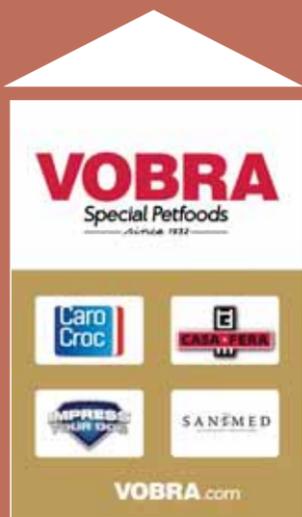




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# Milk for Cats

*During the suckling period, kittens are entirely dependent on the queen's milk. In the absence of a lactating foster queen, orphaned kittens may be hand reared using an appropriate milk replacer. Milk provides nutrients, including lactose, or milk sugar. The kittens' intestine produces lactase, the enzyme that digests lactose, but the capacity falls from birth to weaning.*

*Many cats love to lap up cow milk, but it is generally considered bad practice: lactose in dairy products is indigestible and degraded by gut bacteria, leading to diarrhoea. This one-sided look at lactose intolerance paved the way for lactase-treated, hence lactose-free, cat milk. At the same time, the marketplace offers some dry cat foods featuring lactose-containing milk powder. In those foods, lactose is simply one of the common indigestible, fermentable carbohydrates present at harmless or beneficial concentrations.*

*Research data indicate that adult cats can ingest 6 g of lactose per day without problems, whereas 10 and 16 g causes intermittent and continuous diarrhoea. Six g of lactose corresponds with 130 ml of cow milk. Making allowance for individual sensitivity, 85 ml can be seen as the maximum daily intake not provoking lactose-mediated diarrhoea. This amount must be combined with a base diet that is nutritionally complete. For a 4-kg cat, commercial food and 85 ml milk, providing 77 and 23 percent of its daily calorie requirement, form an adequate ration (1, 2).*

*Food allergy causes skin disorders (itching, self-mutilation) and/or gut problems (vomiting, flatulence, diarrhoea). The risk of milk allergy is very small in cats. In cats, the occurrence of all food-allergic reactions is not more common than in dogs, and would be affecting less than 0.05 percent of the cat population (3), with dairy products accounting for less than 0.01 percent (4).*

## Milk Appetite

It is common knowledge that most well-fed cats enjoy milk. The liking for milk might concern a preserved mechanism that ensured acceptance of queen's milk through palatability of the lactose and/or butterfat constituents. Compared with the solvents alone, cats preferred dilute milk with added lactose and emulsifier-enhanced water with added butterfat (5).

Milk appetite may reflect a conditioned taste preference. Milk drinking in cats is accompanied by electroencephalographic activity indicative of diminished arousal (6-8). That response was also seen in cats with



broth intake, but not during water drinking (7). Alpha-caseozepine, a hydrolysis product of casein from milk, may be anxiolytic, but there is no solid evidence that it reduces stress in cats (9).

Cats' desire for milk is illustrated by the use of milk rewards in some task performance studies (10, 11). Out of 23 foods, only dairy cream and non fat, evaporated milk masked the distaste of bakers' paste colourings (12). In a two-choice test (5), adult cats strongly preferred whole, homogenized, vitamin D fortified milk to the dilute product (20 percent whole milk, 80 percent deionised water).

## Lactose

The disaccharide lactose consists of glucose and galactose joined by a  $\beta$ -(1, 4)-glycosidic linkage. Lactase activity in small intestinal mucosa was high in new born kittens, but group-mean values in kittens aged 6-12 weeks and adult cats were about 90 percent lower (13). Lactose feeding (16 g/MJ metabolizable energy) did not affect lactase activity in adult cats, while some individuals had high intrinsic activity (13).

Lactose (6, 10 or 16 g/MJ) in carbohydrate-free diets had an apparent, total intestinal tract digestibility of almost 100 percent (14, 15), but lowered fecal pH (15), pointing at extensive fermentation in the hindgut. Dietary lactose (6 g/MJ) did not influence postprandial glucose, but brought some lactose, glucose and galactose in urine (16), urinary galactose excretion equaling about 0.4 percent of intake (17).

Cats fed 10 g lactose/MJ had at times diarrhoea (14) while 16 g lactose/MJ induced continuous diarrhoea (15).

Lactose intake at 6 g/MJ did not harm feces quality and allowed appropriate fecal dry matter content (15, 17). For a 4-kg cat, 6 g lactose/MJ corresponds to an intake of 130 ml milk/day or 35 percent of total calories from whole milk.

## Milk Powder

Whole milk powder is obtained by removing water from pasteurized, homogenized, whole milk through evaporation and spray drying processes. In 1962, the US National Academies (18) qualified two formulas as successful stock diets for growing and/or reproducing cats. The diets, apparently not inducing diarrhoea, contain about 40 percent energy dried whole milk (19, 20), or 7 g lactose/MJ.

## Processed Milk

In the 1930s, Pottenger (21) fed cats on a diet consisting of two thirds raw milk, one



third raw meat and some cod liver oil. The milk provided about 40 percent energy. Other cats received either pasteurized, evaporated or sweetened condensed milk. Raw milk in the diet sustained health, but the other milks impaired reproduction and caused various disorders. Supporting data come from a contemporary rat study (22-24).

The description of the cat experiment in abstract form (21) lacks details, but suggests that the applied treatment of milk had generated toxicants and/or had destroyed nutrients, the latter without abatement by the raw meat ingredient. The impact of modern milk processing on feline reproduction and health is unknown.

## All-milk diet

Feeding only unfortified, whole cow milk to cats may cause deficiencies of taurine, iron, zinc, manganese and copper. Skim milk also falls short of essential fatty acids and vitamins A and D.

List of references is available on request from the author (beynen@freeler.nl)

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