

Chapter 9

Potential Anti-Diabetic Effect of Camel Milk

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ABSTRACT

Based on empirical observations regarding the low prevalence of diabetes mellitus in population drinking regularly camel milk, camel scientists have investigated and assessed the effect of regular camel milk consumption on glycaemic status of diabetic patients and animal models. All the experiments' results concluded to the reduction of blood glucose and glycosylated haemoglobin. The hypothesis of high quantity of natural insulin in camel milk was proposed, but the quantities reported in the literature could not explain by itself the beneficial effect of camel milk consumption. It is stated that the lack of coagulum formation of camel milk the stomach was supposed to act as an effective vehicle (under internal nanoparticles) to take the milk insulin unchanged throughout the digestive tract and absorbed in the intestine. Other proteins in higher concentrations in camel milk than in other milk could interact with insulin receptor and contribute by their antioxidant and anti-inflammatory effect to regeneration of beta-cells in pancreas.

DOI: 10.4018/978-1-7998-1604-1.ch009

INTRODUCTION

Camel milk presents some specificities in its composition as emphasized in the chapter 2 (Camel milk composition and nutritional value) of the present book. Indeed, its fine composition could differ from other ruminant milks regarding minerals (Gorban & Izzeldin, 1997), vitamins, especially vitamin-C (Konuspayeva, Faye & Loiseau, 2011; Yadav et al., 2015), and some proteins as lactoferrin known for their anti-viral and anti-bacterial properties (Habib, Ibrahim, Scheider-Stock & Hassan, 2013), present in higher quantity in camel milk (Konuspayeva, Faye, Loiseau & Levieux, 2007) and with higher bioactivity (Conesa et al., 2008). Other bioactive proteins as immunoglobulins and lysozyme are also expected in higher quantity in camel milk (El-Agamy, 2009). The health effect of camel milk is in relationship with its different components, especially those having antioxidant activity which contribute to remove free radicals, or those having protective effect which may have possible role for enhancing immune defence mechanism. Those aspects are widely described in the chapter 7 (Exploring potential therapeutic properties of camel milk) of the present book. Therefore, the present chapter is focused on the role of camel milk in the regulation of glycaemia in diabetic patients giving to this product a reputation of anti-diabetic adjuvant (Agrawal, Kochar, Sahani, Tuteja & Ghouri, 2007a).

BACKGROUND

Diabetes mellitus (DM) is the world's prevalent endocrine disorder caused by several aetiologies, implicating dysfunction of macronutrients metabolism. Usually, two forms of DM called DM type 1 (T1DM) resulting autoimmune destruction of insulin-producing Langerhans β -cells of the pancreas, and DM type 2 (T2DM), a metabolic disorder due to insulin resistance and relative insulin deficiency leading to high glycaemia. The global prevalence of DM is dramatically growing worldwide expected to reach 4.4% of the total human population in 2030, mainly in the third world countries (Wild, Roglic, Green, Sicree & King, 2004). The beneficial effect of regular consumption of camel milk (CM) on diabetic patients is described for long time empirically, notably in the Middle East (Mohamad et al., 2009; Malik, Al-Senaïdy, Skrzypczak-Jankun & Jankun, 2012) and Ethiopia (Alema & Yusuf, 2014). In tribal population living with camel and consuming regularly its milk, low prevalence of diabetes was observed, notably in Raika pastoralist population (Agrawal et al., 2004a).

In a further study focused on the Raika community, it has been reported that the diabetes prevalence was negligible among the Raika population consuming camel milk while it was 0.7% in Raika community not consuming camel milk (Agrawal, Budania, Sharma, Gupta & Kochar, 2007b). These prevalences were 0.4% and 5.5% in non-Raika community consuming and not consuming camel milk, respectively (Agrawal et al., 2007b). It was concluded that the protective effect of regular camel milk consumption to DM is a reality, but the mechanisms of this beneficial effect requires to be investigated.

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