

MILK COMPOSITION OF THE BONGO ANTELOPE (*TRAGELAPHUS EURYCERUS*) THROUGH LACTATION

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Abstract

Bongo antelopes (*Tragelaphus eurycerus*) are a species of antelope that originate from Africa. The gestation length is about 285 days. Bongo antelope calves weigh about 20 kg when born. Adult females weigh between 210-230 kg, while adult males weigh 240-270 kg. Young reach sexual maturity when approximately two years old. The milk samples used in this study were part of the Smithsonian National Zoological Park's Milk Repository and had been stored at -20°C since collection. For this study 23 bongo antelope (*Tragelaphus eurycerus*) milk samples from two individuals over three lactations were analyzed. Milk samples were analyzed from day six post-partum through day 300 post-partum. Samples were assayed for dry matter (DM), fat, sugar, crude protein (CP), ash, calcium, phosphorus, and gross energy using standard methods that have been validated at the Nutrition Laboratory of the Smithsonian National Zoological Park and performed on milks from about 200 species of mammals. Gross energy was calculated using the formula: $9.11 * \text{fat} + 3.95 * \text{sugar} + 5.86 * \text{CP}$.⁴ Gross energy was also directly measured on 13 samples by adiabatic bomb calorimetry.

Bongo antelope milk has 27.3% dry matter, 11.2% fat, 3.6% sugar, 10.8% crude protein, 1.1% ash, 0.26% calcium, 0.16% phosphorus, a calcium to phosphorus ratio of 1.81, and a gross energy of 1.8 kcal/g milk. There was very little change in the nutrient composition over the lactation period with the exception of the last sample (day 300 post-partum) which was excluded from the results. The calculated gross energy of 13 bongo antelope milk samples were highly correlated ($r = 0.972$, $p < 0.0001$) with gross energy determined by adiabatic bomb calorimetry. A paired T-test showed a difference in mean of only 0.09 kcal/g milk, with no significant differences between the two methods ($p = 0.115$). The nutrient composition of bongo antelope milk suggests calves have a fast growth rate. Changes in milk composition from this study suggest weaning actually occurs around 9.5 months of age rather than the commonly cited six months. Previously utilized milk replacer formulas for bongo antelope calves were compared to the nutrient composition of bongo antelope milk. An additional milk replacement formula more closely resembling bongo antelope milk was proposed for use by zoological institutions.

Literature cited

1. Bosley LF. 2003. International Studbook for Bongo Antelope (*Tragelaphus eurycerus isaaci*). Vol. XVIII (18). Fort Worth, TX: Fort Worth Zoo.
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4. Perrin DR. 1958. The calorific value of milk of different species. J Dairy Res 25(2):215-220.

Table 1. Nutrient composition of bongo antelope milk expressed as a percent of total milk compared to previously utilized milk replacement formulas (Bosley LF. 2009. International Studbook for Eastern/Mountain bongo (*Tragelaphus eurycerus isaaci*). Vol. XXIV (24). Portland, OR: The Oregon Zoo) and a proposed milk replacement formula (Formula E) all on an as is basis.

Nutrient	Bongo milk ¹	Formula A ²	Formula B ³	Formula C ⁴	Formula D ⁵	Formula E ⁶
Dry Matter	27.3	20.0	17.4	11.7	9.1	27.7
Protein	10.8	7.5	5.2	3.4	2.7	10.9
Fat	11.2	7.7	7.5	2.6	2.2	12.1
Sugar	3.6	3.9	3.7	5.0	3.6	2.9
Calcium	0.26	0.13	0.19	0.13	0.10	0.34
Phosphorus	0.13	0.11	0.15	0.10	0.08	0.24
Ca:P ratio	2.2	1.2	1.3	1.3	1.3	1.4
GE (kcal/g)	1.8	1.3	1.1	0.6	0.5	1.9

¹ The last bongo antelope milk sample was not included due to significant alterations in the milk nutrient composition compared to the other samples.

² Whole goat's milk : cow's cream : whey protein concentrate : water (w/w, 12:2:1:2)

³ Whole goat's milk : Multimilk (30/55) : water (w/w, 10:1:2)

⁴ Evaporated cow's milk : non-fat cow's milk : water (w/w, 1:1:1)

⁵ Evaporated goat's milk : non-fat cow's milk : water (w/w, 1:1:1)

⁶ Zoologic Milk Matrix (30/52) : Zoologic Milk Matrix (42/25) : water (w/w, 1:1:5)