



The natural way to support a pet's gut health



ut health is big business in human and animal nutrition. However, not all added fibres have been created equal. Here Dr Maygane Ronsmans,

Product Manager Animal Nutrition at BENE0, discusses why prebiotic chicory root fibres are best for promoting gut health and the other range of benefits they can offer pet owners and pet food producers alike.

For some time now, animal digestive health has been tracking the popularity seen in human nutrition. In fact, even before the pandemic had made pet owners more health conscious, a study showed that 76% of cat and dog owners believed that actively looking after their pet's digestive health was essential for their overall health.¹ Following its global research in 2021, BENE0 was

able to identify ten key drivers that cat and dog owners perceived were vital to making pet foods seem healthier.²

Ten key drivers to healthier pet food perceptions

Almost 90% of cat and dog owners said that using natural ingredients was their number one way for pet food to seem healthier to them, closely followed by using less or no preservatives and additives. Reducing fat and adding fibre were seen as strong influencers by over 80% of pet owners, and of similar importance was having recognisable ingredients on the label, that were also not genetically modified. Three quarters also wanted to know where the ingredients had been sourced from and they wanted to see a short ingredients

list on pack. Interestingly, plant-based ingredients and the addition of prebiotics also made products seem healthier to over 70% of cat and dog owners.²

Digestive health becomes mainstream

With added fibre and prebiotics being two of the key drivers to make pet food seem healthier to pet owners, it is no surprise that digestive health has well and truly moved into the mainstream. In fact, 83% of dog and 84% of cat owners consider digestive health as extremely or very important. Today around 1 in 4 new global pet food products promote a digestive health claim or prebiotic benefit on packaging³. The link between a pet's digestive health and their overall health has been made by pet owners, however, not all fibres are the same. At present, a wide range of fibres can be used in dog foods. These include insoluble fibre sources such as cellulose or blends of insoluble and soluble fibres, which include sugar beet pulp and wheat bran, as well as fully soluble fibre sources such as inulin-type fructans. Based on the fibre type, they behave differently in a pet's digestive system, significantly influencing their potential digestive health benefits.

Why is prebiotic fibre important?

Dietary fibre is the indigestible part of plant material and can be soluble, insoluble or a mix of the two. Insoluble fibres can create bulking and a longer feeling of fullness, while also supporting bowel function. Soluble fibres include fermentable fibres (such as those found in sugar beet pulp) and prebiotic fibres. While both are dissolved and fermented in the colon, only prebiotic fibre sources like inulin-type fructans specifically feed healthy gut bacteria when they reach the colon. Prebiotics are "a substrate that is selectively utilized by host microorganisms conferring a health benefit"⁴. Both the criteria for feeding beneficial bacteria and conferring a health benefit need to be fulfilled for an ingredient to be defined as a



© Shutterstock: G-Stock Studio

prebiotic. In comparison to other fermentable fibres, chicory root fibres - namely chicory inulin and oligofructose - are natural prebiotics for many animals like cats and dogs and they support a healthy microbiota along with other health benefits.

Products masquerading as prebiotic

With almost 80% of respondents stating that "prebiotic" on-pack communication affects their interest in buying a certain food for their pets², this has led to some suppliers making unfounded 'prebiotic' claims for their products. In the pet food industry at present, there are a profusion of products that are being promoted as prebiotic but in fact aren't (such as fermentable fibres-containing ingredients, or even resistant starches). However, the only established prebiotics that have been scientifically proven to selectively encourage the growth of good bacteria and deliver related health benefits in humans - with corresponding evidence in pets as well - are inulin-type fructans, including BENEØ's natural chicory root fibres Orafiti® Inulin and Oligofructose.⁵

When the chicory root fibres reach the colon, they are selectively fermented by the good microbiota residing in the pets' intestine, such as bifidobacteria, and selectively stimulate their growth and proliferation. Additionally, their fermentation by selected microbiota results in the production of Short-Chain Fatty Acids (SCFAs), namely acetate, propionate, and butyrate. These fatty acids decrease the lumen pH in the gut and enhance its structure. They also strengthen the gut mucosa's barrier against pathogenic bacteria, as butyrate is the primary source of energy for the intestinal cells.

Scientifically proven prebiotic effect

BENEØ's Orafiti® Inulin and Oligofructose have been studied extensively for over two decades both in human and animal nutrition, and the scientific foundation for their prebiotic effect is strong. In human nutrition, a recent systematic review with meta-analyses that applied the Cochrane methodology (considered the strongest methodology in the hierarchy of scientific evidence) and was based on intervention studies, confirmed the prebiotic effect of inulin-type fructans sourced from the chicory root⁶. In dogs and cats, studies have shown that the selective fermentation of chicory root fibres Orafiti® Inulin and Oligofructose by specific beneficial bacteria leads to an increase in SCFA production^{7,8,9,10,11,12}, and is linked with nutritional benefits for pets, that go beyond the gut. For instance, as part of their prebiotic effect and effect on digestive health, chicory root fibres support calcium and mineral absorption in dogs.^{13,14} Further research has shown that chicory root fibres can support blood sugar management in dogs^{7,15,16}, as well as weight management in both, dogs and cats.^{17,18,19}

Absorption of minerals and bone health

The absorption of minerals is essential to an animal's growth and bone strength. From their selective fermentation which produces SCFA, inulin-type fructans reduce the luminal pH and nurture the intestinal mucosa with butyrate, thereby allowing for additional calcium absorption in the lower gut (the colon). Studies with oligofructose have demonstrated increased mineral uptake in dogs^{13,14} and among others calcium, therefore supporting bone health.

Supporting weight and blood sugar management

Being overweight or obese are common in companion animals, and according to a 2019 report from the UK's Pet Food Manufacturers' Association, 51% of dogs and 44% of cats in the UK are classified as such.²⁰ As well as supporting a pet's intestinal health, chicory root fibres also show positive effects related to weight management in pets^{17,18,19}, and blood sugar management in dogs^{7,15,16,21}. First studies show that including Orafiti® Inulin and Oligofructose in a pet's diet can curb their appetite, improve satiety and decrease voluntary food intake^{17,18,19}. In doing so, chicory root fibres help to maintain the healthy condition of a pet's body. Additionally, since inulin-type fructans are non-digestible carbohydrates and

natural support to a pet's intestinal health. BENEØ's Orafiti® Inulin and Oligofructose are produced from non-GMO chicory roots, which are locally sourced from farmers close to the production sites. Processed in two state-of-the-art plants in Belgium and Chile, both of which have food and feed certification, these functional dietary fibres meet the highest safety and quality standards. They are acknowledged as feed materials in the EU²⁵ and some of them by the AAFCO in the US.²⁶ Orafiti® Inulin and Oligofructose can be qualified as natural ingredients and used in both dry and wet pet foods, or in snacks. BENEØ offers a customisable range of chicory prebiotics that is suitable for a wide range of life stages and animals.

Natural, recognisable, and health-promoting ingredients are key drivers to pet food purchasing.



© Shutterstock: Dmytro Zinkevych

dietary fibre, they do not trigger a rise in post-prandial blood glucose or insulin concentrations. Hence, they support blood sugar management in dogs. What's more, studies in dogs have shown that feeding them with chicory prebiotics can allow for a lower blood sugar response after a meal^{15,16}, and this benefit can extend to a subsequent meal taken hours later, even if that meal doesn't include chicory root fibres,^{7,21} which is called the second meal effect.

Support of renal health in cats

Cats are sensitive to kidney disorders as they age, and one indicator of a problem can be elevated levels of blood urea nitrogen. Typically, in healthy animals the liver produces urea to clean up the nitrogen from the blood, which then travels to the kidneys through the bloodstream, where it is then filtered and excreted in the urine. In ageing cats, this renal metabolism might become less effective and nutritional solutions, amongst other things, could be supportive. Inulin-type fructans such as Orafiti® Inulin and Oligofructose have been shown to induce a shift in nitrogen metabolism, through increased nitrogen excretion via the feces^{22,23}, and decreased clearance in the urine²⁴, therefore representing a potentially valuable nutritional support for renal function.

With owners concerned about ingredients labels and their pet's long-term health, chicory inulin-type fructans are well placed for both cat and dog food product development that delivers

With more and more owners making label-based choices, BENEØ's chicory root fibre ingredients are valuable assets that help manufacturers deliver quality pet food products with a range of health benefits, and whose natural credentials appeal to pet parents.

References:

- 1 Mintel 2020: <https://www.mintel.com/press-centre/food-and-drink/four-legged-flexitarians-over-a-third-of-uk-dog-food-buyers-believe-its-good-for-pets-to-regularly-have-plant-based-meals>
- 2 BENEØ Consumer Research on Attitudes towards Pet Food in US, Brazil, UK, Germany & China 2021 (N=5'500)
- 3 Mintel's Ingredient Watch: Prebiotics in pet food 2021
- 4 Gibson G, Hutkins R, Sanders M et al. (2017) Expert consensus document: The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of prebiotics. *Nature Reviews Gastroenterology & Hepatology* 14, 491–502. <https://doi.org/10.1038/nrgastro.2017.75>
- 5 Gibson G, Hutkins R, Sanders M et al. (2017) Expert consensus document: The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of prebiotics. *Nature Reviews Gastroenterology & Hepatology* 14, 491–502. <https://doi.org/10.1038/nrgastro.2017.75>
- 6 Nagy DU, Sándor-Bajusz KA, Bödy B, Decsi T, Van Harsselaar J, Theis S & Lohner S (2022) Effect of chicory-derived inulin-type fructans on abundance of Bifidobacterium and on bowel function: a systematic review with meta-analyses. *Critical Reviews in Food Science and Nutrition*, DOI: 10.1080/10408398.2022.2098246
- 7 Alexander C, Cross TL, Devendran S, Neumer F, Theis S, Ridlon JM, Suchodolski JS, de Godoy MRC, and Swanson KS (2018) Effects of prebiotic inulin-type fructans on blood metabolite and hormone concentrations and faecal microbiota and metabolites in overweight dogs. *British Journal of Nutrition*. 120(6), 711–720. DOI: 10.1017/S0007114518001952
- 8 Propst EL, Flickinger EA, Bauer LL, Merchen NR, Fahey Jr. GC (2003) A dose-response experiment evaluating the effects of oligofructose and inulin on nutrient digestibility, stool quality, and fecal protein catabolites in healthy adult dogs. *Journal of Animal Science*. 81(12), 3057–3066.
- 9 Flickinger EA, van Loo J, Fahey Jr. GC (2003) Nutritional responses to the presence of inulin and oligofructose in the diets of domesticated animals: a review. *Critical Reviews in Food Science and Nutrition* 43(1), 19–60. <https://www.ncbi.nlm.nih.gov/pubmed/12587985>
- 10 Bosch G, Verbrugghe A, Hesta M et al. (2009) The effects of dietary fibre type on satiety-related hormones and voluntary food intake in dogs. *British Journal of Nutrition* 102(2): 318–325. <https://www.cambridge.org/core/services/aop->

- cambridge-core/content/view/8E78FB240BCF2967B60F27704D5054D1/S0007114508149194a.pdf/effects_of_dietary_fibre_type_on_satietyrelated_hormones_and_voluntary_food_intake_in_dogs.pdf
- 11 Butowski CF, Thomas DG, Young W, Cave NJ, McKenzie CM, Rosendale DI, Bermingham EN (2019) Addition of plant dietary fibre to a raw red meat high protein, high fat diet, alters the faecal bacteriome and organic acid profiles of the domestic cat (*Felis catus*). *PloS ONE*. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0216072>. Accessed 28 Aug 2019
 - 12 Barry KA, Wojcicki BJ, Middelbos IS et al. (2010) Dietary cellulose, fructooligosaccharides, and pectin modify fecal protein catabolites and microbial populations in adult cats. *Journal of Animal Science* 88(9): 2978–2987. <https://www.ncbi.nlm.nih.gov/pubmed/20495116>
 - 13 Pinna C, Vecchiato CG, Bolduan C, Grandi M, Stefanelli C, Windisch W, Zaghini G, Biagi G (2018) Influence of dietary protein and fructooligosaccharides on fecal fermentative end-products, fecal bacterial populations and apparent total tract digestibility in dogs. *BMC Veterinary Research* 14, 106. DOI: 10.1186/s12917-018-1436-x.
 - 14 Beynen AC, Baas JC, Hoekemeijer PE, Kappert HJ, Bakker MH, Koopman JP, Lemmens AG (2002) Faecal bacterial profile, nitrogen excretion and mineral absorption in healthy dogs fed supplemental oligofructose. *Journal of Animal Physiology and Animal Nutrition* 86(9-10), 298-305. DOI: 10.1046/j.1439-0396.2002.00386.x.
 - 15 Massimino SP, McBurney MI, Field CJ, Thomson ABR, Keelan M, Hayek MG, Sunvold GD (1998) Fermentable dietary fiber increases GLP-1 secretion and improves glucose homeostasis despite increased intestinal glucose transport capacity in healthy dogs. *Journal of Nutrition* 128, 1786–1793.
 - 16 Diez M, Hornick JL, Baldwin P, Istasse L (1997) Influence of a blend of fructooligosaccharides and sugar beet fiber on nutrient digestibility and plasma metabolite concentrations in healthy beagles. *American Journal of Veterinary Research* 58(11), 1238–1242.
 - 17 Bosch G, Verbrugghe A, Hesta M, Holst JJ, van der Poel AF, Janssens GP, Hendriks WH (2009) The effects of dietary fibre type on satiety-related hormones and voluntary food intake in dogs. *British Journal of Nutrition* 102(2), 318-325. DOI: 10.1017/S0007114508149194.
 - 18 Bosch G, Gilbert M, Beerda B (2022) Properties of Foods That Impact Appetite Regulation in Cats. *Frontiers in Animal Science* 3:33. <https://www.frontiersin.org/articles/10.3389/fanim.2022.873924/full>
 - 19 Deb-Choudhury S, Bermingham EN, Young W, Barnett MPG, Knowles SO, Harland D, Clerens S, Dyer JM (2018) The effects of a wool hydrolysate on short-chain fatty acid production and fecal microbial composition in the domestic cat (*Felis catus*). *Food & Function* 9(8):4107–4121. <https://www.ncbi.nlm.nih.gov/pubmed/30039140>
 - 20 PFMA Obesity Report 2019. https://www.pfma.org.uk/_assets/docs/White%20Papers/PFMA-Obesity-Report-2019.pdf
 - 21 Deng P, Beloshapka AN, Vester Boler BM, Swanson KS (2013). Dietary fibre fermentability but not viscosity elicited the 'second-meal effect' in healthy adult dogs. *British Journal of Nutrition* 110(5), 960-968. DOI: 10.1017/S0007114513000020
 - 22 Hesta, M, Janssens, GP, Debraekeleer, J, & De Wilde, R (2001). The effect of oligofructose and inulin on faecal characteristics and nutrient digestibility in healthy cats. *Journal of animal physiology and animal nutrition*, 85(5-6), 135–141. <https://doi.org/10.1046/j.1439-0396.2001.00308.x>
 - 23 Groeneveld, EA, Kappert, HJ, Van der Kuilen, J, & Beynen, AC. (2001). Consumption of fructooligosaccharides and nitrogen excretion in cats. *International journal for vitamin and nutrition research. Internationale Zeitschrift für Vitamin- und Ernährungsforschung. Journal international de vitaminologie et de nutrition*, 71(4), 254–256. <https://doi.org/10.1024/0300-9831.71.4.254>
 - 24 Verbrugghe, A, Janssens, GP, Meininger, E, Daminet, S, Piron, K, Vanhaecke, L, Wuyts, B, Buyse, J, & Hesta, M (2010). Intestinal fermentation modulates postprandial acylcarnitine profile and nitrogen metabolism in a true carnivore: the domestic cat (*Felis catus*). *The British journal of nutrition*, 104(7), 972–979. <https://doi.org/10.1017/S0007114510001558>
 - 25 EU Catalogue of Feed Materials (EU 2017/1017)
 - 26 The Association of American Feed Control Officials (AAFCO) is a voluntary membership association of local, state and federal agencies.



For further information on BENEEO and its ingredients, please visit: www.beneo.com and www.beneo.com/news or follow BENEEO on Twitter: @_BENEEO or LinkedIn: www.linkedin.com/company/beneo

BENEEO-Animal Nutrition offers a broad range of natural ingredients with nutritional benefits. The product range is comprised of vegetable proteins, digestible carbohydrates, prebiotic chicory root fibres and specialty rice ingredients. BENEEO-Animal Nutrition extends BENEEO's unique expertise in human food to the world of pet food, livestock feed and aqua feed.

BENEEO, a division of the Südzucker Group, employs more than 1000 people and has production units in Belgium, Chile, Germany, Italy, and the Netherlands.