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Determination of Chemical Quality of Goat on their Raw Milk

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Abstract:

The present experiment was undertaken on "Determination of Chemical quality of Goat on their Raw Milk" Goat was one of the first animals to be domesticated and it remained a popular animal serving the needs of man all over the world. Goat milk is one of the milk sources that is characterized by an economical, nutritional and medical importance. Since goat milk has a high importance as a source of nutrition for poor communities, the present study was conducted to evaluate some of the physio-chemical properties (protein, fat, lactose, ash, specific gravity, T.S, S.N.F. and water), of goat milk. Samples were collected in MGCGVV Chitrakoot M.P. of ten days to determine chemical quality. Different chemical parameters in goat milk due to differences, as also due to replication protein percentage were significant , specific gravity were non-significant, fat percentage were significant , lactose percentage were non-significant , ash percentage were non-significant ,total solid percentage were significant, water percentage were significant and SNF percentage in goat milk were non-significant. In view of the findings and results presented above, it may be concluded that the chemical quality of milk of G3was found best followed by G2 and G1 of goats.

Keywords: Chemical quality, Goat s, raw milk.

Livestock from an important constituent of the economy of our country also in agriculture sector in particular. Numerically, the livestock wealth of the country is highly impressive. India's livestock population according to 2013 livestock census is 190.9 million cattle, 108.7 million buffalo, 729.2 million poultry, 65.07 million sheep, 135.2 million goat and about comparative picture of India's position in world livestock population, according to 2013 data is the India rank first in case of cattle and buffaloes, Second in goat, third in sheep, fourth in camel and first in milk and fourth egg production it is the expected to have a large contribution to national income from livestock and livestock products. Because of poor genetic potentiality of our livestock, the national income derived from their products is about 6 to 7 per cent. (Livestock Sector Annual Report 2014-15) Livestock sector is an integral part of Indian agriculture and is the backbone of Indian economy and play vital role for income, employment and foreign exchange earnings. Livestock worth is the main source for economic and social living. (Shivakant Shukla and U.K. Shukla, 2015).

Goat was one of the first animals to be domesticated and it remained a popular animal serving the needs of man all over the world. Goat milk is one of the milk sources that is characterized by an economical, nutritional and medical importance, especially for children who suffer allergy from the cow milk. Since goat milk has a high importance as a source of nutrition for poor communities. (Lemya M. Warsama, Ibtisam E. M. El Zubeir, 2015).

Goats are the backbone of the economy of small and landless farmers in India. It is an insurance against crop failure and provides alternate sources of livelihood of farmers all the year round. They play an important role in income generation, capital, strong, employment generation and improving house hold nutrition. Goat is a poor Man's cow because of their immense contribution to the poor people's economy. They not only supply nutritious and easily digestible milk camp ration to other mammal's milk. It is regular sources of additional income for poor and landless or marginal farmers being small sized animal the goat can easily be managed by women and children (Prasad. 2010). A majority of sheep, goat, cow and buffalo owners falls in this group. Sheep and Goat are small animals easy to manage. They are kept by poor farmers and land less labourer for meat, wool, skin, manure and some extent even milk. (Shashikant Tripathi and U.K. Shukla, 2014).

India has got about 115 million goat and 55 million sheep. They contribute annually about Rs. 10,000 million to Indian economy by way of meat, skin, manure and milk. Goat production in India is largely in the hands of small marginal farmers and agricultural landless laborers. Annual growth rate in goat is about 2.3 per cent (U.K. Shukla, Pratibha vaishnav and Shivakant Shukla, 2015)

India is today the world's largest producer of milk. Milk accounts for about 18 % of agriculture GDP and in terms of value of output is now the single agricultural commodity in the country. Milk production is dominated by small producers with an estimated 70 million rural milk animal households in the country of which about 75 % are landless, marginal or small farmers. Small and marginal farmers, typically owning between 1-3 animals, contribute about 70 % to the total milk production. Women constitute about 70 % of the labour force in livestock farming. All people, at all times, have physical and economic access to sufficient, safe and nutritious food to meat their dietary need and food preference for an active and healthy life and milk is a near-perfect food source packed with vital vitamins and minerals and keeps our bodies healthy and strong. (U.K. Shukla, Ogendra Singh and Shivakant Shukla, 2015)

The milk of small ruminant plays an important role in the nutrition of both agricultural and urban areas. Goat's milk is of specific economic interest in the developing countries. The production of this milk has to be a useful strategy to stop the problems of poor nutrition in Africa and Asia (Guerreiro O, Velez Z, Alvarenga N, Matos C and Duarte M, Molecular 2013).

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Milk is a white liquid produced by the mammary glands of mammals. It is the primary source of nutrition in the world with its high nutritious property. If convenient storage temperatures are not paid attention, milk becomes a suitable propagation medium for micro-organisms due to its biochemical composition and high water activity. Milk can be easily contaminated and spoiled when it is produced in unhygienic environment. Milk quality is directly related to its composition and hygiene (Oliver et al., 2005). Milk is one of the essential products in the human diet, rich in nutritive components. Although the production and consumption of cow milk is the largest throughout the world, one may observe a growing demand for milk of other farm animals, such as goats, which is recognized in developed countries as a "niche" product (Haenlein and Wendorff , 2006). Although several authors have examined the nutritive value of goat milk taking into consideration various factors, little is known about its composition and physical traits in relation to the stage of lactation.(Nina Strzałkowska, et al., 2009).

Goat milk and milk products are important sources of protein for humans in many developing countries. However, its production and handling presents a major problem limiting its consumption. Most goat milk cheeses are manufactured from raw goat milk with or without thermal treatment (Klinger & Rosenthal, 1997).

In goat milk dry matter is rather variable depending mainly from the breed, while ash content is rather constant. Also freezing point is variable Minerals, despite their small proportion in milk, are very important because they affect in the cheese making properties of the milk highlights that feeding and environmental factors have a small influence on mineral content. There is a relationship between milk mineral contents and the mineral requirements of the goat . Other authors study Ca, P and Mg salt equilibrium to delineate their relationships with rennet-coagulation properties. The introduction of "TMR" ("Total mixed ration") diet in goat herds could lead to a improving in milk quality. In this research feeding management and production factors affecting physicochemical properties and mineral content of Saanen goat milk were studied.(Summer et al.2007)

Materials and Methods:

The study was conducted in the Department of Animal Husbandry. Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (M.P.) during January to April 2016 to study Determination of Chemical Quality of Goat on their Raw Milk. All sanitary precautions were followed to produce clean milk. The sample of raw milk were collected for ten days. Samples were collected from the milking pail separately in sterile 250 ml. conical flasks and plugged aseptically with cotton plug. The samples were then brought immediately to the laboratory for determination protein, Sp. gr. Fat, lactose, ash, total solid, solid not fat and water as per the procedure and norms set by A. O. A. C. (2000). The data obtained for the aforesaid tests were subjected to statistical analysis.

Results and Discussion:

Table 1 Chemical composition of raw milk Goat

Composition	G1	G2	G3	Result
Protein (%) Min-Max	3.60 3.56 – 3.65	3.65 3.63 – 3.68	3.69 3.65 – 3.76	Significant
Specific gravity (cc) Min- Max.	1.02 1.01 – 1.04	1.03 1.02 – 1.04	1.03 1.02 – 1.04	non-Significant
Fat (%) Min- Max	3.82 3.77 – 3.86	3.92 3.87 – 3.97	3.87 3.82 – 3.95	Significant
Lactose (%) Min- Max	4.53 4.30 – 4.70	4.58 4.30 – 4.80	4.63 4.41 – 4.81	non-Significant
Ash (%) Min- Max	0.71 0.62 – 0.76	0.72 0.67 – 0.75	0.74 0.67 – 0.78	non-Significant
Total solid (%) Min- Max	12.75 12.70 – 12.83	13.01 12.91 – 13.10	12.91 12.79 – 13.03	Significant
Water (%) Min- Max	87.25 87.17 – 87.30	86.99 86.90 – 87.09	87.09 86.97 – 87.21	Significant
Solid not fat (%) Min- Max	8.89 8.02 – 9.86	8.98 8.09 – 9.85	9.05 8.19 – 9.66	non-Significant

Protein:

Protein percentage in individual goats ranged from 3.56 – 3.65, 3.63 – 3.68, and 3.65 – 3.76, with a mean of 3.60, 3.65 and 3.69 in Goat G1, G2 and G3, respectively. The maximum protein percentage (3.69) was found in G3 followed by G2 (3.65) and G1 (3.60) and the differences between the mean values was significant. The overall mean protein in goat milk was recorded 3.65%.The differences in the protein percentage in goat milk due to differences, as also due to replication, were significant.

Specific gravity (cc):

Specific gravity (cc) in individual goats ranged from 1.01 – 1.04, 1.02 – 1.04, and 1.02 – 1.04, with a mean of 1.02, 1.03 and 1.03 in Goat G1, G2 and G3, respectively. The maximum specific gravity percentage (1.03 cc) was found in G2 and G3 (1.03 cc) followed by and G1 (1.02 cc). The overall mean specific gravity in goat milk was found 1.03 cc respectively. The differences in the specific gravity in goat milk due to different animals, three each, as also due to replication, were non-significant.

Fat:

Fat percentage in individual goats ranged from G1 3.77 – 3.86, G2 3.87 – 3.97, and G3 3.82 – 3.95, with a mean of 3.82, 3.92 and 3.87 in Goat G1, G2 and G3, respectively. The maximum fat percentage (3.92) was found in G2 followed by G3 (3.87) and G1 (3.82) and the differences between the mean values was significant. The overall mean fat in goat milk was found 3.87%. Highest mean fat per-

centage was recorded in the milk of goat (3.60, 3.65, 3.69, and overall 3.65). The differences in the fat percentage in goat milk due to different animals, three each, as also due to replication, were significant.

Lactose (%):

Lactose percentage in individual goats ranged from G1 4.30 – 4.70, G2 4.30 – 4.80, and G3 4.41 – 4.81, with a mean of 4.53, 4.58 and 4.63 in Goat G1, G2 and G3, respectively. The maximum lactose percentage (4.63) was recorded in G3 followed by G2 (4.58) and G1 (4.53) and the differences between the mean values was non-significant. The overall mean lactose in goat milk was found 4.58%. The differences in the lactose percentage in goat milk due to different animals, three each, as also due to replication, were non-significant.

Ash:

Ash percentage in individual goats ranged from 0.62 – 0.76, 0.67 – 0.75, and 0.67 – 0.78, with a mean of 0.71, 0.72 and 0.74 in Goat G1, G2 and G3, respectively. The maximum ash percentage (0.74) was recorded in G3 followed by G2 (0.72) and G1 (0.71) and the differences between the mean values was non-significant. The overall mean ash in goat milk was recorded 0.72%.The differences in the ash percentage in goat milk due to different animals, three each, as also due to replication, were non-significant.

Total solid :

Total solid percentage in individual goats ranged from 12.70 – 12.83, 12.91 – 13.10, and 12.79 – 13.03, with a mean of 12.75, 13.01 and 12.91 in Goat G1, G2 and G3, respectively. The maximum total solid percentage (13.01) was found in G2 followed by G3 (12.91) and G1 (12.75) and the differences between the mean values was significant. The overall mean total solid in goat milk was found as 12.89%. The differences in the total solid percentage in goat milk due to different animals, three each, as also due to replication, were significant

Water:

Water percentage in individual goats ranged from 87.17 – 87.30, 86.90 – 87.09, and 86.97 – 87.21, with a mean of 87.25, 86.99 and 87.09 in Goat G1, G2 and G3, respectively. The minimum water percentage (86.99) was found in G2 and the maximum in G1 (87.25) followed by G3 (87.09) and the differences between the mean values was significant. The overall mean water in goat milk was found as 87.11%. The differences in the water percentage in goat milk due to different animals, three each, as also due to replication, were significant.

SNF:

SNF percentage in individual goats ranged from 8.02 – 9.86, 8.09 – 9.85, and 8.19 – 9.66, with a mean of 8.89, 8.98 and 9.05 in Goat G1, G2 and G3, respectively.The maximum SNF percentage (9.05) was recorded in G3 followed by G2 (8.98) and G1 (8.89) and the differences between the mean values was non-significant. The overall mean SNF in goat milk was recorded 8.97%. The differences in the SNF percentage in goat milk due to different, three each, as also due to replication, were non-significant.

In view of the findings and results presented above, it may be concluded that the chemical quality of milk of G3was found best followed by G2 and G1 of goats.

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