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Influence of management type and stage of lactation on the performance and milk fatty acid profile of dairy camels (*Camelus dromedaries*)

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Abstract

The current research paper addresses the hypothesis that management system (grazing vs. stabling) and/or stage of lactation (early- to late-lactation) can influence the lactation performance and milk fatty acid (MFA) profile in dromedary camels. The results obtained revealed that milk and protein yields of stabled camels were higher, while milk fat content was lower compared to grazing camels. In addition, stabled camels produced milk richer in short- and medium-chains fatty acids but lower in long-chain fatty acids and fatty acids linked with possible health benefits such as oleic acid, vaccenic acid (VA) and rumenic acid (RA), when compared to grazing camels. Moreover, atherogenicity index was higher, while overall Δ^9-desaturase and health-promoting indices were lower in stabled camels. In a similar way, results demonstrated an increase in milk fat and protein contents as lactation advanced. In fact, camels at mid-lactation produced milk richer in short- and medium-chain fatty acids as well as total saturated fatty acids but poorer in oleic acid, VA, RA, long-chain fatty acids and total unsaturated fatty acids, when compared to milk samples collected at early stage of lactation. Moreover, compared to early- and late-lactations, atherogenicity index was higher while overall-Δ^9-desaturase and health promoting indexes were lower at mid-lactation. In conclusion, the intensive stabling system and mid-lactation stage can alter lactation performance and MFA profile in dairy dromedary camels.

Introduction

Despite the fact that camel milk composition shows wide variability in its constituents due to multiple physiological, genetic and environmental factors (Ayadi *et al.* 2009; Konuspayeva *et al.* 2009; Aljumaah *et al.* 2012; Mostafa *et al.* 2018), it has a unique composition compared to other ruminants. It contains higher fats, vitamins (such as A, E, B2 and C) and minerals levels (such as potassium, calcium, iron, magnesium, copper and zinc) but lower lactose level compared to cows' milk (Konuspayeva *et al.* 2009; Al-Humaid *et al.* 2010; Yoganandi *et al.* 2015). Additionally, camels' milk contains several distinct proteins (such as immunoglobulins, lysozymes, lactoperoxidase, N-acetyl-§-glucosaminidase and lactoferrin) that exert numerous functions due to their antibacterial, antiviral and immunological properties (El-Agamy *et al.* 1992; Shabo *et al.* 2005). Camel milk has actually been proposed as a beneficial substitute for humans' and cows' milk for premature new-born and milk-allergic children because of the lack of β-lactoglobulin and beta casein, in addition to its comparably smaller nanobodies (Shabo *et al.* 2005; Zafra *et al.* 2011). Furthermore, a considerable amount of research has been published indicating the potential therapeutic employment of camel milk for treating many dysfunctions and autoimmune diseases such as diabetes mellitus, hypercholesterolemia, obesity, atherosclerosis, oxidative stress, hepatitis B, Crohn's disease, autism and cancer (Corl *et al.* 2003; Lock & Bauman, 2004; Agrawal *et al.* 2005, Sboui *et al.* 2010; Diaz-Medina *et al.* 2016; Abrhaley and Leta, 2018), which reflects a growing interest in utilizing camels' milk for human nutrition.

Due to the increasing global demand for value-added foods with potential health benefits for humans, a specific initiative has been promoted to produce dairy products enriched with conjugated linoleic acid (CLA), a frequently used term that represent a family of positional and geometrical isomers of octadecadienoic (C18) acids with a conjugated double bond system.

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