



Factors affecting milk yield and composition of Tunisian camels (*Camelus dromedarius*) over complete lactation

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Abstract

This study aimed to investigate the milk production potential and the impact of nongenetic factors on milk yield and composition of Tunisian dromedary camels. Milk recording and sampling were carried out at monthly intervals over complete lactation for 3 years from 95 camels reared in intensive and semi-intensive systems. The overall means of daily milk yield and fat, protein, total solids, and ash contents were 4.21 ± 1.98 l/day, $2.45 \pm 0.9\%$, $2.67 \pm 0.74\%$, $10.75 \pm 1.41\%$, and $0.85 \pm 0.08\%$, respectively. The total milk yield was 1388.41 ± 575.46 l/lactation for 11 months of lactation. The daily milk yield increased regularly throughout lactation until it reached its peak in the 4th month postpartum and then decreased until the 17th month postpartum. The chemical components, except ash, followed an opposite trend to the milk yield. Their minimum contents were recorded during the 7th and 8th months postpartum, while the maximum levels were observed during the 17th month postpartum. Regarding seasonal variation, the highest daily milk yield was recorded during summer (June), whereas the lowest was found in winter (December). In contrast, the maximum and minimum contents of fat and protein were observed during winter (December) and summer (July), respectively. Similarly, total solids content was maximum in January and minimum in August. Parity had no effect on daily milk yield, while all chemical components were higher in milk from primiparous than multiparous camels. Calf sex and management system did not affect the milk yield and composition. These results are useful in order to develop feeding strategies and breeding programs for improving milk production.

Keywords Dromedary camel · Tunisia · Milk yield · Milk composition · Variation

Introduction

According to the FAO statistics, the total heads of camels worldwide are about 34.82 million (FAO 2017). In Tunisia, the population of dromedary camels (*Camelus dromedarius*) is estimated to be 100,000 animals, mainly reared for meat production in the desert and arid regions. Milk is considered a secondary product (Hammadi et al. 2006) and is usually consumed locally in Tunisia as well as other parts of the world (Hammadi et al. 2006; Al Kanhal 2010). Over recent decades, rising market demand for camel milk has been worldwide observed due to its

potential health-promoting properties (Al Kanhal 2010). As a result, the intensification process of camel farming system is ongoing (Faye 2016) and machine milking has been introduced in several countries (Atigui et al. 2014; Nagy and Juhasz 2016). Despite this considerable progress in milk production improvement, there is a need for additional basic and applied research (Nagy 2016).

Continuous monitoring of milk yield and composition throughout lactation is essential for a more detailed characterization of camel milk potential and a better understanding of its factors of variation. Several studies on camel milk yield and composition have been reported in different countries, showing that the main factors of variation were the stage of lactation (Konuspayeva et al. 2010; Musaad et al. 2013a), breed (Aljumaah et al. 2012; Nagy et al. 2017), parity (Aljumaah et al. 2012; Ahmad et al. 2012), season (Haddadin et al. 2008; Nagy et al. 2017), geographical origin (Konuspayeva et al. 2009), management system (Aljumaah et al. 2012; Ayadi et al. 2018), feeding (Al-Saiady et al. 2012; El-Hatmi et al. 2004), and calf sex and year (Nagy et al. 2017).

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