienic point of view recently are as follows: spider-web, insufficient weather – strips, presence of undesirable insects, mostly flies, dirty floors and walls, in hot summer season higher temperatures in ripening stores, than is allowed, insufficient hygiene of employees, insufficient cleanness of milk ewe's bodies etc

To summarize, it can be stated, that in spite of different conditions, either economic, climatic or hygienic, Slovak producers and processors of ewe's milk do not have to be afraid of open united European market. Further education, realizing the basic fact i.e. to provide united European market with competitive, not only financially but also with qualitative safe food, is the only chance to keep in the market using the financial support of guaranteed funds, including own inserted financial resources and demanding physical work, which breeding of milk ewes undoubtedly is, they stay in this market and ewe's milk products henceforward will present Slovakia in the trade market.

SUMMARY

The methods of ewe's milk processing used in Slovakia are described. All of these methods have their advantages and disadvantages which can affect the quality of raw milk mainly from the microbiological viewpoint. The hygienic condition observed in dairy sheep farms are discussed, too.

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HYGIENICKÉ ASPEKTY CHOVU OVIEC V POĽNOHOSPODÁRSKYCH OBLASTIACH SLOVENSKA

Zhrnutie

Aj ovčie mlieko má svoje miesto vo výžive ľudí, lebo má v porovnaní s kravským mliekom približne o 60 až 75 % vyšší obsah bielkovín, a takmer dvojnásobný obsah tuku. Zloženie ovčieho mlieka ovplyvňuje plemeno, individualita, laktačné obdobie, zdravotný stav, výživa a ostatné vonkajšie faktory. Bielkoviny z 85 % tvorí kazeín, ovčí albumín sa nezráža syridlom ani kyselinami, ale prechádza pri výrobe syrov do srvátky. Mliečny tuk je vo forme tukových guľôčok o veľkosti 4 - 6 mikrometrov. Má vyšší obsah kyseliny kaprínovej a kaprylovej, ktoré sa podieľajú pri vytváraní špecifickej vôni ovčieho mlieka. Obsah mliečneho cukru v porovnaní s kravským mliekom je nižší. Minerálne látky obsiahnuté v ovčom mlieku, najmä vápnik, majú význam pri výrobe ovčieho hrudkového syra. Z vitamínov v porovnaní s kravským mliekom obsahuje ovčie mlieko menej karoténu, viac vitamínu A. Slovensko je krajinou, ktorá má na svojom území veľmi vhodné podmienky na chov mliečnych oviec a výrobu typických mliečnych výrobkov. Zdravotný stav oviec, hygienické a zoohygienické podmienky chovu oviec, hygiena dojenia a prvotného ošetrenia a spracovania mlieka, rovnako ako kvalita mlieka a výrobkov z ovčieho mlieka sú pravidelne kontrolované a sú pod stálym veterinárnym dozorom.

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