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Abstract: The maternal milk composition of many wild animals is considerably lower in carbohydrates (lactose) than that found in the domestic counterparts. Milk powders manufactured for domestic animals are generally used as the base ingredient of milk formulas used in zoos and wildlife rehabilitation centers. Many times the milk formula provided contains a higher level of lactose than is found in the maternal milk. Mammals that do not have the lactose enzyme, lactase, have difficulty breaking down the milk sugar for digestion. The undigested particles ferment in the small intestine and allow for the proliferation of potentially pathogenic bacteria. The result is diarrhea and, in severe cases, enteritis.

Hand-rearing Cheetah (*Acinonyx jubatus*) Cubs: Milk Additives

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The maternal milk composition of many wild animals is considerably lower in carbohydrates (lactose) than that found in the domestic counterparts. Milk powders manufactured for domestic animals are generally used as the base ingredient of milk formulas used in zoos and wildlife rehabilitation centers. Many times the milk formula provided contains a higher level of lactose than is found in the maternal milk. Mammals that do not have the lactose enzyme, lactase, have difficulty breaking down the milk sugar for digestion. The undigested particles ferment in the small intestine and allow for the proliferation of potentially pathogenic bacteria. The result is diarrhea and, in severe cases, enteritis (Evans, 1987).

The addition of specific products that either contain lactase or bacteria that produce lactase (e.g. *Lactobacillus*) have been beneficial in assisting the neonate in digesting lactose in the milk formulas. This paper addresses several products available, which may be added to milk formulas, and describes their use and function as they relate to the hand-rearing of captive cheetah cubs.

Milk Additives

Lact-aid® is a product that contains the lactase enzyme. The dose is two drops to 100ml of formula. Lactase will begin breaking down the sugar in the formula and will be effective for 24 hours. Lact-aid® must be added to the formula 24-hours prior to offering it to the cub.

Simethicone is a de-foaming agent that reduces gas build-up in the intestinal tract, a symptom associated with the inability to break down lactose. But this product does not contain lactase, so it doesn't break down the milk sugar. Trade names for simethicone include Gas-X®, Mylicon® (pediatric formula) and Phazyme®.

Lactobacillus spp. is a group of bacteria that produce lactase and digest lactose. It is marketed as "Acidophilus" for humans and Probios® or Bene-bac® for animals. These bacteria live naturally in the gastrointestinal tract of mammals, and help maintain a healthy gut. They also help prevent the proliferation of pathogenic bacteria, such as *E. coli*. (Supplement Watch).

The maternal milk of cheetahs is comparatively low in carbohydrates. As an obligate carnivore, cheetahs obtain their energy source from proteins and fat, not carbohydrates (Bechert, et al., 2002). Diarrhea has been reported in *Panthera* spp. raised on milk formulas high in carbohydrates (Hedberg, 2002). It is a fair assumption that cheetahs also do not digest milk sugars efficiently. Therefore, it would be wise to add one or more products to assist in the breakdown of lactose to prevent gastric upsets, particularly in milk formulas that exceed 3.5% carbohydrates (14.8% DM). Lactaid® is commonly used prophylactically and is readily available. The main drawback of Lactaid® is that it must be added to the milk formula 24 hours in advance of feeding and refrigerated in order to be effective. But when used, it appears to be helpful in preventing the signs associated with lactose-intolerance.

Simethicone may be used to treat a cub with a distended "bloated" abdomen, or added to the formula to prevent the occurrence of a "gassy-stomach". The dose for rabbits with gastrointestinal stasis (ileus) is 67-133mg (1-2ml of pediatric formula) once an hour x 2-3 doses (Krempels, et al., 2000).

The addition of *Lactobacillus* spp. in conjunction with simethicone may be an effective alternative to Lact-aid®, if it is not available. It is unnecessary to add *Lactobacillus* spp. to the milk formula several hours in advance of feeding. The milk is mainly a vehicle for the bacteria to enter the

digestive tract, where it will breakdown lactose into glucose and lactic acid, and the glucose is absorbed into the cells from the small intestine.

Probios[®], a product manufactured for livestock, recommends a dose of 50 million bacteria (5 grams) for newborns of all sizes (lambs and calves). This product does contain vegetable oil (as the binding agent) and sucrose (in very small amounts). If given in too high of dose, it has the potential to loosen the stool, but may be helpful with cubs prone to constipation. The product comes in gel form and packaged in a calibrated syringe. The dose is squirted directly into the mouth of the animal.

Probios[®] is not required every day. The purpose of this product is to ensure there is an adequate population of lactose-consuming bacteria in the gut. They will be self-reproducing, so it is not required that they be completely replenished on a regular basis. A daily dose until the cub is on the full-strength stock milk formula may be advisable, and then every 2-3 days after that until the cub starts consuming solid food. Probios[®] can be discontinued during the weaning process, but given as needed if loose stool/diarrhea occurs.

Bene-bac[®] is a product similar to Probios[®]. It is manufactured by Pet Ag[™] for birds and small animals. It comes in powder and gel forms. The powder form does not contain vegetable oil and may be added directly to the milk formula during preparation. Like Probios[®], it also contains 10 million bacteria/g. Pet Ag's[™] recommendation is to give it every two days from birth until seven days (or first week of hand-rearing) and then once a week until the introduction of solid foods. The dosing of *Lactobacillus* spp. bacteria is more about infusing an adequate number of bacteria into the gut rather than being weight-related, so the product recommendations should be considered reasonable guidelines — more is not necessarily better.

Acidophilus comes in tablet form and may be crushed and added to the milk formula. The dose for humans (adults and children) is one tablet (1 billion bacteria). From personal experience, I have given small mammals (rodents and rabbits) *acidophilus* at the rate of 1/2 - 1 tablet in a batch of formula which lasts 2-3 days and have had no ill effects from that dose. As a general guideline, one-half tablet/cub/day may be adequate. *Acidophilus* works the same way as Probios[®] and Bene-bac[®]. It is just another form, and does not contain vegetable oil or sucrose.

The addition of products that reduce the effects of lactase in lactose-sensitive or -intolerant species may be a beneficial component of the hand-rearing formula. There are a variety of products, each which have pros and cons attached to them. Each individual facility should consider their particular protocol when deciding which product will provide the most benefit to the animals, and then use it consistently to maximize its effects.

References

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www.supplementwatch.com/supatoz/supplement.asp?supplementId=180.

Product List

Gas-X[®]

Novartis[™]

www.novartisconsumerhealth.ca

Lact-aid[®]

McNeil Nutritionals[™]

Ft. Washington, PA

1-800-LACTAID (1-800-522-8243)

www.lactaid.com

Mylicon[®]

Johnson ... Johnson-Merck Consumer Pharmaceuticals[™]

Ft. Washington, PA.

1-800-222-9435

www.mylicon.com

Pet Ag[™]

261 Keyes Ave., Hampshire, IL. 60140

1-800-323-0877/ 1-800-323-6878

www.petag.com

Phazyme[®]

GlaxoSmithKline[™]

www.phazyme.com

Probios[®]

Valley Vet

1118 Pony Express Hwy., Marysville, KS 66508

1-800-419-9524

www.valleyvet.com

*A complete hand-rearing manual is available by request from the author at zoonutrition@msn.com. and will be sent as an electronic document (MS Word).

Cheetah Fast Facts

- The cheetah is the most primitive of all cats, evolving approximately 18 million years ago.
- The name cheetah comes from an Indian (Hindi) word meaning "spotted one." The Swahili word for cheetah is "Duma".
- The cheetah was trained by man for hunting as long as 3000 BC
- Cheetahs were once raced against greyhounds