



RESEARCH PAPER

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Comparison of milk yield and composition of descriptive goat breeds & local non-descriptive breed (Ajharhy) in District Swat

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Abstract

The current research study was conducted under the annual technical research program 2020-21 of the goat production research station with the aim to compare the milk composition of local indigenous goat breeds with non-descriptive goat breed in district swat, Malakand division. A total 100 goat each from 3 indigenous goat breed named; Beetle, Kaghani, Teddy and non-descript goat were selected under completely randomized design from the progressive goat farmers for the study. Milk samples were collected in a 50ml vial in the morning and transported to the laboratory for further analysis. Milk samples were analysed through milk lactoscan in the laboratory of Goat Production Research Station Charbagh Swat. There were significant differences recorded in the milk components especially in milk fats. High milk fats contents were observed for Non-descriptive goat breed (5.04) as compared to the indigenous pure breed (3.4 - 4.5g/100g). The total solid was also found significant for non-descriptive (15.0g/100g) as compared to the descriptive goat breed (12.0g/100g). There was no significant difference reported for rest of the milk components among the pure breed vs non-descriptive breed. It was concluded from the study that non-descriptive goats produce less milk with high milk fats contents as compared to the pure goats breed. For shaperred who are consuming high fats milk for home can rear one or two goats with high milk fats contents instead of buffalo.

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Introduction

In Pakistan, livestock play an important role and grew at a rate of 4% in 2019-20, accounting for about 60.5% of agriculture value added and 11.2% of GDP. The importance of the sector can be realized from the fact that it is not only a source of foreign exchange earnings, but also a source of income for over 8 million rural families. Within the livestock sector, milk is the largest single commodity. Overtime, the higher growth in the livestock sector was mainly attributed to milk production (Economic Survey of Pakistan 2019-20).

Pakistan is the 4th largest milk producing country in the world. Approximately 80% milk is produced at small scale in rural areas, 15% peri-urban and 5% in the urban areas. Pakistan is the third largest country in the world after China and India having 80.2 million goats primarily raised for meat production purposes (Mutton). In Pakistan currently 36 goats breed are reared and mostly with dual purpose breed (Milk and Meat). However, few of them are recognized milch breed dairy goat named: Beetle, Kamori, Dera Din Pana, and Damani. The estimated population of these goats are 15 million heads. According to the economic survey of Pakistan (2019-20) goat milk production is (965 million liter) which accounts 2.2% of the total milk production of the country. This huge amount of milk production per year is not due to high yield per goat but it is due to high number of goats in the country as compared to the developed countries.

There are 07 million of farmers rearing in the country and about half of the goats population is raised under the flock of less than 16 per head, and 12% are raised in more than 200 goats/herd. There are 3 production system of goat rearing in the country, nomadic, transhumant, and sedentary. Transhumant farming system is the most common system of goats rearing in Khyber Pakhtunkhwa and Baluchistan whereas, in Punjab and Sind province farmers prefer sedentary system of goat farming. However, milk of goats is very rarely sold in the markets, because mostly people like high fats milk for home consumption in the country.

Buffalo milk is preferred by the people of Pakistan probably due to its high fat content.

There is high variation in milk composition of goats as compared to buffalo and cow milk as well as among the goat breeds. Milk is a complex nutritious product of mammary gland secretion containing water, protein, fat, carbohydrate mainly lactose, minerals, and vitamins. Among all food, milk is the most complete and most balanced in its nutritional contents. The amount of water in milk reflects the nutritional balance of milk which makes milk of greater nutritional value than the value of its individual nutrients. The water content of goat milk ranged from 88 to 90% (Bencini and Pulina, 1997). Goat milk is generally used for domestic consumption by the farmers or is mixed with cow/buffalo milk. It is not sold through retail shops. However, a certain demand does exist for goat milk due to its medicinal value against some ailments.

In general, there is scanty information on the gross composition of goat milk particularly in the tropical breed and very little information has been available concerning the milk chemical composition of indigenous breeds of Pakistan. It is hypothesized that non-descriptive goat has high milk fats than pure goats breed. Based on the above-mentioned issue the current study was planned at Goat production Research Station Charbagh Swat to compare milk composition of different indigenous goats breed vs non-descript breed rearing in district Swat, Malakand Division.

Material method

Site selection

The current study was conducted in District Swat. For the study four different tehsil of district swat were selected having maximum goat population. Before the start of the data collection, baseline survey was conducted by the station research team consist of Research officer and supporting staff for farmers registration and identification for the research study. According to the short baseline survey conducted by the staff team, the major goats population reared by the goat farmers in the district swat were consisting of non-descriptive breed (50%) of goats, Kaghani (10%),

Beetle (25%), and rest of the population were of different goat breed like Teddi, Gadi, and Kamori, Damani etc. In the initial basic survey, a very well questionnaire was designed for basic data of the animals and farmers before sample collection. The basic data collected from the farmers were included daily milk yield (kg/day) and lactation length, numbers of kids, kidding intervals, puberty age, feeding regime, vaccination, deworming, management, and breeding program etc.

Sample collection

After registration and selection of the farmers, 100 lactating dairy goats of each breed and non-descript breed were selected among the total goats population in district swat. Fresh milk sample from each breed and non-descriptive local goats were selected in a 50ml vial in the morning. The fresh milk sample were kept in ice box and transported to the laboratory of the goat station for milk analysis.

Sample Analysis

For milk composition determination samples were processed through milk Lactoscan (Lactoscan SA-Milkotronic limited, Nova zagora, Bulgharia) through the recommended procedure by the laboratory staff. Milk composition determined were milk fats, protein, lactose, ash, solid not fats, total solid, pH and milk density.

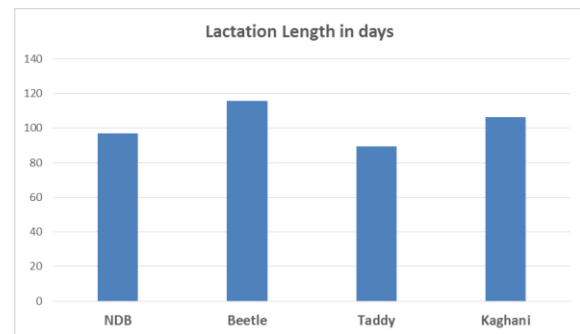
Statistical Analysis

Data were tabulated in excel sheet and then analysed for simple mean and frequency distribution.

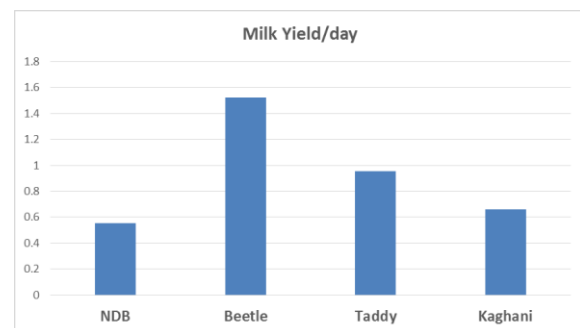
Results

The study was carried out to compare the milk yield and composition of indigenous goat breed with non-descriptive breed in district Swat. The lactation length of the three pure breed was compared with ND breed. The maximum lactation length (120 days) was reported for Beetle goat breed followed by Kaghani (105) and the minimum length (95) was observed at Teddy breed (90) summarized in graph 1. Results for the milk yield (kg/day) shows a significant difference between descriptive and non-descriptive breed. High milk yield was recorded in Beetle goats (1.6 kg/day) followed by Teddy (0.9), Kaghani (0.70) and the

lowest milk yield per day was observed for non-descriptive breed of goats (0.55) given in graph 2.

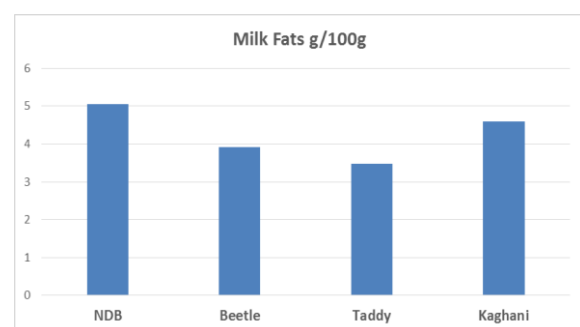


Graph 1. Comparison of Lactation length of descriptive vs non-descript breed of goats.



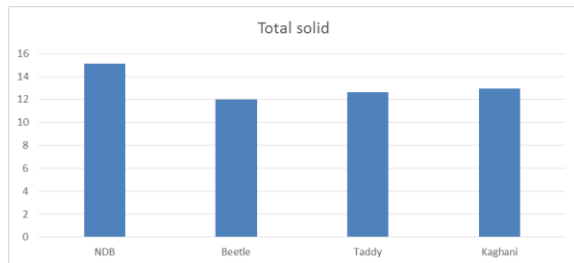
Graph 2. Milk yield comparison of descriptive vs non-descript breed of goats.

The results shows that there is a significant difference ($P < 0.05$) between the milk composition of different breed vs non-descriptive breed of goats. Non-descript breed in district Swat is having the higher value of Milk Fats composition as compared to the descriptive breeds. The higher value of Milk fats is (5.10%) in non-descriptive breed, followed by Kaghani (4.60), beetle (3.92) and the lowest value of milk fats was in the milk of Teddy goats (3.48%) summarized in graph 3.



Graph 3. Milk fats comparison of different breed vs non-descriptive breed of goats.

The highest significant value of total solids (15.1%) was observed at non-descriptive goats milk, followed by Kaghani, Teddy and the lowest value was recorded for Beetle goats breed in district Swat summarized in Table 1 and graph 4.



Graph 4. Milk composition analysis of three indigenous goat breeds vs non-descriptive goat breed in district Swat is summarized in table 1.

Table 1. Chemical composition of descriptive vs non-descript goat breed in District Swat.

↓Composition%	Non-Descriptive	Beetle	Kaghani	Teddy	Significant
Fats	5.10 ^a	3.92 ^c	4.60 ^b	3.48 ^d	P<0.05
SNF	10.7	11.3	8.70	9.47	NS
Lactose	5.20	4.30	4.20	4.74	NS
Protein	3.68	3.61	3.76	4.40	NS
Ash	0.86	0.81	0.83	0.72	NS
Total solid	15.1 ^a	12.0 ^c	13.2 ^{ab}	12.6 ^{bc}	P<0.05

SNF; solid not fats

Discussion

Milk like other important nutrients contains essential dietary constituents including water, protein, carbohydrate, fat, vitamins, and minerals in optimal amounts to maintain health and growth of young animals and humans. Goats milk has special attributes such as high digestible fat and protein, the highest digestibility of protein is of importance to infant diets and kids as well as to invalid and convalescent diets, in addition goat milk tends to have a better buffering quality, which is good for the treatment of ulcer (Brendelaug and Abrahamsen, 1986). But unfortunately, goat milk is still not preferred in the country due to is low milk fats (3-4%) as compared to buffalo milk (6-7%).

In the current study milk of three indigenous goats breed were compared with a non-descriptive breed of goat in district Swat Malakand division. High variation was found among the milk components and

particularly the milk fats of the local non-descriptive breed (5.04%) were higher than the pure descriptive indigenous breed (3.45 -4.50%). This variation in the milk contents might be due to the variation in genetic configuration. According to the earlier data presented by (Daniel *et al.*, 1999, Renner, 1982) milk fats contents of different goats breed can range from 3.0 to 6.0%. which are in line with the current study reports. The other possible cause may be the extra grazing time and eating of different feeds plants and trees of the non-descriptive breed in district Swat as compared to pure breed goats which are mostly reared on stall feeding or grazed for short period of time. Sollberger and Schaeren (2003) and Majid *et al.* (1994) reported that, there was differences in milk yield and milk composition between goat breeds.

Farzana, 2005 and Warner 1978 reported that good feeding particularly in high energy intake, tend to stimulate milk yield and the solids not fat percentage and to lower the fat percentage, while energy shortage in the diet tend to decrease milk yield and to increase fat content (Moran-Fehr, 1981). Su-Ankuo *et al.* (2002) found that, adding bypass fat to Saanen dairy goat rations can increase the percentage of milk protein, lactose, and total solids. Rousselot (1997) found that, increasing fiber in feed intake tend to increase milk fat. Differences due to parity, number of lactations or age of animal can have a significant effect on gross milk composition, and the yield levels (Casoli *et al.*, 1989). In the current study milk protein contents were in lined with the previous research data presented by Auqasha and Al-Jiborry, 2002 that the concentration of protein in goat milk was found to range from 2.46 to 3.70%. The contents of solid not fats and total solids were also supported by (Jenness 1980, Ensminger and Parker, 1986) who reported total solid ranged from 11 to 14%. Gol and Abdalla 1997) stated that total solid of goats milk should be round 12%. Although there are several other factors that can affect milk fats and milk contents of goats breed like nutritional factors, stage of lactation, season, and parity.

Conclusion

It was concluded from the results of the current study that non-descriptive goats reared in district Swat is

high milk fats in their milk as compared to the pure breed of the goats. Although milk yield was found high in pure Beetle goats and other indigenous pure breed.

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Declaration of interests

All authors reported no conflict of interest.

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