

# Milk composition, antioxidant activities and protein profile of *Gaddi* goat milk

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## Abstract

There is increasing awareness of therapeutic and nutritive importance of goat milk. Increasing evidences show a surge in harnessing the potential of bioactive milk components. This study reports *Gaddi* goat milk composition and antioxidant activity in different lactation stages. A significant ( $p < 0.05$ ) higher pH ( $7.05 \pm 0.03$ ) and lactose ( $4.28\% \pm 0.07\%$ ) were noted in late lactation. Total phenol (mg TAE/100 ml) was  $56.99 \pm 2.32$ ,  $8.15 \pm 0.44$ , and  $7.05 \pm 0.03$  in whole milk, whey and casein, respectively. 2, 2-Diphenyl-1-picrylhydrazyl radical scavenging activity and protein ( $4.06\% \pm 0.19\%$ ) were higher, whereas fat was lowest ( $6.00\% \pm 0.28\%$ ) in late lactation milk. It is envisaged that late lactation *Gaddi* goat milk with splendid biological activities, could be a source of milk-derived bioactive nutraceuticals to thwart oxidative stress and aging.

## Practical applications

Milk is an important source of complex proteins, enzymes and peptides of diverse biological activities. Goat milk has assumed importance in humans, particularly in infants, as alternative to cattle milk. Milk composition and antioxidant activity of *Gaddi* goat milk and its protein fractions were assessed for bioactive potential. The casein protein fraction of *Gaddi* goat milk proved to be a potent antioxidant component and may be used as futuristic nutraceuticals. This is the first study unravelling antioxidant traits of *Gaddi* goat milk, whey and casein in different lactation stages.

## KEYWORDS

antioxidant activity, *Gaddi* goats, milk biomolecules

## 1 | INTRODUCTION

The goats in view of their remarkable evolutionary adaptation to prevailing dietary resources, and agroclimatic conditions are important livestock assets. The *Gaddi*, *Chegu* and *Changthangi* are the main migratory goats in North-West Himalayan Region (NWHR) encompassing India, Nepal, Bhutan, China and Pakistan.

Milk proteins possess beneficial attributes including opioid, immunomodulatory, antimicrobial and antioxidant activities (Ahmed, El-Bassiony, Elmalt, & Ibrahim, 2015; Korhonen & Pihlanto, 2007).

Whereas cow milk and whey are most widely studied and important sources of bioactive proteins, milk of less known livestock such as donkey (Jirillo, Jirillo, & Magrone, 2010), camel (Nanda et al., 2011; Singh, Mal, Kumar et al., 2017; Wang et al., 2017), yak (Kumar, Chouhan, Sanghi, & Teotia, 2013), and goats (Amati et al., 2010) have also received attention owing to nutritional and biofunctional attributes of their milk.

The goat milk being a rich source of proteins, vitamins, flavonoids, carotenoids and antioxidant biomolecules has importance in humans, especially the infants, as alternative to cattle milk. From a nutrition point of view, goat milk differs significantly from milk of