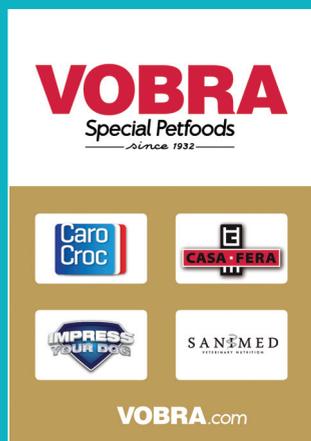




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Beet pulp in dog food

In many cases, beet pulp is listed by the ingredient panels on packaged dry dog foods. The ingredient refers to the dried residue of sliced sugar beets after the sugar constituent has been removed. Beet pulp as ingredient is not always highlighted, but a significant number of dog foods predicates that it supports gut health. Beet-pulp fiber allegedly promotes digestion of nutrients, intestinal motility, firm stools and good bacteria in the large intestine.

Sugar-beet pulp contains about 50% non-fermentable and 20% fermentable fibers. All of these fibers are resistant to the dog's digestive enzymes, but the fermentable ones are broken down by the bacteria in the lower intestinal tract. Dry dog food with added beet pulp typically includes less than 5%. The non-fermentable fibers in beet pulp end up in stool, together with bacterial products of the fermentable fibers.

Research data indicate that beet pulp in dry dog food impairs digestion. An average inclusion rate of 3.1% beet pulp raised daily feces output by 14%. Stool bulk was increased due to higher contents of both water and solids. The extra solid matter in the large intestine holds water and so moistens stool. Dietary beet pulp accelerated the flow of alimentary tract contents toward the anus and increased the frequency of defecation. Feces consistency was not perceivably changed. Beet pulp did not clearly affect the good bacteria in the dog's gut.

Switching from a commercial dry dog food without beet pulp to a food with beet pulp is associated with multiple diet composition changes. Therefore, the impact on feces volume and appearance is unpredictable. However, studies in dogs suggest that the changeover to a diet rich in beet pulp increases rather than decreases stool volume. This could be considered disadvantageous to many dog owners.

Beet pulp

Dried sugar-beet pulp has variable contents of sugar and molasses, but roughly comprises 50% insoluble and 20% soluble fiber compounds (1). The beet pulp used in a dog feeding trial contained 31% hemicelluloses, 25% cellulose and 16% viscous polysaccharides (2). The latter mainly represents pectin (3). Beet pulp contains about 10% crude protein (1).

The apparent total-tract digestibility of beet pulp in dogs was measured by the difference method with a canned (4) or extruded (5) food as dietary base. Mean fecal digestibilities of organic matter and crude protein were 44 and 49%. When using dog feces as microbiota source, beet pulp appears moderately fermentable (6-10).

Macronutrient digestibility

Beet pulp is poorly digestible and its fibers may interfere with the effectiveness of digestive enzymes. The net effect of beet pulp inclusion on whole food digestibility depends on the amount added and the nature of the exchange ingredient(s).

Replacing gelatinized corn starch or brewer's rice by beet pulp reduced apparent ileal digestibility of dry matter, crude protein and fat by 9.6, 5.5 and 2.4% units (11-14). The undigested proteins and carbohydrates, and the pectin from beet pulp, all feed the colonic bacteria. This enhances bacterial protein excretion (15), which lowers apparent protein digestibility.

Eighteen publications describe the impact of dietary beet pulp on the net efficiency of macronutrient digestion in dogs (2, 6, 11-25, 27). On the whole, beet pulp had a dose-dependent lowering effect (2, 27). The influence of the exchange ingredient(s) cannot be assessed. At an average inclusion level of 6.9% in dry food, beet pulp lowered overall apparent fecal digestibility of crude protein and crude fat by 1.8 and 0.9% units.

Feces characteristics

Taken all data (2, 6, 11-14, 16-20, 22-26) together, 7.0% beet pulp in dry food increased fecal wet weight by 77%, dry matter excretion by 29%, fecal moisture fraction by 8% units and lowered fecal dry matter digestibility by 2.0% units. There were no perceivable changes in feces appearance (6, 12-14, 20, 22, 23).

Beet pulp's low digestibility and its depressive effect on macronutrient digestion raise dry matter excretion. The more concentrated colonic luminal content triggers osmotically induced fluid secretion, thus bringing about greater fecal water loss. Compensation seems to occur through more water drunk (19), while leaving urinary water excretion unchanged (25).



Gut function

Diets containing beet pulp reduced the mean gastrointestinal retention time of chromium-mordanted fiber from 25 to 21 hours (2, 6, 17, 18). Faster intestinal transit may lessen dry matter digestibility. Dogs fed beet pulp needed to defecate more frequently: 3.0 times/day instead of 2.4.

Beet pulp feeding raised the concentrations of fecal short-chain fatty acids (11, 14, 22, 23) and lactic acid (22, 23), which lowered fecal pH (14, 22, 24, 25). The prevalence of intestinal lactic acid bacteria, which are regarded as beneficial for canine health, was variably influenced by consumption of beet pulp. The number of lactobacilli in the distal colon was unaffected (15). Both fecal lactobacilli and bifidobacteria were diminished (22) or strengthened (14, 22). Beet pulp also increased lactobacilli without affecting bifidobacteria (23). Probably, the exchange ingredients were co-defining.

One dog study (28-30) showed that intake of beet pulp in place of cellulose increased the colonic surface-to-volume ratio and improved the histopathological picture, but reproducibility is unknown.

Closing remarks

Beet pulp lowers macronutrient digestion and expands stool bulk. Other indicators of canine gut function are not convincingly improved. Prevention of intestinal disorders has gone unaddressed until now.

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

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