THE COMPOSITION OF INDIAN COWS AND BUFFALOES' MILK.

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INFORMATION as to the composition of Indian cows and buffaloes' milk will doubtless be of interest to members of the Society of Public Analysts, and I submit now the following results of analyses made by myself. I may mention that an idea had become current in India that the milk of Indian cows is different in composition to that of European cows, and accordingly complete analyses were in each case made. As to the composition of buffaloes' milk, no reliable information existed previously.

In Table I. are given analyses of milking from a number of cows at the Poona Dairy Farm (Bombay Presidency), and in Table II. similar information regarding milk from cows of the Saidapet herd (Madras). Table III. exhibits the composition of buffaloes' milk (Poona herd).

Firstly, as to Indian cows' milk. It is found to differ in no essential particulars from that met with in Europe. The relations existing between the specific gravity, the solids-not-fat, and the fat agree well in all cases with those which Richmond and others have found in the case of milks from English cows. So also, as shown in Table IV., the relationship between the milk-sugar, the proteids, and the mineral matter agrees well with the proportions 13 : 9 : 2. The percentage of butter-fat is high, varying from 4 to 6. Indian cows' milk is invariably very nearly white and the butter very pale yellow, unless coloured artificially.

Secondly, as to buffaloes' milk. It will be seen that the majority of the samples analysed are characterized by an extraordinarily high proportion of butter-fat, 7 and 8 per cent. being common, and in one case close on 10 per cent. of fat was found. Buffaloes' milk is white and the butter is also usually quite white.

As will be seen from Table III., the relation existing between the specific gravity, the solids-not-fat, and the fat is the same as for cows' milk, the solids-not-fat, when calculated by Richmond's formula, agreeing well with those found by analysis.

The percentage of proteids in buffaloes' milk is distinctly higher than in cows' milk, and varies from 3.5 to 4.3 per cent. The percentages of milk-sugar and mineral matter correspond very closely with those of cows' milk. On the other hand, the relationship between these three ingredients is not the same as for cows' milk. In one particular sample (that of the mixed milk of the herd) the percentage of proteids was higher than I found in most of the individual milks; but this does not materially alter the fact. If one takes the mean figures, the relationship works out to about 10 : 12 : 2. It is probable that the proportion of proteids is necessarily higher in a milk containing so much butter-fat, in order that the albuminoid ratio may be maintained.

TABLE I.—COMPOSITION OF INDIAN COWS' MILK. POONA HERD (BOMBAY), 1899.

	Janki, March 1.	Sind Cows.							Half- bred Deccani- Kalyani, 31/1/99.	Aden Cows.		Aden- Sind Yam- meni, 4/2/99.	Aver- age Milk of Cows, 6/2/99.	Aver- age Milk of Cows, 28/2/99.
		Janki, 24/1/99.	Sama- rath, 25/1/99.	Sama- rath, 26/1/99.	Sama- rath, 27/1/99.	Sunda, 29/1/99.	Sabin, 30/1/99.	Bhawa, 1/2/99.		Ner- mada, 2/2/99.	Kar- angi, 3/2/99.			
Water...	87.35	87.51	85.76	85.88	85.67	86.82	84.72	85.27	84.89	86.68	87.27	86.02	86.35	86.32
Fat ...	3.46	3.65	4.89	4.88	5.20	4.10	6.11	5.59	5.77	4.43	4.28	4.64	4.75	4.91
Proteids	3.65	3.16	3.68	3.61	3.54	3.14	3.62	3.55	3.89	3.06	2.76	3.35	3.31	3.33
Milk- sugar..	4.88	4.65	4.37	4.56	4.56	4.58	4.13	4.65	4.04	4.85	4.80	4.86	4.63	4.58
Mineral matter	0.72	0.68	0.71	0.78	0.86	0.69	0.77	0.67	0.74	0.69	0.66	0.83	0.70	0.73
	100.06	99.65	99.41	99.71	99.83	99.33	99.35	99.73	99.33	99.71	99.77	99.70	99.74	99.07
Solids- not-fat	9.19	8.84	9.35	9.24	9.13	9.08	9.17	9.14	9.34	8.89	8.45	9.34	8.90	8.77

TABLE II.—COMPOSITION OF COWS' MILK. SAIDAPET HERD (MADRAS), 1900.

	Average Milk of Herd, 29/3/00.	Average Milk of Herd, 4/4/00.	Average Milk of Herd, 7/4/00.	Baggeon II., 28/3/00.	Govindi, 2/4/00.	Parvati, 3/4/00.	Manachu II., 5/4/00.	Poongan, 6/4/00.	Manachu III., 9/4/00.
Water ...	86.27	86.87	85.97	86.14	85.52	84.48	86.13	86.98	86.08
Fat ...	4.00	4.14	4.68	4.41	5.48	6.07	4.57	3.52	4.62
Proteids ...	3.15	3.16	3.23	3.23	3.14	3.27	3.44	3.27	3.25
Milk-sugar ...	4.82	4.81	4.92	5.03	4.68	4.66	4.56	4.96	5.05
Mineral matter ...	0.76	0.74	0.72	0.76	0.70	0.72	0.77	0.75	0.77
	99.00	99.72	99.52	99.59	99.52	99.20	99.47	99.48	99.77
Solids-not-fat ...	9.73	8.99	9.35	9.45	9.00	9.45	9.30	9.50	9.30
Specific gravity at 15.5° C. ...	1033.50	1032.0	1032.0	1033.0	1031.0	1033.0	1032.0	1034.0	1033.0
Solids-not-fat calcu- lated by Rich- mond's formula	9.32	8.97	9.08	9.27	8.99	9.60	9.05	9.34	9.31

TABLE III.—INDIAN BUFFALOES' MILK. POONA HERD (BOMBAY).

	Jaffarabadis.				Suratis.		
	Nevasi, 6/2/99.	Nevasi, 13/2/99.	Champa, 7/2/99.	Thami, 10/2/99.	Kevada, 8/2/99.	Phonga, 9/2/99.	Mangel, 11/2/99.
Water ...	86.43	85.09	82.84	84.05	82.63	83.38	81.74
Fat ...	4.08	5.78	7.32	6.89	7.74	6.86	8.66
Proteids ...	3.29	3.24	4.36	3.53	3.75	3.99	4.32
Milk-sugar ...	5.12	5.09	4.42	4.70	4.94	4.70	4.66
Mineral matter ...	0.80	0.68	0.75	0.82	0.68	0.72	0.80
	99.72	99.88	99.69	99.99	99.74	99.65	100.18
Solids-not-fat ...	9.49	9.13	9.06	9.63	9.63	9.76	9.60

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TABLE IV.

	Nevasi, 28/2/99.	Gaura, 2/3/99.	Jama- dar, 3/3/99.	Kaoli, 3/3/99.	Bhadra, 4/3/99.	Asman, 4/3/99.	Gulab, 6/3/99.	Mixed Milk of Kirkee Buffa- loes.	Rekhmi, 6/3/99.	Avadi, 7/3/99.	Chandi, 7/3/99.
Water	85.78	82.16	80.16	81.57	82.89	81.15	82.63	82.22	82.74	82.52	83.23
Fat	5.17	8.14	9.95	8.79	7.56	8.81	7.59	8.09	7.42	7.52	6.95
Proteids	3.31	4.33	4.04	3.86	3.62	4.31	4.39	4.34	3.91	3.89	3.89
Milk-sugar	4.97	4.27	4.58	4.66	4.87	4.61	4.89	4.56	4.65	4.60	4.67
Mineral matter	0.70	0.77	0.79	0.71	0.71	0.76	0.73	0.76	0.81	0.80	0.75
	99.93	99.67	99.52	99.59	99.65	99.64	100.23	99.97	99.53	99.33	99.49
Solids-not-fat ...	9.05	9.70	9.89	9.64	9.55	10.04	9.78	9.69	9.84	9.96	9.84
Specific gravity at 15.5° C. ...	1034.5	1032.1	1031.2	1032.0	1032.9	1032.9	1032.7	1032.1	1034.3	1033.8	1033.9
Solids-not-fat, calculated by Richmond's formula ...	9.79	9.79	9.93	9.90	9.87	10.12	9.83	9.78	10.19	10.09	10.00