ISSN: 2224-0616
Int. J. Agril. Res. Innov. & Tech. 3 (2): 49-53, December, 2013 Available online at http://www.ijarit.webs.com

STUDY ON EXISTING NUTRITIONAL CONDITION OF PERI-URBAN DAIRIES AT CHITTAGONG, BANGLADESH

M. Hasanuzzaman[1]*, M. Ahaduzzaman[2] and M.R. Begum[3]

Received 16 September 2013, Revised 15 December 2013, Accepted 25 December 2013, Published online 31 December 2013

Abstract

The study was aimed to observe the nutritive value of concentrate used in different dairy farms at peri-urban areas of Chittagong, Bangladesh. Ten (10) different concentrate feeds were randomly selected from ten different farms which analyzed for moisture, dry matter (DM), crude protein (CP), crude fiber (CF), nitrogen free extracts (NFE), ether extracts (EE), total ash (TA) and acid insoluble ash (AIA) and requirements of concentrate for unit production of milk was calculated. It was found that the nutritive value of individual feed concentrate of each farm varied significantly. The observed proportion of using feed ingredients was also significantly different among the farms. Finally, it may be summarized that the concentrate mixture used by the different farmers of peri-urban areas of Chittagong was different in regards to chemical composition, ingredients and amount required for milk production.

Keywords: Peri-urban Dairies, Concentrate Feed, Proximate, Milk Production

[1]Department of Animal Science and Nutrition, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh
[2]Department of Medicine and Surgery, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh
[3]Department of Agricultural Economics and Social Science, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh

*Corresponding author's email: anikzaman@yahoo.com (M. Hasanuzzaman)

Introduction

In Bangladesh, more than 80 per cent of people are involved in rearing nondescript indigenous Zebu-type animals (Khan, 2006) with an average live weight of 150 kg for cows which is 25-30 per cent less than that of Indian Zebu cattle (Jackson, 1981). This poor physical condition and low reproductive performance are mostly due to consumption of insufficient and imbalanced feed (Alam *et al*., 2009) as feed provides the basic nutrients required for production (FAO, 1983). The concentrate mixture used in Bangladesh mainly composed of wheat bran, rice polish, split red lentil bran, split green gram bran, gram chuni, oil cakes, soybean meal, wheat flour etc. Maize is now somewhat available due to an increase in production in recent years. (Khaleduzzaman and Khandaker, 2009). Therefore, farmers can supply dairy cows with crushed maize in addition to rice polish, wheat bran and oil cakes (Kamal *et al.,* 2009). A method for the quantitative analysis of macronutrients is the Weende or proximate analysis, based on the Weende analysis that was developed in 1860 by Henneberg and Stohmann in Germany (Henneberg and Stohman, 1860). Some researchers estimated the different feed ingredients and evaluated the effect of concentrates requirement on milk yield in cows. Sen and Ray (1971) found 10.55, 1.90, 4.39, 80.66 and 1.94 per cent for crude protein (CP), crude fiber (CF), ether extract (EE), nitrogen free extract (NFE) and total ash (TA) in maize respectively. Shama (2011) reported the CP, CF, EE and TA to be 38.50, 5.40, 2.10 and 7.54 per cent, respectively in soya flakes. Chinedu and Nwinyi (2012) estimated that moisture, protein, fat, ash, crude fiber and total carbohydrates of Bambara groundnut (*Voadzeia subterranean*) were 2.86±0.02%, 32.40±0.02%, 7.35± 0.02%, 5.78±0.02%, 2.68±0.02% and 51.78±0.02% where its amount in African yam beans (*Sphenostylis stenocarpa*) were 1.96± 0.02%, 37.21±0.02%, 9.49±0.02%, 5.35±0.02%, 3.55±0.02% and 44.4±0.02%, respectively. The effect of feeding maize-based concentrates on milk yield in cows with cost-benefit analysis was done by Kamal *et al*. (2009) at smallholder farms in four districts of northern Bangladesh.

There is scant information regarding the proportion of ingredients in concentrate feeds and nutritional demand of cows for the milk production at peri-urban level. Many feed manufacturing companies are preparing concentrate feed mixtures and supplying large dairy farmers, but smallholders are unable to buy because of its high prices (Kamal *et al*., 2009). So, it is very important to follow the proper feedingmanagement of dairy cows including the

use of ingredients of optimum nutritive value and standard proportion for better outcome. Therefore, the present study was carried out to determine nutritive value of concentrate feed using in different farms and amount of concentrate feed offered in relation to milk production.

Materials and Methods

***Selection of farms*:** Ten dairy farms were selected from peri-urban areas of Chittagong district based on good transportation facilities from where ten concentrate mixture samples, one from each farm, were collected.

***Sample collection*:** Approximately 500 grams of sample was collected from each farm, wrapped up by polythene bag and preserved in the laboratory for chemical analysis. Samples were subjected to grind to make it homogenous powder. Later on, it was mixed properly and exposed to shade to cool down for better sampling.

***Sample analysis*:** The experimental samples were subjected to proximate analysis for moisture, dry matter (DM), crude protein (CP), crude fiber (CF), ether extracts (EE), total ash (TA), nitrogen free extract (NFE) and acid insoluble ash (AIA) following the method described by the Association of Official Analytical Chemist (AOAC, 2005) where all analysis were done in triplicates.

***Data analysis*:** Descriptive statistics were used to determine different concentration of feed ratio of chemical composition in different farms after that one sample t-test was used to determine any significant difference in different concentration of feed of chemical analysis by using in different farms. Percentage distribution was used to determine ingredients used in different farms and χ^2 test were used to test of significance of using observed proportion of different ingredients. Statistical packages SPSS 16.0, R 2.14.0 was used during analysis and 5% level of significance was considered.

Results and Discussion

Chemical composition of different dairy farms concentration of Mean±SE was given in Table 1. It was observed that maximum 8.70% moisture was found in F2 followed by F4 makes up 8.50% whereas minimum 7.20% in F6, and dry matter ranges from 91.30% in F2 to 93.40% in F7. In case of crude protein observed highest 14.70% in F6 followed by 14.35% in F1 whereas only 7.18% in F3 and crude fiber of F2 was maximum 18.0% and minimum 9.50% in F10. The highest and lowest percent values of EE, TA, NFE and AIA were 7.10 and 2.00 in F10 and F1, 10.92 and 4.23 in F8 and F1, 67.87 and 48.65 in F3 and F6, and 7.93 and 2.63 in F7 and F3, respectively. This varying quality may be due to difference in production, preservation and storage of the ingredients. A graphical plot was given in Fig. 1 regarding to different nutritive value ration.

Table 1. Chemical composition of different dairy farms concentrate feed rations (%DMB)

Farm	Moisture	DM	CP	CF	EE	TA	NFE	AIA
F1	7.20±0.04	92.80±0.16	14.35±0.15	17.5±0.05	2.00±0.57	4.23±0.01	61.92±1.70	3.31±0.07
F2	8.70±0.32	91.30±0.17	13.82±0.23	18.0±0.57	5.00±0.32	5.95±0.09	57.23±0.99	5.20±0.05
F3	7.00±0.33	93.00±0.07	7.18±0.58	11.5±0.05	4.90±0.66	8.55±0.23	67.87±0.54	2.63±0.90
F4	8.50±0.60	91.50±0.00	11.72±0.33	13.5±0.05	2.90±0.59	8.78±0.75	63.10±1.11	4.05±0.55
F5	7.50±0.04	92.50±0.01	11.90±0.58	16.0±0.73	5.00±1.34	9.89±0.88	57.21±0.32	2.75±0.00
F6	7.20±0.04	92.80±0.23	14.70±0.84	14.5±0.48	6.70±0.97	15.45±1.98	48.65±2.02	3.37±0.32
F7	6.60±0.37	93.40±0.32	12.25±1.34	12.0±0.10	4.10±0.02	10.68±0.77	60.97±0.72	7.93±0.98
F8	7.40±0.19	92.60±0.34	12.30±0.67	13.0±2.66	5.10±0.67	10.92±0.03	58.68±1.03	4.51±0.56
F9	7.40±1.65	92.60±0.54	11.38±0.65	12.5±0.10	6.90±0.08	6.51±0.65	62.71±0.04	5.17±0.74
F10	6.80±0.05	93.20±0.78	12.60±0.76	9.50±0.76	7.10±0.77	6.77±0.44	64.03±0.07	5.56±0.41

Table 2 represents the single mean t test of significance of chemical composition of different dairy farms where every concentration mean of nutritive value was significantly different from zero in every dairy farm. Anderson-Darling (AD) for normality test proved that the data were sampled was normally distributed (all p-values<0.05) and graphs of normal probability plot was shown in Fig. 2, in every graph the points roughly follow the fitted line. An index plot was portrayed in Fig.3, all graphs didn't exhibit obvious trend or pattern indicate that the samples were independent.

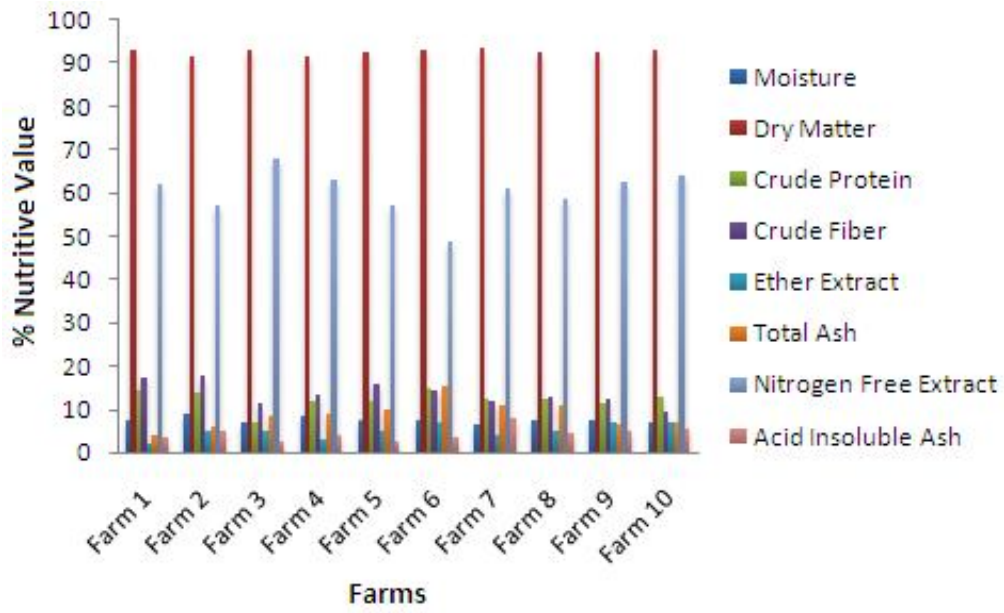

Fig 1. Percent of nutritive value of concentration using in different farms

Table 1. Test of significance of single mean of chemical composition of different dairy farms

Concentration	Mean	SD	SE	95% CI	T	P	AD (P-value)
Moisture	7.43	0.68	0.21	(6.94, 7.92)	34.64	<0.01	0.086
Dry matter	92.57	0.68	0.21	(92.08, 93.06)	431.56	<0.01	0.086
Crude Protein	12.22	2.10	0.67	(10.71, 13.73)	18.36	<0.01	0.079
Crude Fiber	13.8	2.71	0.86	(11.86, 15.74)	16.1	<0.01	0.789
Ether Extract	4.97	1.67	0.53	(3.77, 6.17)	9.4	<0.01	0.353
Nitrogen Free Extract	60.24	5.22	1.65	(56.50, 63.97)	36.49	<0.01	0.336
Total Ash	8.77	3.19	1.01	(6.49, 11.06)	8.68	<0.01	0.670
Acid Insoluble Ash	4.45	1.61	0.51	(3.30, 5.60)	8.75	<0.01	0.417

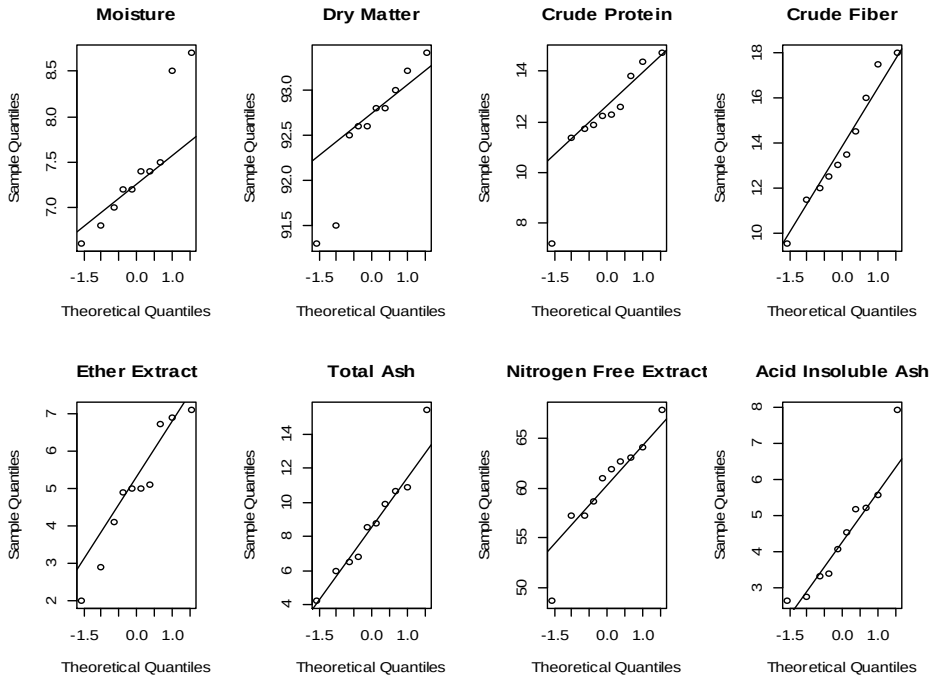

Fig. 2. Normal Probability Plot (Q-Q plot) of different concentration in different dairy farms

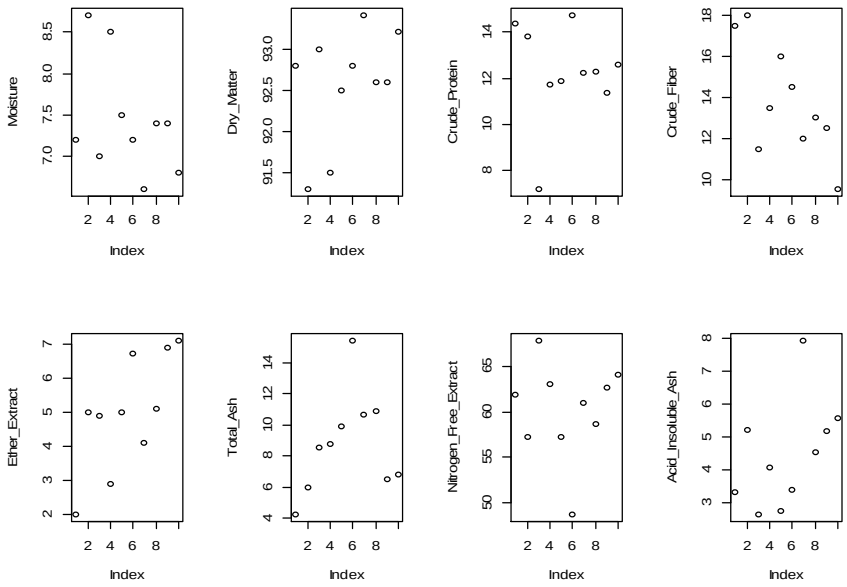

Fig. 3. Time series plot of different concentration of different farms against index

Table 3 represents distribution of dairy farms based on using different ingredients in the feed where 100, 90, 80, 60, 40, 20 and 10 percent farm used wheat bran; rice polish and mug powder; mosur hulls and maize; pea bran and oil cake; chirakura and soyabean; gram chuni, broken pea and vitamin mineral premix (VMP); and jaur, respectively. A chi-square (χ^2) test was used to examine the equality of observed proportions for using number ingredients in different farms. The result observed that there were significant difference among the observed proportion for using ingredients (Chi-square, $\chi^2 = 58.78$; p-value<0.01). The difference is due to the availability, economic and production status of the farm.

Table 3. Percentage distribution of farms regarding to use ingredients

Ingredients	Wheat bran	Pea bran	Rice polish	Jaur	Mosur hulls	Gram chuni	Broken maize	Broken pea	Chira Kura	Mug powder	Oil cake	Flour	Soybean	V.M.P.
Used	10	6	9	1	8	2	8	2	4	9	6	5	4	2
Not used	0	4	1	9	2	8	2	8	6	1	4	5	6	8
Percent	100	60	90	10	80	20	80	20	40	90	60	50	40	20

Table 4 provides the amount of concentrate feed offered in individual farm concerning milk production, which was similar in F1, F2, F5, F9 and F10 as they offered 1.0 kg concentrate for 1kg milk. Farm F6 provided 1.0 kg concentrate feed for 1.3 kg of milk production whereas for 1.0 kg concentrates the output was 1.4.1.8 and 2.5 kg for F7 and F8, F3 and F4, respectively. The amount of feed offered in relation to milk production varied may be due to difference in nutritional values of feed ingredients in ration.

Table 4**.** Amount of concentrate feed offered in individual farm in regard to milk production

Farms	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Milk : Concentrate feed	1:1	1:1	1.8:1	2.5:1	1:1	1.3:1	1.4:1	1.4:1	1:1	1:1

Conclusion

From this study, it was evident that nutritive status of different farms in the study area varied in composition, ingredients of feed and their amount required for unit milk production, which hampered the productive performances of cows.

Acknowledgement

The authors heartily acknowledge the positive help and endless support of CVASU.

References

AOAC. 2005. Official Methods of Analysis. 18th edition, Association of Official Analytical Chemist, Washington DC, USA. pp: 868-278.

Alam, M.G.S., Rahman, M.A., Khatun, M. and Ahmed, J.U. 2009. Feed supplementation and weight change, milk yield and post-partum estrus in Desi cows. *The Bangladesh Veterinarian.* 26 (2): 39-47.

Chinedu, S.N. and Nwinyi, C.O. 2012. Proximate analysis of *Sphenostylis stenocarpa* and *Voadzeia subterranean* consumed in South-Eastern Nigeria. *J. Agril. Ext. & Rural Dev.* 4 (3): 57-62.

FAO. 1983. Interactions between Livestock Production Systems and the Environment - Impact*(www.fao.org/wairdocs/lead/x6123e/x6123e04.htm).*

Henneberg, W. and Stohman, F. 1860. Begründung einer rationellen Ftterung der Wiederkäuer. Vol. 1. Schwetschtke u. Sohn, Braunschweig, Germany.

Jackson, M.G. 1981. Evolving a strategy for maximum livestock production on minimum lands. p. 15. In: Proc. of Seminar held in Bangladesh Agricultural University, Mymensingh, February 22-24, Bangladesh.

Kamal, M.M., Iqbal, D.M.H. and Khaleduzzaman, A.B.M. 2009. Supplementation of maize-based concentrates and milk production in indigenous cows. *The Bangladesh Veterinarian.* 26 (2): 48-53.

Khaleduzzaman, A.B.M. and Khandaker, Z.H. 2009. Commercial feed production and quality control: Present status and future prospects in Bangladesh. pp. 12-15. *In:* Proc. of the 6th International Poultry Show and Seminar, WPSA-BB, Dhaka, Bangladesh.

Khan, M.S. 2006. Community Extension Workers Training Guide, Participatory Livestock Development Project (PLDP), Department of Livestock Services, Dhaka, Bangladesh. pp. 11-12.

Sen, K.C. and Ray, S.N. 1971. Nutritive values of Indian cattle feeds and the feeding of farm animals. ICAR, New Delhi. pp. 67-69.

Shama, S. 2011. Effects of probiotics suppleme.ntation on the utilization of Seabuckthorn cake in broiler production. MVSc Thesis. Department of Animal Nutrition, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, HP, India. pp. 15-22.