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Sources of Contamination of Raw Camel Milk with Microorganisms

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Abstract

Camel milk is the most important nutritional source as well as a remedy for the population in many arid areas. Camel milk is mostly consumed fresh or as a naturally fermented product and hence unpasteurised. However, camel raw milk can be contaminated at any step in milk production and processing and, thus, loses its quality and safety standard. The purpose of the present study was to determine potential sources of microbial contamination of camel raw milk. Bacterial contamination of camel raw milk can occur at four levels, within the udder, after harvest, from the surface of equipment used for milk processing, and during storage and transport. Milk removed from a healthy udder contains a very low concentration with microorganisms, usually less than 10×10^2 colony forming units of total bacteria per ml (cfu/ml). A camel with clinical or subclinical mastitis has the potential to shed large numbers of microorganisms in its milk. Several studies have investigated that quarters from infected camels have the potential to shed more than 10×10^6 cfu ml^{-1} in the produced milk. In the traditional husbandry systems, poor management and low hygienic standards during milking lead to mastitis in camels. Autochthonous microorganisms from the exterior of the camels udder and teats can contribute to the contamination as well as microorganisms that are derived from the environment in which the camel is housed and milked. However, the contribution of microorganisms from teats soiled with manure, mud and feed appears to be most important. Furthermore, under tropical and subtropical conditions, characterised by a lack of cooling and higher temperatures, camel raw milk can become contaminated after milking by storage and transport, especially if farmers store their milk in low hygiene plastic containers, and by the use of contaminated water. In such situations, the bacteria are able to grow rapidly and reached a total bacteria count of up to 10×10^7 cfu ml^{-1}. The types of bacteria that grow and become significant depends on the initial contamination of the milk. In conclusion, camel health, environment, milking procedures, equipment sanitation and storage and transport conditions can influence the level of microbial contamination of camel raw milk.

Keywords: Camel, mastitis, microorganisms, milk storage, milk transport, milking, raw milk

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