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Influence of TANUVAS mineral mixture on milk production in Desi grey Donkey in southern agro climatic zone of Tamil Nadu

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Abstract

The effect of TANUVAS mineral mixture supplementation for 30 days on the qualitative and quantitative parameters of milk in Grey donkeys was estimated. The present study revealed significant increase in milk yield ($p < 0.01$), Calcium ($p < 0.01$) and Phosphorus ($p < 0.05$) content in milk. Further, present study revealed no significant difference in lactose, SNF and casein % which might be due to improved quantity of milk without changing its constituents. This study could be concluded the supplementation with TANUVAS mineral mixture augmenting the quantity of milk without affecting its quality.

Keywords: SNF, mineral, phosphorus

Introduction

Donkey milk is so similar to human milk that it can fulfill the nutritive requirements of the infants, as well as it is rich in lactose, lysozyme, Omega-3 and -6 polyunsaturated fatty acids. Donkey milk has higher amount of lactose hence it has good palatability, avoids allergy in infants due to low casein content and is an alternate for infants suffering from cow's milk protein allergy (CMPA). The lower fat content in donkey milk less than 1% compared to human and cow's milk (3.1% and 3.7%, respectively) (Saarela *et al.* 2005, Guo *et al.* 2007) [9, 5]. Equid mammary gland has low average capacity so it should milked around 3 times to get maximum yield (Alabiso *et al.*, 2009) [8]. In southern agro climatic zone of Tamil Nadu commonly desi grey type donkeys and white donkeys are seen in clusters in few areas of Tirunelveli and Thoothukudi district. Donkeys in this region mainly used as a pack animal and female donkey has an average milk yield of 200 – 400 g/day. The donkey milk sold for infants and elderly because of its medicinal properties. Sharma *et al.* (2002) [6] and Sharma *et al.* (2003) [7] reported that dairy animals with macro- and micro mineral deficiencies were producing milk sub optimally and subsequently showed improved milk production levels post mineral supplementation. The local market of donkey milk is around Rs.1000/ litre of milk. Hence, the present study was made to assess the effect of TANUVAS mineral mixture supplementation on milk yield and milk composition of donkey. Nowadays, so-called therapeutic and cosmetic properties of donkey milk seem to be validated by many trials (Brumini *et al.* 2016) [10]. Donkey milk is rich in vitamins and polyunsaturated fatty acids and contains anti-ageing, anti-oxidant and regenerating compounds, which are described as naturally active in skin hydration and skin ageing prevention

Materials and Methods

The present experiment was carried out to study the effect of TANUVAS mineral mixture supplementation in milk yield and milk composition of donkey maintained under semi-intensive system of management in Meiyur village in Thoothukudi district. 20 Female donkeys of small desi grey type at same stage of lactation (first month of lactation) were selected for the trial from the same village. All the 20 selected donkeys divided in to two equal groups and were maintained under similar management conditions and feeding pattern. Control group animal fed with wheat bran without addition of mineral mixture whereas animals from

Treatment group were fed with wheat bran mixed with TANUVAS mineral mixture @ 30 gm/day/donkey for a period of 30 days. The daily milk yield of these animals was recorded one week after supplementation of mineral mixture for a period of 60 days. Milk sample were collected after one month. Collected milk samples were analysed for fat, SNF, mineral and amino acid profile at SGS India Private Limited Laboratory, Chennai.

Results and Discussion

The results are presented in Table 2. Donkey under the treatment group showed an increase in milk yield was 29% in 30 days study period when compared to control group. These findings were in agreement with Vinothraj *et al.*, (2021) [4] who reported cows fed with TANUVAS Area Specific Smart Mineral mixture showed increased milk production (1.06 liter/Day) in 30 days study period when compare to regular farmer practice without Mineral mixture supplement. This increase in milk yield might be due to supplementation of zinc, manganese, copper, and cobalt to the dairy animals which improves the milk quality and udder health.

The present study revealed an increase of milk yield without a decrease of fat, SNF, Lactose and casein percent. Nayak *et al.* (2020) [1] reported the average lactose content in donkey milk was similar to human (6.3–7.0%), horse milk (5.6–7.2%) and higher than that of cow, sheep and goat milk (Polidori *et al.* 2015) [11] which is in concurrence with present study. Further

the protein content observed by Nayak *et al.* (2020) [1] coincides with present study. This maintenance of milk constituent's percent might be due to the supplementary effect of mineral mixture and increased bioavailability of micro-minerals which act as the co-enzymes for lactogenesis and metabolic homeostasis. The fat content in milk during this study was in agreement with Swar (2011) [12] who reported the mean fat content of donkey milk was quite similar to mare milk (1.30%) and much lower than cow, buffalo, sheep, goat and human milk.

The calcium and phosphorus level in present study was in agreement with Garhwal *et al.* (2023) [3] who reported 60–62.24 mg/100ml and 32.10–33.96 mg/100 ml, respectively. Further, significant increase in Calcium and phosphorus after supplementation of TANUVAS mineral Mixture might be due to increased absorption and homeostasis of Calcium and Phosphorus in animals body.

Table 1: Composition of TANUVAS mineral mixture

S. No	Mineral	Quantity (percentage)
1	Calcium	28.0
2	Phosphorus	14.0
3	Sulphur	0.13
4	Zinc	0.22
5	Iron	0.55
6	Copper	0.03
7	Manganese	0.08
8	Cobalt	0.008

Table 2: Performance of TANUVAS mineral mixture in desi grey Donkey milk yield

Particulars	Control Group	Treatment Group
Milk Yield (g/day)	328.33±10.77 ^a	426.66±11.73 ^b
Fat (%)	0.94±0.03	0.97±0.02
SNF (%)	8.58±0.05	8.90±0.18
Lactose (%)	5.37±0.08	5.49±0.05
Casein (%)	0.76±0.01	0.75±0.09
PH	7.35±0.01	7.39±0.02
Calcium	52.33±0.34 ^a	57.43±0.14 ^b
Phosphorus	44.61±0.17 ^a	46.85±0.96 ^b

^{a,b} indicates ($P < 0.01$) significantly differ in groups

Conclusion

This study revealed the improved quality and quantity of milk supplemented with TANUVAS Mineral Mixture which is beneficial for donkey farmers. Though it is a newcomer to the milk market but still there is vast gap and research and development is required in this field to explore the more health and nutritional benefits of donkey milk

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