

A Report on Nutritional Compositions of Goat Milk



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Submitted By:

Md. Jobair Hakim

Roll No: 18/54

Reg. No: 03017

Intern Id: 50

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Faculty of Veterinary Medicine
Chattogram Veterinary and Animal Sciences University
Khulshi , Chattogram – 4225 , Bangladesh

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Approved By:

Dr. A K M Humayun Kober

(Professor)

Department Of Dairy and Poultry Science

Faculty of Veterinary Medicine

Chattogram Veterinary and Animal Sciences University

Khulshi, Chattogram – 4225, Bangladesh

Table of Contents

Contents	Page no
Statement of author.....	v
List of acronym used.....	vi
Abstract.....	vii
Chapter 1: Introduction.....	1-2
Chapter 2: Materials and Method.....	3-5
2.1: Study period.....	3
2.2: Study area and location.....	3
2.3: study analysis process and laboratory tools.....	3
2.3.1 Animals and their management.....	3
2.3.2 Milk samples.....	4
2.3.3 Laboratory tests conducted for milk sample analysis.....	4
2.3.4 Study photo gallery.....	4-5
Chapter 3: Results and Discussions.....	6-7
3.1: Size of the farm.....	6
3.2: Analyzing the nutritional compositions of the samples.....	6
3.2.1 Physical parameter.....	6
3.2.2 Chemical parameters.....	7

Chapter 4: conclusion.....	8
References	9-10
Acknowledgement	11
Biography.....	12

List of Tables

Table	Title	Page
Table 01	Physical characters of Black Bengal and Jamnapari goat's milk	6
Table 02	Comparison of nutritional constituents between Black Bengal And Jamnapari goat milk	7

List of figures

Figure	Title	Page
Figure -1	Geographical Location of Data Collection Site	3
Figure -2	Analyzing the acidity of collected sample	2
Figure -3	Analyzing the Fat% of collected sample	2
Figure -4	Counting the temperature of the collected sample	2
Figure -5	Black Bengal Goat	2
Figure -6	Jamnapari Goat	2
Figure -7	Selected chemical constituents of native goat milks	7

Statement of Author

I, Md. Jobair Hakim, hereby certify that I have successfully completed all tasks included in this report. Books, national and international periodicals, websites, and other references were used to gather the material. All citations are properly acknowledged. As a result, I am entirely responsible for gathering, combining, preserving, and publishing all of the data that has accumulated in this report.

The author

Date

List of Acronym Symbols Used:

Abbreviation	Elaboration
%	Percentage
No.	Number
e.g.	Example
etc.	Et cetera
ET. al	And his associate

Abstract

The present study was conducted at Dairy Science laboratory of Chittagong Veterinary and Animal Sciences University to accomplish the determination of the selective nutritional compositions of the milk of native goat (Black Bengal and Jamnapari) by standard laboratory test. Milk samples were collected from backyard farm of muradpur, Chattogram city from 3rd April to 8th April, 2023. Selective nutritional composition's percentage eg. SNF, fat and acidity of the goat milk were determined. The average fat, SNF and acidity percentage of the black Bengal goat sample was 4.43%, 8.8%, and 6.70% respectively and the average fat, SNF and acidity percentage of the Jamnapari goat sample was 4.58%, 8.71% and 6.30 % respectively. It may be concluded that nutritional quality of Bengal goat milk and Jamnapari goat milk were satisfactory level.

Key words: Black Bengal goat, Jamnapari goat, nutritional compositions, goat milk

Chapter 1

INTRODUCTION

Milk is very valuable food, readily digested and absorbed. It consists of nutrients, which are needed for proper growth and maintenance of body. Chemical and microbiological analysis is important tool to monitor the quality of milk. Milk from various mammals is used for producing different dairy products including cream, butter, yoghurt, ghee, sour milk etc. (Adam, 2009). Goat milk is a nutritious dairy product known for its unique composition. It contains essential nutrients like protein, fat, carbohydrates, vitamins, and minerals. The specific constituents of goat milk can vary slightly from cow's milk. For instance, goat milk typically has smaller fat globules and slightly higher levels of certain vitamins and minerals such as vitamin A, calcium, and potassium. It's also often easier to digest for some people due to its lower lactose content. In Bangladesh, goats are reared by landless farmers and women to meet the milk requirements of their families and as a source of income.(Siddiki, 2017).Black Bengal goat is an indigenous goat breed are reared for dual (meat and milk) purposes. Black Bengal goat comprises more than 90% of the total goat population, and the rest 10% comprises of Jamnapari and different crossbred goats. (Saha, et al .2018). The annual milk production of Bangladesh is about 10.6 million metric tons, where goat milk contributes 2% of the total milk production. (Hamid MA, et al.2014). Goat milk is of interest due to its nutritional composition and easily digestible to humans. Nutrients such as vitamins, minerals, trace minerals, electrolytes, enzymes, proteins, and fatty acids present in goat milk are easily absorbed by the human body. (Kumar, et al.2012)

Goat's milk contains all the components necessary for human consumption: proteins, lipids, sugars, mineral salts, vitamins, enzymes and water. It is one of the most complete foods for people, given the characteristics of its components, such as proteins that contain a large number of essential amino acids for food. (LVAREZ R, et al.1998). However, the chemical composition of milk may vary according to individual characteristics such as race, food composition, and time of lactation, management, climate and the region where the animals are found. (VEGA S, et al. 2005).

However, very limited number of research works has been carried out in Chattogram regarding goat milk quality. Therefore, the present study was undertaken with the aim of making a comparative study regarding the nutritional quality (SNF, fat and acidity%) of milk of native goat (Black Bengal and Jamnapari)

Chapter 2

Materials and Methods

2.1 Study period:

The study was carried out for periods of 5 days from 3rd April to 8th April, 2023.

2.2 Study area and location:

The study area was at Chattogram metropolitan area and the location of the farm was Shah Amanat Abasik, Hamzarbagh, Muradpur Chattogram. (**Figure -1**)



Figure -1 Geographical Location of Data Collection Site

2.3 Study analysis process and laboratory tools:

2.3.1 Animals and their management:

Four Black Bengal Goat and Four Jamnapari goat weighing between 32 and 45 kg were selected. Goats were healthy and 2nd to 3rd lactation. They were stall feed and with about 6 to 8 hours grazing in a day. In addition, 2 kg of concentrate were supplied to all these animals with ad libitum water.

For strategic controlling parasitic infestation, nitroxylin 10mg/kg was given subcutaneously in 3rd trimester of pregnancy. All animals were routinely vaccinated against common infectious diseases.

2.3.2 Milk samples:

The morning milk sample from each goat was collected in a sterile individual glass tube. Color, taste and flavor of milk were analyzed by Aggarwala and Sharma (1961) and Draaijer (2002).

The milk quality tests were done in the Dairy Science Laboratory under the Dept. of Dairy and Poultry Science of Chittagong Veterinary and Animal Sciences University during the period from from 3rd April to 8th April, 2023.

2.3.3 Laboratory tests conducted for milk sample analysis:

Milk fat was determined by Gerber test (Eckles et al., 1951). Briefly, milk (10.75ml) at 25° C was added to butyrometer together with sulphuric acid and amyl alcohol. After centrifugation, the sample kept in a 65 ° C water bath and read after three minutes.

SNF were measured by Indian Standard Institution Formula Draaijer (2002):

$$\% \text{ SNF} = \frac{\text{CLR}}{4} + 0.25 \times \text{F (Fat \%)} + 0.6$$

Here, CLR = corrected lactometer reading at 77 ° F

F = Fat percentage

And percentage of acidity were calculated by using following formula:

$$\% \text{ Acidity} = \frac{\text{Ml of alkali used} \times \text{N of NaOH} \times 0.09}{\text{Ml of milk sample}} \times 100$$

2.3.4 Study photo gallery:

These are the results of the study that was done. Here, the test animals and lab work are displayed.



Fig -2: Analyzing the acidity of collected sample



Figure 3: Analyzing the FAT% of collected milk sample



Figure -4: Counting the temperature of the collected sample



Figure -5: Black Bengal Goat



Figure -6: Jamnapari goat

Chapter 3

Results and discussions

3.2.1 Physical parameters:

Physical parameters of Black Bengal and Jamnapari goat's milk as shown in Table1 .The color of the milk was whitish creamy. Eckles et al. (1951) reported that the color of milk depends upon breed, amount of fat and solids and in most cases on nature of feed consumed by the goat. All the milk samples had normal flavor due to proper attention taken by the farmers in order to maintain hygiene at all stages of milk collection. Physical parameters of Black Bengal and Jamnapari goat's milk agreed with the findings of Kumar et al (2012).

Table 1: Physical parameters of Black Bengal and Jamnapari goat's milk

Physical parameters	Black Bengal goats milk (Avg.)	Jamnapari goats milk (Avg.)
Color	Whitish	Whitish
Flavor	Milky (normal)	Milky (normal)

3.2.2 Nutritional/Chemical parameters:

The average milk fat of Black Bengal goat was 4.43 %, lesser than that of the milk from Jamnapari goat at 4.58 %. Fat affects the richness of milk and it varies with the seasons of the year. The average SNF of milk was 8.8 % in Black Bengal, higher than the 8.71 % in Jamnapari goats. The average acidity in milk of black Bengal were 6.70 % and higher than the 6.30 % in Jamnapari goats. These results are in agreement with the finding of Saha, et al. (2022).who found fat of 5.5%, solids not fat (SNF) 8.23%. However, the SNF, fat and acidity percentage of the milk sample is shown in the table 2. Nutritional/Chemical parameters (SNF, fat and acidity %)of milk of native goat (Black Bengal and Jamnapari) agreed with the findings of Kumar et al (2012).

Table 2: Nutritional/Chemical parameters of Black Bengal goat’s milk and Jamnapari goat’s milk

**** n= 4 goat milk samples (both Black Bengal & Jamnapari goat)**

Chemical Parameters (%)	Black Bengal Goats (Avg.)	Jamnapari Goats (Avg.)
Fat	4.43	4.58
SNF	8.8	8.71
Acidity	6.70	6.30

This study compares the fat, SNF and acidity % of two native goats. This study also examines the fat, SNF and acidity percentages of two distinct breeds of native goat found in Bangladesh. Milk proteins were not examined in this report.

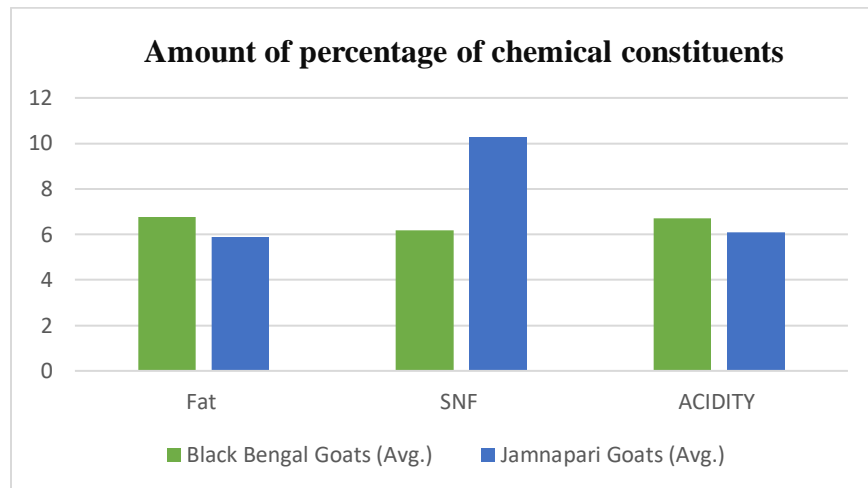


Figure -7: Selected chemical constituents of native goat milks

Chapter 4

Conclusion

Judging from the results of physical and chemical parameters(Fat,SNF etc), it was found that, milk sample of Jamnapari (4.58% fat,8.71%SNF) were superior to Black bengal goat milk (4.43%fat,8.8%SNF). So, consumer are requested to collect Jamnapari goat milk in order to get quality.

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Biography

This is Md. Jobair Hakim, the 4th child of Hazi Abdul Hakim and Nasima Begum, doing his graduation on Doctors of Veterinary Medicine (DVM) at Chattogram Veterinary and Animal Sciences University under the Faculty of Veterinary Medicine. He passed the Secondary School Certificate Examination (SSC) in 2014 from Shah Wali Ulah Institute, Chattogram, and got GPA 5.00 and then Higher Secondary Certificate Examination (HSC) in 2014 from Chattogram Biggan College, and got GPA 4.75 out of 5.00. Currently, he is doing his year-long internship. He has a great enthusiasm for research and researches in the different dairy product microbiology.