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Composition of the Milk of the Monkey (*M. mulatta*).

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Apart from the observations of Schumacher¹ on the Orang-utan, we have found no data in the literature relative to the composition of milk in the infrahuman primates. We present here a summary of some analyses made by one of us (H. E. H.) on milk samples taken from 4 monkeys (I-IV) during 1936-37, and from another group of 5 monkeys (V-IX) during 1938-39.

Methods. The babies were removed from their mothers 4 hours prior to collection of the sample. Milk was expressed by hand, particular care being taken to avoid traumatic changes in the nipples. Usually 4 to 8 cc of milk could be obtained. Samples were taken after lactation had become well established. In monkey V, specimens were obtained between the 35th and 50th day; in monkey VII, between the 61st and 103rd day, and in monkey VIII, between the 44th and 75th day. During these intervals, at least, no systematic changes were observed in the percentages of the principal milk constituents, or in the calorific values ascribable to them. Results on the two groups of animals are presented in Tables I and II.

TABLE I.
Composition of Monkey Milk (H.E.H. data).

Monkey No.	Protein ¹		Fat ²		Carbohydrate ³	
	Average %	% Calories	Average %	% Calories	Average %	% Calories
I	(7)* 3.56	18	(11) 4.58	53	(5) 5.62	29
II	(6) 2.64	10	(16) 7.65	66	(7) 6.14	24
III	(6) 1.51	10	(6) 3.44	50	(4) 6.34	40
IV	(5) 1.77	12	(4) 2.51	39	(1) 7.10	49

¹Micro Kjeldahl method. ²Man and Gildea method. ³Hydrolyzed with HCl: Hagedorn and Jensen method.

*Figures in parentheses refer to the number of samples analyzed.

* The monkey colony which is maintained for the study of reproductive physiology in the laboratory of the Department of Obstetrics and Gynecology at New Haven has been supported by grants from the Fluid Research Fund of the Yale University School of Medicine and by the John and Mary R. Markle Foundation.

¹ Schumacher, H. M., *Z. Kinderheilk.*, 1934, **56**, 415.

TABLE II.
Composition of Monkey Milk (H.R.C. data).

Monkey No.	Protein†		Fat‡		Carbohydrate§		Specific gravity	Ash %
	Average %	% Calories	Average %	% Calories	Average %	% Calories		
V	(10)* 2.60	14.5	(10) 4.50	56.0	(10) 5.45	29.5	(5) 1.010	(5) .27
VI	(1) 1.45	15.0	(1) 2.45	56.5	(1) 2.80	28.5		
VII	(3) 1.77	11.8	(3) 3.27	48.5	(3) 6.20	39.8	(3) 1.019	(3) .26
VIII	(3) 2.05	14.9	(3) 2.40	39.6	(3) 6.31	45.5	(3) 1.024	(3) .25
IX	(1) 1.45	8.1	(1) 4.34	54.0	(1) 7.01	38.0		

†Semi-micro-Kjeldahl, Hitchcock and Belden² (nitrogen:protein = 1:6.37). Average of duplicates. ‡Meigs' method. §Benedict's method applied to cleared filtrate. Duplicates.

*Figures in parentheses refer to the number of samples analyzed.

Discussion. Protein. In the first group of animals, monkey I showed a high milk protein value, which represented 18% of the total calories of the milk. This does not appear to be a typical finding. All other animals in this group showed caloric percentages for protein of 10-12, which approximates closer to the human figure (9%) than to that typical of the cow (22%). Further, the second group of results definitely confirmed the impression that the protein of monkey milk both in absolute (1.45-2.60%) and in caloric (8.1-15.0%) percentages tends rather toward the values recorded for man and the orang.

Carbohydrate. The sugar content of monkey milk is some 25% higher than that of cow's milk and approximates closely that of man and the orang. In caloric percentage attributable to carbohydrate, monkey milk lies intermediate between that of man and cow.

Ash. Monkey milk resembles human in its low ash content (0.26%) as compared with that of the cow (0.6-0.7%).

Average values for the group of 9 animals give: protein 2.1%, carbohydrate 5.9%, fat 3.9%. The corresponding caloric values are 12.6%, 34.7%, 52.8%. As an expedient for feeding valuable monkey babies unable to suckle their mothers for any reason, cow's milk must be modified in the same general direction as for human infant feeding. Practically, 2 oz water and 4.1 g sucrose (level teaspoon) are added to 4 oz cow's milk. Protein and ash are thus reduced in amount and calories ascribable to carbohydrate are increased.

Summary. 1. Monkey's milk tends toward that of the human in composition and differs from cow's milk in having a lower percentage of protein and ash and a higher percentage of milk sugar. 2. A modification of cow's milk for infant monkey (*M. mulatta*) feeding is described.