Vol. XIII (2), 1976.

A COMPARATIVE STUDY OF COLOSTRUM OF BUFFALO AND COW

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A comparative study of the composition of buffalo and cow colostrum was made on seven hundred samples obtained from 25 animals of each of the two species. Compared to that of cow, the buffalo colostrum contained more fat, protein, S.N.F. and ash. Lactose content was, however, higher in the cow colostrum. The values for these constituents, on an average, ranged from 8.3–4.8, 17.36–4.84, 17.88–9.56 and 1.56–0.72 in buffalo and from 6.1–3.8, 16.20–4.00, 18.66–8.18 and 0.84–0.58 in cow, respectively. In both the species a progressive fall was noticeable in all the constituents except lactose which with the passage of time showed a gradual increase. Average values for lactose were 3.26–4.89 and 3.83–5.23 per cent in buffalo and cow, respectively. The buffalo colostrum changed to normal milk earlier than that of cow.

INTRODUCTION

Colostrum is the fluid secreted by the mammary glands of the mammalia as food for their youngones during the first few days after parturition. The chemical composition of colostrum assumes importance because during the first few days of life, it is the sole food for the new born The new born animal is particularly susceptible to infection since it lacks antibodies because of the failure of these substances to pass the placental barrier during prenatal life. The youngones during their early life are incapable of developing active immunity against infectious diseases. To combat the invading organisms during this period, nature has provided them with prepared antibodies contained in the colostral secretion.

Detailed studies on the composition of colostrum in cows, particularly in European breeds, have been carried out in several countries. However, the information on the composition of buffalo colostrum and even in case of indigenous cattle breeds is very scanty. Therefore, a comparative study was planned to explore the composition of colostrum in buffalo and cow and to determine the time required after parturition for transition from colostrum to normal milk.

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REVIEW OF LITERATURE

Parrish *et al.* (1950) studied changes in mammary secretion collected from dairy cows during transitory period from colostrum to normal milk. In most cases colostrum contatined more nutrients than did milk. Minerals and sometimes fat, solids-not-fat (SNF), total protein and ash decreased rapidly during the first four to six milkings but only small decrease was noted throughout the remainder of the 14 days of study. Lactose changed in approximately an inverse ratio to the aforementioned constituents.

Rook (1961) found that during the first few milkings after calving, the mammary secretion showed a very high total solids content, which fell rapidly at first and more steadily later to a minimum at about six weeks and then increased steadily later until the end of lactation. Ghosh and Anantakrishnan (1964) reported that all the constituents and particularly globulin content of colostrum were high as compared to those of normal milk The time required for the colostrum to attain normalcy was shorter in case of buffaloes as compared to that of cows.

MATERIALS AND METHODS

Seven hundred samples of colostrum were obtained from 25 buffaloes and 25 cows during the period from January to June, 1974. Fourteen samples were taken from each animal (one each from the morning and evening milkings) during the week following partutition. The samples were analysed the same day for determining the percentage of fat, protein, SNF, lactose and ash. These determinations except those for SNF, were made according to AOAC (1970) methods, whereas, SNF was determined by the method of Golding (1957).

RESULTS AND DISCUSSION

The average per cent composition of colostrum of buffaloes and cows is given in Table 1. The mean values for percentage of fat, protein, lactose, ash and SNF in buffalo and cow colostrum during the first week after partutition were observed to be 6.33, 4.95, 9.69, 8.38; 4.09, 5.47; 0.94, 0.69; 11.91 and 11.15, respectively. The colostrum of cows had significantly lower percentage of fat than that of buffaloes.

This appeared to be due to greater genetic potential for fat production in this species. It was observed that species, animals and days significantly affected the fat content Table (2).

TABLE 1. *Average per cent composition of colostrum in buffalo and cow*

Species	Days	Fat	Protein	Lactose	Ash	SNF
Buffaloes						
	1.	8.3±0.80	17.36±0.73	3.26±0.89	1.56±0.13	17.88±3.90
	2.	7.8±1.88	15.63±2.10	3.57±0.64	1.03±0.37	13.87±4.53
	3.	6.7±1.46	11.56±1.03	3.86±1.95	0.90±2.13	11.93±4.52
	4.	6.0±1.18	6.65±0.17	4.08±0.92	0.85±1.18	10.34±1.94
	5.	5.5±1.13	5.88±0.43	4.34±0.84	0.80±3.55	10.05±1.09
	6.	5.2±1.40	5.54±1.19	4.65±0.79	0.76±0.79	9.72±1.53
	7.	4.8±1.61	4.84±1.24	4.89±1.10	0.72±1.32	9.56±1.19
Cows						
	1.	6.1±0.80	16.20±1.04	3.83±0.64	0.84±0.24	18.66±2.82
	2.	5.7±0.73	13.24±4.71	4.12±0.81	0.77±0.27	13.07±4.44
	3.	5.4±0.76	9.39±4.29	4.52±0.87	0.72±0.14	10.40±1.76
	4.	4.9±0.54	6.32±3.40	4.93±0.96	0.68±0.19	9.67±2.10
	5.	4.4±0.51	5.05±1.40	5.12±0.86	0.05±0.16	8.32±6.08
	6.	6.1±0.61	4.48±1.64	5.21±1.33	0.61±0.40	8.72±4.47
	7.	3.8±0.93	4.00±1.14	5.23±1.81	0.58±0.11	8.18±6.71

TABLE 2 *Analysis of variance of data showing effect of species, animals and days on different colostrum constituents in cow and buffalo.*

Source of variation	Degree of freedom	Mean squares of Fat %	Protein %	Lactose %	Ash %	SNF %
Species (S)	1	325.1700	300.0500	65.9200	10.8000	96.9800
Animals (A)	24	3.0000	8.6300	1.2800	0.0900	10.2200
Days (D)	6	118.6500	2405.0000	31.7800	3.5500	1127.0300
AS	24	1.6800	6.5600	0.9400	0.0900	8.3300
SD	6	3.4700	9.8100	0.7100	0.01NS	13.7200
AD	144	.2600	4.8100	0.02NS	1.1100	4.1100
ASD	144	.2500	.4600	0.02NS	0.02NS	0.62NS
Error	350	.0700	.4500	0.04	0.02	0.76

00 = Highly significant
NS = Non-significant

The percentage of protein in the colostrum of buffalo and cow registered a steep fall from the first day after calving to the 7th day. About 60 per cent decline in protein content had occured by 4th day after

parturition in both the species. However, a comparatively gradual decline continued later on as well. Ghosh and Anantakrishnan (1964) also reported similar findings. Percentage of protein in the colostrum of buffalo and cow was highly significantly affected by species, animals and days (Table 2). The animals produced significantly less lactose on the first day with a gradual but constant increase later.

It was noted that cows had significantly lower ash percentage than buffaloes. The results indicated that this capability depended more upon the genetic potential of the animals than on the environmental factors. There was a rapid and significant decrease in percentage of ash in colostrum with the passage of time and this observation closely coincided with the findings of Parrish *et al.* (1950). The analysis of variance revealed that species, animals and days had highly significant effect on percentage of ash.

The S.N.F. in buffalo colostrum was found to be higher as compared to that of cow colostrum. Both the species produced higher S.N.F. percentage on the first day of milking and there was a gradual decrease thereafter. The analysis of variance revealed that S.N.F. content in colostrum of both the species was highly significantly affected by species, animals and days (Table 2). It was noted that as the composition of colostrum changed towards normal milk, the percentage of total solids in cow as well as buffalo colostrum gradually declined. The composition of colostrum began to change towards normal milk by 5th and 6th days in buffalo and cow, respectively.

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