Prebiotics in pet food
For most commonly used prebiotics in pet food, the focus is directed more towards their impact on the intestinal flora, but less on the systemic (general) effects these nutraceuticals can provide. The microbiota of the large intestine play a fundamental role in maintaining the health of the gastrointestinal tract. Prebiotics are carbohydrates that withstand digestion, before reaching the colon, where they stimulate the growth and/or activity of beneficial microbial species. This influences the composition and metabolism of these intestinal flora and affects both intestinal and general health.

Systemic effect
Xylo-oligosaccharides (XOS), obtained by enzymatic hydrolysis of non-GMO corn cobs, can increase the population of beneficial bacteria (bifidobacteria and lactobacilli). In puppies, dietary supplementation of XOS (0.3%) improves gut health by decreasing levels of harmful bacteria, reducing faecal ammonia level and significantly increasing the population of ‘healthy’ bacteria (lactobacilli). The ‘prebiotic index’ – defined as ‘the increase in the absolute number of bifidobacteria expressed, divided by the daily dose of prebiotic ingested’ – is higher for XOS compared to the classic prebiotics (FOS, inulin) used in pet food. Modification of the intestinal flora by prebiotics can modify Short Chain Fatty Acid (SCFA) production in favour of one specific fatty acid and hence modulate the indirect systemic effect of the prebiotic. XOS thus significantly decrease faecal pH. This beneficial effect is fixed after three weeks. The higher SCFA concentrations resulting from increased bifidobacterial fermentation in the entire gut may explain how XOS feeding decreases systemic inflammation.

Intestinal health is the cornerstone of well-being in humans and we can easily assume the same is true of pets. Dr. Hermann Bourgeois explains the prebiotic effects of Xylo-oligosaccharides on pets’ health.
Digestive hypersensitivity

The development of local immunity is highly dependent on the growth of bacterial populations in the gut. microbes increase the turnover of mucus and epithelial cells and are constantly testing gut immunity, leading to the production of inflammatory and immune cells. Super-prebiotics, like XOS, can control the activation of tissue mediators and modulate the inflammatory response at systemic level. The positive impact of XOS on the intestinal barrier can be of interest in animals with digestive hypersensitivity.

Oxidative stress

In addition to the prebiotic effects on gut health, XOS have a clinically proven anti-oxidant effect. In Labrador puppies consuming a maintenance diet supplemented with 0.02% XOS, the production of toxic metabolites from oxidative stress decreases while the production of enzymes protecting against oxidative stress increases. These data confirm the beneficial effect of XOS supplementation on oxidative stress. Knowing the correlation between increased oxidative stress and obesity, XOS represents an alternative solution to cut the vicious circle of increased oxidative stress, inflammation and obesity. In diabetic animals, XOS supplementation improves body weight, reduces blood sugar levels and significantly increases the activity of circulating anti-oxidant enzymes. The correlation between anti-oxidant status and vitality in pets was confirmed in a study evaluating the changes observed by owners in the behaviour of their pets and blood markers of oxidative stress.

Research results

In adult dogs, a 0.08% XOS supplement induces a significant decrease in faecal concentrations of fermentation metabolites. These results support the notion that XOS supplementation positively influences the metabolism of amino acids reaching the colon, improving gut health as revealed by improved stool odour.

The benefits of XOS have also been studied in cats. As cats ingest high protein diets that impact intestinal fermentation, modify the bacterial population and promote the formation of putrefactive compounds, prebiotics can be useful in limiting these effects. A recent clinical trial in healthy cats reveals that 0.4% XOS supplementation induces a change in the abundance and richness of beneficial bacteria with a beneficial modification of SCFA production and promotion of total antioxidant status.

A super-prebiotic

XOS are well tolerated without significant impact on palatability, food digestibility and faecal scoring. Acid- and heat-resistant, XOS resist process constraints and the relatively small dosage requirements allow inclusion in premix or palatability enhancers.

Compared to the traditional prebiotics applied in pet food, XOS can be considered as one of the ‘super-prebiotics’. There are many benefits and compound the advantages of various nutraceuticals (immune stimulants, antioxidants, chelated trace-elements, et cetera) without any impact on food intake and food tolerance. These transversal advantages allow a reduction in the ingredient list, minimise the risks of ingredient interaction and represent an excellent alternative for optimising the nutritional, technical and economic advantages of a recipe.