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Effect of roughage replacement in camel diet with tannin containing tree leaves on water intake of lactating camel

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Abstract

This study investigated the effect of roughage replacement in camel diet with tannin containing tree leaves on water intake. Fifteen lactating camels (average BW 554 kg) in mid lactation stage were used to study the impact of tree leaves. Animals were blocked by weight and milk production into three groups, where they were offered roughage to concentrate ratio of 70:30. Roughage components included crop residues as Groundnut straw (GS), Guar phalgati (GP) and Khejri leaves /Pala leaves in different ratio. Group T₀ fed with GS and GP ratio of 50:50, Group T₁ fed with GS, GP and Khejri leaves ratio of 40:40:20 and Group T₂ were offered GS, GP and Pala leaves ratio of 40:40:20. Results reveal that water intake in camels fed 20% tree leaves significantly ($p < 0.01$) higher as compared to control group.

Keywords: Water intake, Khejri, pala, composition, arid zone roughage

Introduction

Camel, a unique animal species of desert ecosystem, is adapted to sustain on a variety of feeds and fodders like grasses, tree leaves, crop residues and agro-industrial by-products (Nagpal *et al.*, 2002) [7]. The camel can thrive in desert ecosystems very efficiently compared with other livestock species (Faraz *et al.*, 2019) [4]. First of all, there are probably no other animal species as versatile for the human being: the camel is a multipurpose animal, used to produce meat, milk, wool, hides, and skins, with an active role in agricultural, cultural and recreational life of many populations worldwide (Padalino *et al.*, 2021) [10]. The camel has a legendary reputation to withstand relatively long periods of water deprivation under hot conditions and is reputed to be able to withstand a water loss equivalent to 25% of body weight (Filali *et al.*, 2005) [6]. Pala (*Zizyphus mauritiana*) and khejri (*Prosopis cineraria*) trees are native of desert ecosystem and form natural feeds of camel but intake tree leaves is limited in camel because of some anti-nutritional factors of tree leaves such as tannins, alkaloids, oxalates and flavonoids (Abo-Donia *et al.*, 2015) [2]. Camels recompense their loss in body mass by consuming a huge amount of water at the time of rehydration after a prolonged water deprivation phase (Faraz *et al.*, 2021) [5].

Material and Method

Animals

Fifteen Lactating camels in mid lactation of divided into three groups of three each based on comparable milk yield, body weight, number of lactations completed and days in lactation.

Feeding Management

The experimental animals housed in individual stalls were provided with uniform management practices except feeding. Three dietary combinations were prepared for Lactating camel by substituting conversational roughage Groundnut straw and Guar phalgati with khejri leaves and pala leaves. All feed ingredient were analysed for proximate principles (AOAC, 2016) [1] and fibre fractions (Van Soest *et al.*, 1991) [11].

Statistical analysis

Statistical Analysis Statistical analysis was performed using SPSS version 24 (SPSS Inc., Chicago IL). The effects of tree leaves feeding on parameters, were analysed by ANOVA with the Tukey post hoc test

Results and Discussion

Water intake

The data on the average water intake are presented in the Table.1 and graphically depicted in the fig. 1. The overall mean of water intake of lactating camels was 21.77 ± 0.545 , 26.75 ± 0.702 and 23.28 ± 0.503 litre/day for T₀, T₁ and T₂ respectively. The water intake was significantly ($P < 0.01$) different between T₀, T₁ and T₂. During the period of experimental trial because milk yield and water intake show positive correlation. Results of this study was in agreement with Nagpal *et al.* (2017)^[8] assessed that water intake was increased in camels when fed with tree leaves. Findings of present investigation get favour from the findings of the study of Bhakat *et al.* (2005)^[3] who reported water intake within this range. Findings of our investigation in line with Patil *et al.* (2013)^[9].

Table 1: Mean \pm SE value of water intake (Liter/day) Lactating camels (n=5) on different diet.

Fortnights	Treatments		
	T ₀	T ₁	T ₂
0	22.4 \pm 1.631	30.6 \pm 2.040	24.4 \pm 1.939
1	22.0 \pm 1.581	29.0 \pm 2.145	23.0 \pm 1.703
2	22.4 \pm 2.581	30.8 \pm 3.121	24.0 \pm 3.178
3	23.0 \pm 2.569	30.0 \pm 2.915	23.8 \pm 1.393
4	22.0 \pm 2.665	27.2 \pm 2.177	23.0 \pm 1.871
5	20.2 \pm 1.772	27.6 \pm 1.990	23.8 \pm 2.905
6	20.2 \pm 1.985	25.0 \pm 1.549	21.6 \pm 1.965
7	21.0 \pm 3.098	23.0 \pm 2.588	21.8 \pm 1.158
8	20.2 \pm 1.772	23.6 \pm 3.187	21.8 \pm 0.860
9	20.4 \pm 1.208	23.0 \pm 1.049	22.6 \pm 2.337
10	22.4 \pm 1.778	25.8 \pm 2.615	24.2 \pm 1.319
11	23.6 \pm 2.619	26.2 \pm 3.247	24.2 \pm 2.035
12	23.2 \pm 0.663	26.0 \pm 2.550	24.4 \pm 1.208
Overall	21.77 \pm 0.545 ^c	26.75 \pm 0.702 ^a	23.28 \pm 0.503 ^b

Note: - a, b, c - Means superscripted with different letters within a row differ significantly from each other ($p < 0.01$)

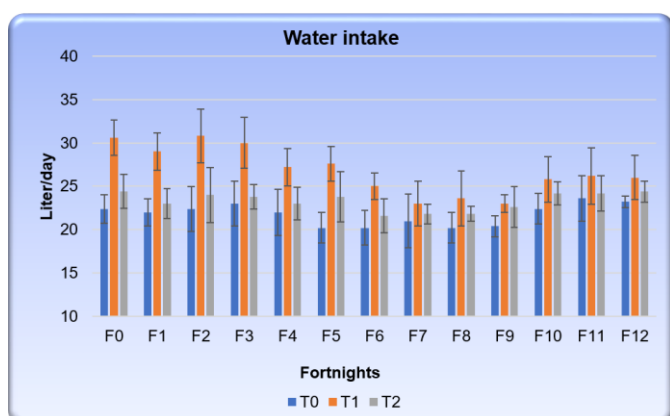


Fig 1: Average water intake (Liter) of three different groups of lactating camel.

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