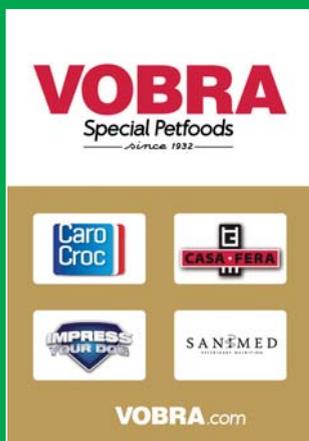




Dr A C Beynen was professor of veterinary nutrition at the Faculty of Veterinary Medicine, Utrecht University, The Netherlands in the period of 1993-2007.



Probiotics and petfood

Probiotics are marketed as beneficial bacteria that support intestinal health by maintaining or restoring the normal balance of the gut's good and bad bacteria. Two probiotic strains licensed for dogs originate from a Swedish baby and Japanese soil. Probiotics selected for desired traits are grown in tanks containing a nutrient broth. The probiotic yield is in liquid, frozen or freeze-dried form.

By definition, probiotics are live. According to theory, effective probiotics must survive passage through the dog's and cat's intestinal tract, which includes gastric acid and bile. In the lower tract, ingested probiotics should multiply, but not overwhelm or imbalance the normal resident bacteria. Subsequently, live probiotic bacteria are excreted with stools (1-8). Probiotics do not settle in the intestine and hence, for efficacy, should be consumed on a regular basis.

High temperatures during processing kill probiotics. This disqualifies canned petfood and kibble matrix applications, but the marketplace offers finished kibbles and treats coated with probiotics. In addition, probiotic pet supplements are being sold. Probiotic products may not meet the guarantees of declared species and number of live organisms (9-11). Clearly, the probiotics must be viable through the end of shelf life. Pet owners should demand evidence of label truthfulness.

Well-formed poop mirrors a healthy gut. Loose or watery stool (diarrhea) may indicate overgrowth of bad bacteria in the intestine. Clinical benefits of probiotics, if any, depend on amount and type. Research indicates that kenneling stress causes diarrhea in 3 out of 10 dogs or cats, while probiotics can prevent the condition in 1 animal. Probiotics can shorten the course of acute diarrhea in dogs from 4 to 3 days. In 5 out of 7 studies, probiotics were ineffective at reducing the severity of chronic canine diarrhea.

Legislation

The European Union permits two probiotics in complete petfood as gut flora stabilizer: *Enterococcus faecium* NCIMB10415 for dogs and cats (12) and *Bacillus subtilis* C-3102 for dogs (13). The former can also be added to dog food with convalescence as particular nutritional purpose (14).

Mechanism of action

Probiotics are assumed to enhance resistance to colonization by enteropathogens through competitive exclusion and/or the production of antimicrobial compounds. For healthy dogs, however, substantiation is questionable. Oral administration of *E. faecium* lowered fecal *Clostridium* spp (15) and *Pseudomonas*-like bacteria (16), but elevated *Salmonella* and *Campylobacter* spp (15). *Bifidobacterium animalis* depressed fecal *Clostridia* (17), but *Lactobacillus* spp also (8). *L. acidophilus* reduced fecal clostridial organisms (18, 19), but promoted coliforms (20).

There is some evidence that probiotics stimulate cellular and humoral immunity in healthy dogs. Mitogen-induced proliferation of lymphoid cells was increased for donor dogs given heat-killed *E. faecalis* perorally (21). Dietary inclusion of encapsulated *E. faecium* raised plasma total and canine distemper virus vaccine-specific immunoglobulin(Ig) A in puppies (22). *L. murinus* and *rhamnosus* increased fecal total IgA (23) and serum IgE against house dust mites (24).

Prevention of diarrhea

In three studies (8, 25, 26) probiotics reduced the risk of stress-associated diarrhea. In an animal shelter, placebo and *E. faecium* SF68 were administered with dry food (25). Dogs and cats, which were housed for 2 to 7 days, received 2.1×10^9 colony-forming units per day (cfu/d). Control and test dogs with at least one day of diarrhea matched 13% (10/80) and 10% (10/102). For the cats, the outcomes were 32% (28/87) and 26% (34/130).

Young dogs got treats without or with canine-derived *B. animalis* AHC7 (1×10^8 cfu/d) (8). They were relocated from nursing homes to training centers. During the first 3 weeks, 16% (5/31) of controls and 7% (6/90) of test dogs passed one or more unacceptable stools (8). Dogs entering an animal shelter consumed food sprinkled with placebo or *E. faecium* NCIMB10415 (2×10^9 cfu/d) (26). During the first 4 weeks, 33% (123/374) and 23% (90/399) of the control and test dogs had at least one day scored as diarrhea.

Acute canine diarrhea

Some veterinarians use combination therapy including probiotics at first presentation of dogs with acute diarrhea (27). Administration of probiotics shortened the diarrheal phase in two out of three



double-blinded, placebo-controlled trials with canine patients (28-30) and in one such trial with shelter dogs (31).

Addition of *B. animalis* AHC7 to treats (2×10^{10} cfu/d) reduced the mean time to resolution of diarrhea from 6.6 (n= 18) to 3.9 (n= 13) days (28). A paste containing lactobacilli and bacilli (5.7×10^9 cfu/d) reduced the duration of diarrhea from 2.2 (n=21) to 1.3 (n=15) days (29). Feeding a sour-milk product with three canine-derived lactobacilli (4×10^{11} cfu/d) depressed fecal excretion of *Clostridium perfringens*, but did not accelerate recovery from diarrhea (30).

Diarrhetic shelter dogs (n = 16/group) received metronidazole without or with *E. faecium* SF68 (5×10^8 cfu/d) mixed with food; median times to the initial normal stool were 3.0 and 2.5 days (31). *L. murinus* LbP2 (5×10^9 cfu/d) reportedly improved feces consistency in dogs with distemper-associated diarrhea (32).

Chronic canine diarrhea

Five studies demonstrated lack of benefit of probiotics in treating different representations of chronic canine diarrhea (33-37). In contrast, *E. faecium* SF68 normalized fecal consistency (38) and *B. subtilis* C-3102 induced improvement in dogs with more severe diarrhea (39).

Feline *Campylobacter* infection

Cats (n=50) with clinical *Campylobacter* infection were treated with cephalosporin. Follow-up with *L. acidophilus* DSM13241 reduced re-infection (40).

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

* Dr Anton C Beynen writes this exclusive column on dog and cat nutrition every month. He is affiliated with Vobra Special Petfoods.