

Chapter 3


Strategies and Technologies for Camel Milk Preservation

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ABSTRACT

This chapter aimed to report the strategies and technologies for camel milk preservation. Raw camel milk is easily spoiled owing to its nutrient content, which provides an ideal substrate for the development of microorganisms. Several traditional methods have been conducted in order to increase the shelf life of camel milk including fumigation of milk containers, simple evaporative cooling, chilling, freezing, pasteurization, and milk processing into many products like fermented camel milk, butter, and ghee. Modern technologies are used nowadays to preserve camel milk including freeze-drying, spray drying, high hydrostatic pressure, and sterilization. Besides, many value-added products are produced like yoghurt, cheese, ice cream, snacks, and camel milk protein hydrolysates, which are used in the field of functional food and nutraceuticals. The non-marketed camel milk is sold at a lower price or consumed at the household level in tea or after processing it into naturally fermented milk.

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INTRODUCTION

Camel milk is often consumed raw or naturally fermented. The sale of camel milk was considered as a taboo in pastoral communities. However, in recent years, camel milk utilization has been shifted from subsistence to commercialization all over the world (Konuspayeva & Faye, 2004). Hence, there has been a great interest in increasing the amount of milk marketed. Camel milk has longer shelf compared to the milk of other animals due to its high content in antimicrobial factors (Rahmeh, Alomirah, Akbar, & Sidhu, 2019). Yet, camel milk is easily spoiled owing to its nutrient content, which provides an ideal substrate for the development of microorganisms, especially at high temperatures. Thus, camel milk preservation is a must. Subsequently, different preservation strategies and technologies that increase its shelf life have been conducted to limit microbial contamination (Ogolla, Dede, Okoth, Hensel, & Sturm, 2017). The processing of camel milk into value-added products is among the most adequate methods to increase its shelf life. However, the manufacturing of camel dairy products using the same technology as for dairy products from cow milk results in processing difficulties and products with inferior quality (Berhe, Seifu, Ipsen, Kurtu, & Hansen, 2017). This data has prompted several researchers around the world to conduct studies to overcome these difficulties and allow populations to consume these products during all the year thanks to their longer shelf life compared to raw camel milk (Mati et al., 2017). In this chapter, the different strategies and technologies for camel milk preservation are detailed.

Strategies and Technologies for Camel Milk Preservation

Since long time ago, pastoralists used traditional preservation procedures, which are adapted to their lifestyle but don't necessarily offer the quality and safety standards required by ever changing modern lifestyles and growing population. Thereby, this has led to the search for new modern technologies to preserve camel milk aiming to satisfy the demand for quantity, quality, and safety (Ogolla et al., 2017). The main strategies and technologies used for the preservation of camel milk are summarized in Table 1.

Table 1. Main strategies and technologies for camel milk preservation

| Camel milk preservation | |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Traditional methods | Modern methods |
| Heat Treatment | |
| Simple evaporative cooling, pasteurization, refrigeration, freezing | Sterilization, UHT, high hydrostatic pressure treatment |
| Value added products | |
| Spontaneously fermented camel milk, butter, ghee | Fermented milk with probiotic starters, cheese, yogurt, ice cream, snacks, protein hydrolysates... |
| Others | |
| Fumigation of milk containers, special milk containers: Qoodha, condensation | Drying technologies: Freeze-drying, Spray drying |

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