Comparative Study on Nutritional Importance of Cow, Camel and Goat Milk of Nangarhar Province, Afghanistan

Assistant Prof. Hedayetullah[1],
Assistant Prof. Gulahmad Sohail[2]
[1,2]Physics Department Nangarhar medical faculty, Nangarhar University, Afghanistan
Associated Prof. Jamaat Khan Hemat[3]
Biology Department Nangarhar medical faculty, Nangarhar university, Afghanistan

Abstract

Milk is a dispersed complex colloidal solution containing fats, Protein, water, minerals and some other compounds. Specific gravity of milk is defined as a density of milk per density of water with same volume.As the milk is a complete food, the assessment of its nutritive value valuable.The comparisonof 20 samples of cows, camels and goats milks regarding to physical and chemical parameters including: pH , Proteins, Fats and specific gravity.

The research has been done in Nangarhar Province, Khatiz Diary Process Factory from February 2019 to Jun 2019 on pH, protein, Fat, Specific gravity, chemical and physical parameters and analysis of cow, camel, and goat's 20 samples of milk in Khatiz Dairy Process factory. Based on the research, cow's milk has the following amount of ingredients. pH is 6.75, protein 3.5%, Fat 4.62%, Specific gravity1.050. Camel's milk has the following amount of ingredients. pH is 6.75, protein 3.42%, Fat 4.3%, Specific gravity1.030, Goat's Milk has the following ingredients pH is 6.75, proteins 4.82%, Fat 6.73% and Specific gravity 1.050.Comparing the result of above 3 types of milk of 3 different cattle's, we come to know that goats' milk is more enriched with protein and Fat than cow and camel's milk. That is the reason why goats' milkis traditionally recommended in rural areas and villages for kids suffering from malnutrition. On the other hand, based on medical research camel's milk are recommended for patients suffering from cancer.

Key words: PH, Proteins, Fat, Specific gravity, Nutrition**.**

Introduction

As we know there is abuse of nonstandard milk in our markets, there for we preferred to do this study for better diagnosis and introducing of milk.

Milk is a disorganized complex colloidal solution which included from fats, carbohydrates, protein, water, mineral materials and other compounds. You can use the chemical and physical parameters of milk as well as viscosity of milk for evaluation of milk quality. The acidity of milk is explained by pH and the pH of milk has relation with buffer (such us phosphate) and heat [(20)].

It has known that milk is a complex buffer solution, so by variation of heat marked changes will be occurred in temperature of buffer solution. In most fresh milk, the difference between pH and buffer related to the viscosity of milk and specific gravity of milk. The specific

gravity of milk decreased by uprising of temperature, because it affects fats of the milk and other solid will be contracted.

There are two types of protein in milk composition; the first one is casein which takes 0.9% of milk. The second one is lacto albumin which takes 0.4% of milk. Lactose is a carbohydrate that takes 6.8% of milk. Fat takes 3.3% of milk which included from neutral fats, cholesterol and phospholipid. It has worth to be mentioned that more important vitamins are present in the milk such us; vitamin A, vitamin B, Ascorbic acid and Vitamin D. Beside vitamins there are more mineral in the milk such us ; calcium, Chlorine, Potassium, |Sodium, Phosphorous and Magnesium. Finally 88.5% of milk is consisting of water, so milk is a complete food regime [17, 26].

This research is important, because it define us the type of milk having high quality, so milk is a complete food regimen and it may use for the treatment of malnutrition especially in children. On the other hand there is no any research regarding importance of types of milk in Nangarhar province in the past.

Because of the warm weather Nangarhar is suitable place for development of agriculture and ranch, so agriculture and ranch developed significantly in Nangarhar province .In the recent 10 years dairy product project make significant source of revenue for People, by selling of milk and its products.Physical and chemical Characteristic of raw milk includes its microbiological and Nutritive value.Milk of cow,camel,and goat have special nutritive value than other animals like Sheep's, and Buffalo.Milk product includes yogurt, cheese, batter, cruds used as food source .one cup of milk (250cc)contain 9-14gr (3-5%) lactose, fats (3.3%),and two kinds of protein Casein(0.3%),and lactate albumin(0.4%).Milk contain lactose(6.8%),lipids 3.3% including unsaturated fatty acids,cholesterol and phospholipid,Vitamins like A,B,C,D,minerals like calcium,chlorine,potassium,sodium,phosphorus. Water make 88.5% of milk. Milk is complete food [7,26]. Milk has important rule in development of villages, and find work for people it prevent people from displacement [22].

Milk include twenty elements like Magnesium, Potassium, Copper, Iron, Zinc [13,14].camel milk contain less lactose[13,14].

Medical Research has shown that camel milk has anti-cancer [18, 19]. Anti-allergic [23] and anti-diabetic [1] effects. It's anti allergic effects are because of low level of $\beta - casein$ and absence of $\beta - luctoglobulins$ lactoferin, immunoglobulin, lysozyme and vitamin C in camel milk helps to protect from, cancer, allergy and diabetes.[10,16].

Camel milk has been used as effective food for child. Right now camel milk is pasteurized and packed in some countries like Saudi Arabia, United Arab Emirates, Kazakhstan, Mauritania and Zaire [9, 17].

Milk is a complex colloidal solution which contains fats, carbohydrate, protein, water, electrolyte and others. We can measure the content of the milk from its physical and chemical properties. Temperature can change the concentration and chemical properties of milk.

The concentration and specific gravity of fresh milk is directly related to its ph. The specific gravity of milk decrease in high temperature.This effect is due to fat content of milk which lysis with high temperature. The pH of fresh milk is measure with digital pH meter which is (4-7) buffer.
The specific gravity of the milk is measured with pycno meter the fat content of the milk is measured with kjeldahl method which is described by David.

We have collected milk from cows,camels and goats and keep it in sterilized bottles in freezer.

These simple are kept in chemistry and physics laboratory for analysis.

Objectives

Evaluation of nutritional value of Cow, Camel and Goat milk according to their pH, protein, fat and specific gravity.

Materials and methods

The study Design was experimental laboratory research, which we have carried out in Nangarhar Khatiz dairy processing factory laboratory. In this experiment we collected sample of cow milk, camel milk and goat's milk from different villages this research completed within five months from 2019 January to 2019Jun.
The pH was measured using a digital pH-meter (pH 200 port able pH meter). Protein content was determined by milk protein estimator 220 Bilgharia. Fat content was measured by (BUTTER CHURN Model. BC year 2013 Bilgharia) Specific gravity determined using pycnometer is described by Bekele [3, 8].
The data of this research analyzed statistically and recorded as below in Table 1.

Statistical analysis:

The data collected on different parameters during investigation were subjected to Fisher's method of analysis of variance. The level of significance used in "F" and "t" test was P-value=0.05 values obtained in percentage were subjected to angular transformation. The SPSS version.16.0 statistical package was used for data analysis.

Table 1: pH, protein, fat and specific gravity percentage of cow, camel and goat milk of different village of Nangarhar province.

Species	Average pH	Average protein (%)	Average fat (%)	Average specific gravity
Cow	6.75	3.50	4.62	1.032
Camel	6.75	3.42	4.30	1.030
Goat	6.75	4.82	6.73	1.050
SEM	0.00	0.22	0.38	0.020

Result and discussion:

In this investigation we investigated 20 sample of each species for pH protein fat and specific gravity from which we found pH values of different species are shown in table1. The result showed that the pH of cow, Camel and goat milk was 6.75 the pH of all species are non-significant the pH values of cow and goat milk were similar with findings of [4,15] protein

content of milk samples of cow, camel and goat is given in table1. The protein content of cow milk was 3.50% in camel milk 3.42% and goat milk protein 4.82% the amount of protein in cow and camel milk was non-significant difference. There are significant difference in goat milk cow and camel milk. The amount of protein content is higher in goat milk than the cow and camel. The result was similar with Davide and Kanwal.

The fat content in milk samples collected from cow, camel and goat is illustrated in table1. The result showed that the fat content of cow milk 4.62% in camel milk 4.30%, and goat milk 6.73%.

There is non-significant difference between cow and camel milk fat content but there is a significant difference in fat content of cow milk camel milk with goat milk fat content. The value of fat content in goat milk was higher than cow milk and camel milk [15.12].

The specific gravity was found in milk samples of cow, goat and camel illustrated in table1. The specific gravity of cow milk was 1.032, camel milk 1.030 and goat milk 1.050. There is non-significant difference of specific gravity of cow, camel and goat milk [21, 11, and 24]. The result was in agreement with results of Asif and Tilahun.

Conclusion:

From the tested parameter pH and specific gravity was non-significant difference in cow, camel and goat milk. The protein and fat content of cow, camel and goat milk was higher in goat milk compare to the cow and camel milk.That is why goats' milk is traditionally recommended in rural areas and villages for kids suffering from malnutrition. The amount of the studied parameters in the present work was agreement with reports by some authors and also there were considerable variation when compared to the values reported by others from different parts of the word. This difference may attribute to such factors as location stage [6], feeding, breed, milking frequency, milking system, age of the animaland environmental effect [5].

Suggestions:

- The goats' milk is rich from proteins traditionally recommended in rural areas and villages for kids suffering from malnutrition.
- On the other hand, based on medical research camel's milk are recommended for patients suffering from cancer.

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References

1.Agrawal PP, Swami SC, Beniwal R, Kochar DK, Sahani MS, et al. (2003) Effect of camel milk on glycemic control, risk factors and diabetes quality of life in type-1 diabetes: a randomized prospective controlled study. J Camel Practice & Res 10: 45-50.

2.Ahmed MI, El Zubeir by some dairy cow farms in Khartoum State, Sudan. Research Journal of Agriculture and Biological Sciences 3: 902-906.IE (2007) The compositional quality of raw milk produced

3.AOAC (Association of Official Analytical Chemists) (2000). Official Methods of Analysis International. 17th Edn. Association of Official Analytical Chemists, Washington. DC.

4.Asif M, Sumaira U (2010)A Comparative Study on the Physicochemical Parameters of Milk Samples Collected from Buffalo, Cow, Goat and Sheep of Gujrat, Pakistan. Pak J Nutr 9: 1192-1197.

5.Bakht BK, Arshad I (2001) Production and composition of camel milk. Pak 1 AgriSci 38: 3-4.

6.Bhosale SS, Kahate PA, Kamble K, Thakare VM, Gubbawar SG (2009) Effect of lactation on physicochemical properties of local goat milk. Vet World 2: 17-19.

7.CSA (2013) Agricultural Sample Survey, 2012/13 (2005 E.C.) Report on Livestock and livestock characteristics (Private peasant holdings). Statistical Bulletin 570, Federal Democratic Republic of Ethiopia, Addis Ababa.

8.Davide CL (1977) Laboratory guide in dairy chemistry practicals. FAO Regional Dairy Development Centre for Asia and the Pacific. Dairy Training and Research Institute, Univ. Philippines, Los Banos, Laguna.

9.Dell'Orto V, Cattaneo D, Beretta E, Baldi A, Savoini (2001) Effects of trace element supplementation on milk yield and composition in camels. Inter Dairy J 10: 873-879.

10. Elagamy E, Ruppanner R, Ismail A, Champagne C, Assaf R (1996) 3urification and characterization of lactoferrin, lactoperoxidase, lysozyme and immunoglobulins from camel's milk. International Dairy Journal 6: 129-145.

11. Elbagermi MA, Alajtal AI, Edwards HGM (2014)A Comparative Study on the Physicochemical Parameters and Trace Elements in Raw Milk Samples Collected from Misurata- Libya. SOP transactions on analytical chemistry 1: 15-23.

12. Enb A, Donia AMA, Abd-Rabou NS, Abou- Arab AAK, El-Senaity MH (2009) Chemical composition of raw milk and heavy metals behavior during processing of milk products. Global Vet 3: 268-275.

13. Gorban AMS, Izzeldin OM (1997) Mineral content of camel milk and colostrum. J Dairy Res 64: 471-474.

14. Hashim IB (2002) Acceptance of camel milk among elementary school students in Al Ain city, Emir. J AgricSci 14: 54-59.

15. Kanwal R, Ahmed T, Mirza B (2004) Comparative analysis of quality of milk collected from buffalo, cow, goat and sheep of Rawalpindi/Islamabad region in Pakistan. Asian Plant Sci 3: 300-305.

16. Konuspayeva G, Faye B, Loiseau G, and Levieux D (2007)Lactoferrin and Immunoglobulin Contents in Camel's Milk (Camelusbactrianus, Camelusdromedarius, and Hybrids) from Kazakhstan. Journal of Dairy Science 90: 38-46.

17. Lorenzena PC, Wernery R, Johnson B, Joseb S, Wernery U (2011) Evaluation of indigenous enzyme activities in raw and pasteurized camel milk. Small Rumt Res 97: 79-82.
18. Magjeed NA (2005) Corrective effect of milk camel on some cancer biomarkers in blood of rats intoxicated with aflatoxin B1. J Saudi Chem Society 9: 253-263.
19. Omer RH, Eltinay AH (2009) Changes in chemical composition of camel's raw milk during Storage. Pakistan J Nutr 8: 607-610.
20. Qin W, Dan W, Bin D, Zaijun L, Yanqiang H (2006) Journal of Food Composition and Analysis 19: 76-82.
21. Sabahelkhier MK, Faten MM, Omer FI (2012) Comparative Determination of Biochemical Constituents between Animals (Goat, Sheep, Cow and Camel) Milk with Human Milk. Res J Recent Sci 1: 69-71.
22. Sarwar M, Khan MA, Mahr-Un-Nisa ZI (2002) Dairy industry in Pakistan: A Scenario. Int J AgricBiol 4: 420-428.
23. Shabo Y, Barzel R, Margoulis M, Yagil R (2005) Camel milk for food allergies in children. Immunology and Allergy 7: 796-798.Tilahun H, Schmidt E (2012)
24. Shamsia SM (2009) Nutritional and therapeutic properties of camel and Human milks. Int J Genet MolBiol 1: 052-058.
25. Spatial Analysis of Livestock Production Patterns in Ethiopia. ESSP II Working Paper 44. International Food Policy Research Institute/Ethiopia Strategy Support Program II, Addis Ababa, Ethiopia.
26.Tilahun H, Schmidt E .(2012).Spatial Analysis of Livestock Production Patterns in Ethiopia.ESSP II Working Paper 44. International Food Policy Research Institute/Ethiopia Strategy Support Program II, Addis Ababa, Ethiopia.