

## SESSION 2: MILK, MAN, CULTURE AND SOCIETY

Presided by Catherine Baroin

### Identity, Therapeutic Benefits and Health Claims: Fermented Dairy Products in Central Asia

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#### The kazakhs, big dairy consumers

The countries of Central Asia, and Kazakhstan in particular, are traditionally consumers of dairy products, and per capita consumption has constantly been on the rise since independence (fig. 1), going from 141 kg/pc/year in 1994 to 217 kg/pc/year in 2003 (source FAOstat). One feature of the structure of consumption is the relative importance of liquid milk and the use of non-conventional dairy species such as mares and camels.

This strong preference for milk and dairy products obviously stems from **the pastoral tradition that represents the background to the steppe culture** that the Kazakhs identify with. The non-conventional species mentioned produce **milk that cannot be turned into cheese, hence consumption in fermented form is preponderant, whether it is camel's milk (*shubat*), or mare's milk (*koumis*), but this is also true of cow's milk (*ayran* or *kephyr*)**. Consumers generally drink these fermented products with the conviction that they are good for their health. And in fact, medicinal and therapeutic properties are particularly ascribed to *shubat* and *koumis*. These claims are supported by a host of observations, but often empirical or on the grounds of experiments of which the scientific basis is debatable.

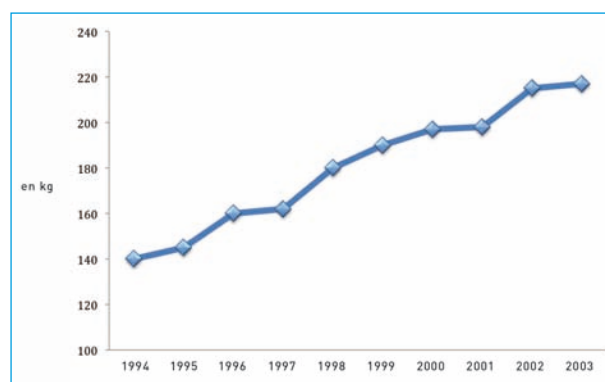
Consumption of these dairy products, which remains at high despite the country's rampant urbanization and changes in dietary behavior that comes with improved living standards, thus reflects **two complementary aspects**: (i) it is rooted in a fundamental cultural identity that can be found in traditional representations of Kazakh society, (ii) it is based in **the supposed multiple virtues** fermented products are believed to have.

#### Fermented milk and cultural identity

Stalin's forced collectivization of agriculture in the early 1930s conflicted directly with traditional animal husbandry in the steppe based on herd mobility, a clan social structure and an agrarian subsistence economy. In this context of brutal "modernization," forced settlement of the nomads appeared as a necessary corollary of collectivization. Yet despite the radical change in territorial organization and breeding practices, the national culture remains strongly marked by this pastoral past, even during the Soviet period, if only from a folkloric standpoint. In this perspective, the Kazakhs identify with cultural elements related to the steppe during their leisure activities, eagle hunting, the yurt, horseback riding and collective games such as *kok-par*, and of course in their culinary tradition (*kazy* or horsemeat sausage, *besparmak* or *kuyrdak*, horse or mutton stew with dough). **The dominance of animal protein in the diet is for instance a direct consequence of the pastoral tradition** and production systems based almost exclusively until recently in the region's history on horse, sheep and bactrian camel breeding. Fermented mare's milk, *koumis*, a widespread drink throughout all Central Asia dating back four thousand years BC approximately, and fermented camel's milk, *shubat*, are the base of dairy consumption.

**Manufacturing processes remain largely artisanal despite recent attempts at modernization.** Production of fermented milks is mainly based on spontaneous fermentation. Fresh milk is left to sit for 3 to 12 hours, fermenting agents are added and then it is homogenized. Depending on the fermented product, it must be stirred a lot (*koumis*), a little (*shubat*), or not at all (*ayran*).

These products are consumed on a daily basis and some of them in special cases (various celebrations). But in the steppe, fermented dairy products are consumed for their **therapeutic benefits**, for instance as an adjuvant in fighting infectious disease or asthenia. During the Soviet era, it was common to take



Growth in annual per capita milk consumption in Kazakhstan between 1994 and 2003 (FAOstat data)



the cure in a sanatorium that included drinking several liters a day of *koumis* after having been treated for tuberculosis. These fermented milks have also been used to balance intestinal flora, treat digestive illnesses and more generally to strengthen the immune system. *Shubat* is also used as an adjuvant to chemotherapy for certain cancers, particularly of the digestive system.

These claims are based on purely empirical observations that seem rooted more in self-persuasion than in biological reality. However, the presence in abundance of certain vitamins and molecules with bioactive properties may prove these effects to be relevant.

### **Physical-chemical and biochemical bases of therapeutic and dietary benefits**

The health claims pertaining to camel's milk and mare's milk can be ascribed to some of their components, both quantitatively and qualitatively. These milks in fact contain **antimicrobial factors** in proteins and fats as well as minerals and vitamins.

The protein components said to have health values are milk proteins that have antimicrobial properties: lactoferrin, lysozyme, lactoperoxidase, immunoglobins. Camels in particular are known to have particular properties (heat resistance), and even, for certain molecules such as IgG, a unique structure in the animal world hinting at possible interesting biomedical perspectives. According to some hypotheses, the antimicrobial properties of lactoproteins in camel's milk as well as in mare's milk are more active than in other types of milk. Its role in fighting diabetes is thought to be related to the presence of insulin-like proteins that are not destroyed by gastric juices.

As regards the fat content in milk, a major role is played by essential fatty acids. These components have both health values and a major nutritional role given their high polyunsaturated fatty acid content, especially in mare's milk. The phospholipids and cholesterol in milk are also thought to have health benefits.

**The bioavailability of calcium** from dairy products is very high in all dairy species. Camel's milk is particularly rich in iron, which may explain its reputation of boosting the immune system and stimulating physical activity in people in a state of overexertion. Lastly, stimulating factors can be linked to the sometimes abundant presence of certain vitamins, especially vitamin C in camel's milk or vitamin E in mare's milk.

In addition to the usual chemical composition of milk, fermented products have the particularity of being **rich in lactic bacteria**. These bacteria are often beneficial to human health and they produce lactic acid as an end product of the final fermentation process from various sugars, particularly lactose. Lactic acid production can occur in conjunction with the emergence of other elements. Lactic bacteria can be considered as probiotics.

Probiotic microorganisms have clinical effects and their workings have been described in detail. In humans, probiotics have mainly been used thus far in the treatment and prevention of diarrhea. In recent years, probiotics have also been shown to play a role in the treatment of chronic inflammatory diarrhea as well as the prevention of respiratory infections and allergic diseases.

## **biographie**

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Professor of biochemistry and immunology in the Biology Department of the Kazakh National Al-Farabi University (KazNU, Almaty, Kazakhstan), she defended her doctoral thesis in Food Sciences at the University of Montpellier II on the physical-chemical and biochemical variability of camel milk in Kazakhstan. She has an in-depth understanding of milk production conditions in the steppes and of the traditional knowledge surrounding dairy products. She has participated in many international symposia and regional workshops (Turkmenistan, Kazakhstan, India, Niger, United Arab Emirates, Tunisia, France). Her work currently focuses on the impact of heavy metal pollution on milk quality and she is particularly specialized in the biochemistry of non-conventional milks (camel, mare).