# HEAVY METALS AND TRACE ELEMENTS CONTENT IN CAMEL MILK AND *SHUBAT* FROM KAZAKHSTAN

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**Abstract:** In Kazakhstan, camel milk is mainly consumed after fermentation process. The fermented camel milk, named *shubat*, is generally home-made by the traditional process. The changes in mineral composition of camel milk during the fermentation process were rarely studied especially for heavy metals. The present study aimed to assess the change in heavy metals and trace-elements contents during the fermentation process.

Samples of milk and *shubat* were collected in eight farms of Southern Kazakhstan in order to determine copper, iron, manganese, zinc, arsenic and lead. In camel milk mean content of these heavy metals was respectively of 0.065 ± 0.04, 1.478 ± 0.53, 0.084 ± 0.03, 5.163 ± 2.17, <0.1 and 0.025 ± 0.02 ppm. In *shubat*, the mean content was 0.163 ± 0.164, 1.57 ± 0.46, 0.088 ± 0.02, 7.217 ± 2.55, and 0.007 ppm respectively.

Arsenic was detected in some samples of milk and *shubat* only. A relationship between heavy metals in raw milk and *shubat* at the farm level was observed.

**Keywords:** Camel milk, camel milk products, pollution, heavy metals, trace element

## 1. Introduction

Kazakhstan is a country where the milk consumption is high since it reaches 240 l/hab/year most of the time in liquid form. Another characteristic of this country is to have on the one hand important milk coming from non-conventional species like the mare and the camel one. These milks are generally consumed in fermented form (named *kumis* and *shubat*). They give culturally important products taking significant part in the Kazakh identity.

*Shubat* has the reputation to have medicinal and probiotic properties largely made profitable by the medical profession (Sinyavskiy, 2004), particularly in the Sanatorium where fermented milks are used as additive in the tuberculosis treatment as well in the countries of the ex-Soviet Union (Kadyrova, 1985; Kenzhebulat et al., 2000) as in the countries of the South (Mal et al., 2006). The camel milk is considered also to have antidiabetic properties (Agrawal et al., 2003), anti-cancer (Magjeed, 2005), and more generally to have dietetic quality because of its richness in unsaturated fatty acids (Narmuratova et al., 2006; Karray et al., 2005). One allots even anti-contaminant properties with respect to the radionuclide. All these properties are however generally based on empirical observations or protocols of insufficiently rigorous observation.

According to the high polluting conditions of some parts of the environment in Kazakhstan, camel milk and *shubat* could contain also pollutants (pesticides, heavy metals, radionuclides). However, as *shubat* is the main product consumed by human, the assessment of the transfer in pollutants from raw milk to *shubat* is an important point to study. So, the present paper is focused on the mineral components of raw milk and *shubat* in different farms from Kazakhstan situated close to pollution sources in order to assess the risk for human consumers.

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