IJBPAS, April, 2012, 1(3): 364-369

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

NUTRIENT CONTENT OF KHOA SAMPLES PREPARED FROM AZOLLA AND NON AZOLLA FED COW MILK

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ABSTRACT

Nutrient composition of Khoa depends on the composition of cow milk which in turn depends on quality of fodder given to cow. The present study deals with comparison of nutrient composition of khoa made from milk samples obtained one from cow fed with experimental diet (including azolla) and other from control diet (excluding azolla). Results revealed that the experimental diet given to the cow had shown an increase in contents like moisture, carbohydrate, fat and protein in Khoa sample over control diet, where as total solids found to be almost equal in both.

Keywords: Khoa, Azolla, Experimental Diet, Control Diet, Cow Milk

INTRODUCTION

Fodder is considered as an important ecological factor influencing the dairy industry. The decline in fodder production diverts the dairy farmers to depend on commercial feeds which are mixed with urea and artificial milk booster. This affects the quality of milk produced and longevity of the animal. The utilization of aquatic plants having high food value are used to supplement fish food has taken a new dimension for producing the much required animal protein at low cost **[1]**. Azolla, which

grows in association with the blue green algae Anabaena azollae, is perhaps the most promising from the point of view of ease of cultivation productivity and nutritive value **[2, 3]**. Azolla is the most economic and efficient feed substitute for live stock which is very rich in proteins, essential amino acids, vitamins, growth promoter intermediaries and minerals (calcium, phosphorus, potassium, ferrous, copper, magnesium etc.,). Azolla on dry weight basis is constituted of 25-35% protein content, 10-15% mineral content and 7 – 19% a combination of amino acids, bio active substances and bio polymers. Azolla can be easily digestible by the livestock, owing to its high protein and low lignin content. It improves the quality of milk, health, longevity of livestock and increases the milk yield by 15 to 20% **[4]**. The nutrient composition of khoa in general depends on many factors like the quality and the initial composition of milk, the temperature applied during preparation, the freshness of the sample, feed given to the animal, breed and health of the animal, the degree of concentration of milk solids, losses or gain during handling and processing **[5]**. Khoa/Khava/Mava refers to the partially dehydrated whole milk product prepared by the continuous heating of milk. Nutrient composition of khoa is important because it goes into the preparation of several indigenous sweet-meats. Azolla given as a feed to cows is expected to lead some changes in the milk constituents in turn effects the khoa composition of that milk. Hence the present experiment was conducted to estimate the nutrient content of khoa samples prepared from cow milk obtained by feeding experimental diet and control.

MATERIALS AND METHODS

A total of 10 Holstein cows were selected in a private dairy farm. These cows were maintained under proper management conditions in well ventilated sheds. The cows were stall fed and fodders were provided at 8:00 am and 4:00 p.m. The cows were milked 2 times per day by hand method at 5:00 a.m and 5:00 p.m. Before milking udder was washed by warm water and dried with cloth. During the experimental period all the animals were confined to shed and were taken out for water 3 to 4 times daily to an adjacent tank. In the first step of the experiment, selected 10 cows were fed with control diet for 30 days. In the second step the same set of cows were fed with experimental diet for 30 days. The control diet in this study was prepared using 25 Kg of green grass, 5Kg of dry grass and 3Kg of concenterate including only ground nut cake. But in experimental

diet among 3Kg of concenterate 2Kg of Azolla and 1Kg of ground nut cake were included. To determine the influence of azolla feed on the composition of khoa, the Khoa samples were divided as;

S_{KA} - Khoa made from milk samples of cows fed with experimental diet.

S_{KC}- Khoa made from milk samples of cows fed with control diet.

Two types of khoa samples S_{KA} , S_{KC} were prepared by boiling 2000g of milk samples each in stainless steel vessels on a gas stove with constant stirring (approx. 45 minutes) until a solid mass of 250g was formed. The Khoa samples were cooled and used freshly for analysis. The two laboratory samples of khoa were analysed for their proximate composition. Moisture was analysed by the standard method **[6]** while total solids was calculated as 100 minus moisture content. Carbohydrate estimation was carried out by the anthrone method [**7**], fat content was determined by the standard method **[6]** while protein estimation was carried out by the micro Kjeldahl method **[8]**.

Statistical Analysis

To estimate the effect of azolla, one way ANOVA was used for the two samples S_{KA}, S_{KC}. Critical differences (CD5%) was analysed by Tukeys post hoc procedure. All the data presented were the average values of three trails of five samples each, run parallel.

RESULTS AND DISCUSSION

Table 1 below explains the major milk constituents of Khoa. Present results show that the moisture content of S_{KA} found to be decreased by 20% over $S_{KC.}$ In case of total solids the two samples do not differ significantly.

Table 1: Major Components of Khoa Made From Cow Milk Obtained by Feeding Experimental Diet and Control Diet

SAMPLE	MOISTURE (%)	TOTAL SOLIDS (%)	CARBOHYDRATE (G)	FAT (G)	PROTEIN (G)	FAT/PROTEIN RATIO
S_{KA}	24.82	69.07	24.37	32.59	17.17	1.89
S_{KC}	30.92	69.17	22.69	31.57	15.68	2.1
CD5%	14.33	1.06	1.33	0.99	0.95	0.05
DIFFERENCE OF MEANS OF S_{KA} -S_{KC}	6.1	0.1	1.68	1.02	1.49	0.21

CD: Critical Difference; All the Values are the Average Values of Three Trails

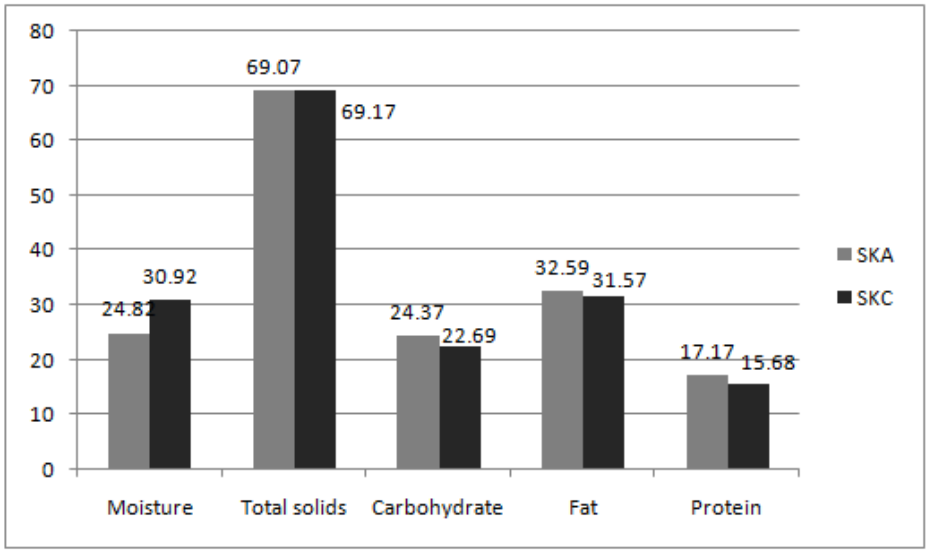

Figure 1: Composition of S_{KA} and S_{KC} Khoa Samples

It is found that Carbohydrate content in S_{KA} had increased by 4.26% over S_{KC}. The mobilization and utilization of glycogenic amino acids for the formation of carbohydrate in the liver and muscle is the cause for increase of carbohydrate **[9]**. Thus a highly significant difference (CD5%) was observed between the two samples for carbohydrate content **(Figure 1)**. A significant increase of 9% in protein content was recorded in S_{KA} over S_{KC} **(Figure 1)**. **[9, 10**] have reported the increase in protein conversion ratio in the liver and muscle of fish fed with azolla diet. Increase in protein content in milk is due to the increase in protein supplementation to cow [**11].** The fat content in S_{KC} was recorded 3% less than S_{KA} **(Figure 1)**. The fat protein ratio was recorded 10% more in S_{KC} over S_{KA}.The high values of protein, fat and total solids are due to lower moisture content **[5]. [12**] working on the options and prospects in dairy cattle reported positive correlation between milk yield and total solids, fat and protein and it depends on feed of the cattle. He also reported that suitable feed will increase milk yield and milk constituents in cow.

CONCLUSION

Thus in conclusion the nutrient composition of Khoa samples made from milk of cow fed with experimental diet have shown an increase in contents like moisture, carbohydrates, protein, fat for which Azolla could be a causative factor.

ACKNOWLEDGEMENTS

We are thankful to the owners of AG Dairy, Ghatkesar Mandal, Ranga Reddy District who have extended their support in providing the cows and facilities to carry on the field work.

REFERENCES

[1] Lakshmanan MAV, Murthy DS, Pillai KK and Banerjee, On a new artificial for Carp fry, FAO Fisheries Report, 44, 1967,373 – 387.

[2] Lumpkin TA and Plucknett L, Azolla as a green manure: Use and management in crop production, West view Trop, Agric, series, 5, 1982, 230.

[3] Van Hove C and Lopez Y, Fisiologia de Azolla, In: Boletin teenico, Universidad Nacional de Colombia, Facultad de Ciencias Agropecuarias,1, 1983, 43-58.

[4] Kamalasanana Pillai P, Premalatha S and Rajamony S, Azolla- A sustainable feed for live stock, Leisa India 4(1), 2002, 15-17.

[5] Pushpa Prasad Acharya and Prabin Sapkota, Effect of Processing Temperature and Ingredients in the Preparation of Gundpak – A Khoa Based Dairyproduct, Nepal Journal of Science and Technology, 9, 2008, 57-64.

[6] AOAC, Official Methods of Analysis, 14th Edition, Association of Official Analytical, Washington D.C, 1984.

[7] Plummer DT, An Introduction to practical biochemistry, 3rdEd, Tata McGraw Hill Publish. Co. Ltd., New Delhi, India, 1990, 1-331.

[8] Oser BL, Hawks Physiological Chemistry, 4th Edition, Tata McGraw Hill Publishing Co. Ltd., NewDehli, 1976.

[9] Sithara K and Kamalaveni K, Formulation of low -cost feed using azolla as a protein Supplement and its influence on feed utilization in fishes, Current biotica., 2(2), 2008, 212-219.

[10] Micha JC, Antoine T, Van Wery P and Hove C, Growth, ingestion capacity, comparative appetency and biochemical composition of Oreochromis niloticus and Tilapia rendalli fed with Azolla, In: IInd International Symposium on Tilapia in Aquaculture, ICLARM Conference. Proceedings, 15, Manilla, Philippines,1988, 347-355.

[11] Walsh JP, Effect of feeding on composition of cows milk in late winter early spring, Irish Journal of Agriculture Research, 8, 1969, 319-327.

[12] Gibson JP, The options and prospects for genetically altering milk composition in dairy cattle, Animal Breeding Abstracts, 55 (4), 1987, 232-242.