



trusted petfood
ingredients

Finding the right ingredients for plant-based pet food applications

By Geert van der Velden, Innovation Manager at IQI Trusted Petfood Ingredients

In the coming years, global protein demand grows rapidly, also in the pet food industry. Not only for animal and marine based proteins but also for alternative non-animal proteins. Likewise, as part of the humanization trend, more and more pet parents are turning to plant-based pet food for their cats and dogs. Plant-based pet food, like plant-based food for humans, is entirely produced from natural ingredients without any trace of animal-based raw materials. Both of these trends require plant-based alternatives which ensure that the nutrient requirements of the animal are met by plant-based diets.

The plant-based trend originally emerged because of ethical reasons, ensuring that the food chain is not responsible in any way for the cruelty or exploitation of animals. In the past 10 years, however, this has been surpassed by concerns over the environmental impact of animal production and fisheries. The plant-based trend excludes a large number of traditional animal-based ingredients, including all kinds of meat, but also dairy, eggs, and other animal-derived ingredients, such as gelatin, honey, carmine, pepsin, shellac, albumin, whey, casein, and some forms of vitamin D3. Developing a fully nutritious plant-based pet food can be quite challenging—especially for cats. However, it is certainly achievable with the careful selection of the right ingredients.

FOOD COMPOSITION FOR CATS AND DOGS

The nutrient requirements across different species of mammals, including humans as well as cats and dogs, are fairly similar, but the food composition must also take into account digestive function and capacity as well as taste preferences. True carnivores, such as cats, have a short and simple digestive tract with a low ratio between body length and intestine length. This is just 1:3 for cats, and 1:4 for dogs, while a true omnivore, like a pig, has a ratio of 1:14. This means that especially cats, and to a lesser extent dogs, have moderate colon fermentation capacity and require highly digestible food.

The natural primary food source of cats is meat and other animal-derived ingredients, due to the simplicity of their digestive tract and their dietary taurine requirement. While cats are strict carnivores, dogs are slightly better adapted to an omnivorous or plant-based diet. Dogs not only have longer intestines but also have 42 teeth, 12 premolars and molars more than cats, which have 30 teeth. Recent research, however, shows that cats as well as dogs can effectively live healthily on a diet using various plant- and yeast-based ingredients to supply the required nutrients.

CHOOSING INGREDIENTS AND SUPPLEMENTS

When choosing ingredients and supplements for plant-based pet food, aspects such as nutritional properties, taste, stool quality, and technical properties should be taken into consideration. Typical

nutrients of animal origin that should be supplemented in plant-based pet food include taurine, long-chain omega-3 fatty acids, carnitine, arachidonic acid, and vitamin D. As true carnivores, cats have certain different nutrient requirements to dogs. Cats have a higher protein and arginine requirement, taurine supplementation is essential, dietary arachidonic acid and dietary retinol (vitamin A) are required, since cats cannot utilize beta-carotene, and they have a high niacin requirement as they cannot convert tryptophan into niacin.

Synthetic sources of retinol, B12, and niacin are available. Vitamin D can be produced from yeast or mushrooms. Minerals can be supplemented from non-animal sources and food could include added phytase to increase utilization of phytate bonded minerals.

THE NEED FOR HIGHLY DIGESTIBLE PROTEIN

Both cats and dogs require sufficient intake of high-quality, highly digestible protein: protein digestibility should be more than 83%. As true carnivores, cats have a higher protein requirement than dogs. The requirement for dogs is that at least 21% of total digestible protein should be highly digestible protein, whereby total protein should be no less than 24%. For cats, at least 31% of the total digestible protein should be highly digestible protein and preferably over 36% total protein of high quality.

There are different kinds of alternative protein sources with high digestibility available for plant-based pet food applications. These range from classical sources that have been on the market for a longer time to more novel protein sources. Examples of classical alternative protein sources are potato protein, wheat gluten, and corn gluten. Newer alternative protein sources are based on rice, non-GMO soy, and pulses, such as peas, faba beans, and chickpeas. Another category is fermented plant-based protein, such as Protéger™ (see below). Processing is essential for plant-based ingredients like Protéger™ to concentrate protein, enhance digestibility, and remove unwanted fiber and anti-nutrients. Novel alternative protein sources that have been introduced onto the pet food market more recently include hemp, microalgae, and single-cell proteins.

THE BENEFITS OF PROTÉGER™

A particularly interesting new ingredient for plant-based pet food applications is Protéger™, a fermented plant-based protein for cats and dogs. Made from sustainably sourced, non-GMO soybeans through a patented fermentation process, Protéger™ offers over 70% crude protein, a complete amino acid profile, and enhanced digestibility and palatability. Its fermentation benefits may include reduced intestinal inflammation and improved metabolic processes, making it a premium choice for sustainable and nutritious pet food solutions.

THE BENEFITS OF PROTASTAR®

ProtaSTAR®, developed by IQI's partner Avebe, is a plant-based protein that provides a complete amino acid profile to support the nutritional needs of pets. Rich in sulfur-containing and aromatic amino acids, it helps maintain a healthy coat and overall vitality. ProtaSTAR® is highly digestible, palatable, and suitable for both cats and dogs. Its low ash content makes it an excellent choice for diets designed to reduce the risk of calcium oxalate and struvite formation.

THE BENEFITS OF FUNGIBITE

As pet owners increasingly look for sustainable and nutritious alternatives to traditional protein sources, mushrooms are emerging as a valuable option. FungiBite, created by IQI's Austrian partner Neuburger Fleischlos, uses king oyster mushrooms as its core ingredient to offer a plant-based solution for pet food. This ingredient is rich in valuable nutrients such as selenium, vitamins D and B6, ergothioneine, spermidine, fiber, and antioxidants. Together, these contribute to healthy digestion, enhance the immune system, and protect cats and dogs against diseases.



Table 1: Suitable high-quality protein sources for plant-based pet food applications						
Protein source	Protein %	Digestibility	Palatability	Cost % protein	Availability	Remarks
Potato protein	75%	+++	0	0	++	
Protastar	80%	+++	+	0	++	10 x lower TGA
Soy protein concentrate	55-70%	++	+	0	+++	non-GMO available
Protéger	74%	++	+	0	++	
Wheat gluten	82%	++		0	+++	
Corn gluten	60%	++	+	0	+++	Important protein already in many pet food formulas
Rice protein	50-70%	++		++	++	Important protein already in many pet food formulas
Oat protein	55%	+		++	0	By-product oat beta-glucan production
Pea protein	56%	++		0	++	Natural process
Faba bean protein	55-65%	++		0	0	Various extraction methods
Chickpea	70%	++		+++	0	Food grade only
Corn fermented protein	55%	++	+	0	+++	Combination of yeast & corn protein
Hemp protein	60-70%	++		+++	+	Legal situation
Mycoprotein	60-65%	?	+	+	-	First commercial products coming soon
Fungibite	4-20%	++	+	+++	++	frozen product only
Guar	35-70%	++	+	+	+	
Single cell protein (bacteira)	70%	?	0	+++	-	First commercial products available
Brewer's yeast	+40%	++	+++	+	+	Spray or drum dried

OMEGA-3 AS AN ESSENTIAL NUTRIENT

Besides taurine, omega-3 fatty acid is another essential nutrient with an essential role in the physiological processes of mammals, such as cats and dogs. In particular, the intake of adequate levels of the long-chain eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) offers a number of benefits to the health and well-being of cats and dogs. These fatty acids increase the absorption of vitamins and minerals and help to manage inflammatory problems related to joint health and functioning, skin/coat, and in the prevention and treatment of heart and bladder diseases. The intake of these omega-3 fatty acids also has a positive influence on eye health and supports cognitive functioning in aging brains.

Since cats and dogs are unable to synthesize any of the essential omega-3 fatty acids, they must be obtained through diet. The most common is the short-chain alpha-linolenic acid (ALA), which is present mainly in vegetable oils, such as flax oil, soya oil, and canola oil. But to achieve any health benefits, ALA first needs to be converted in the body into EPA and then into DHA, which only happens at a very low, almost negligible conversion rate. The most efficient and effective method to ensure sufficient inclusion levels of the beneficial long-chain fatty acids EPA and DHA in the diets of dogs and cats is therefore to supply them directly via pet food.

EPA and DHA long-chain omega-3 fatty acids are mostly found in marine oils, such as fish oil and krill oil, or in microalgae. Algae DHA is produced from cultured microalgae and is the only plant-based source of long-chain omega-3 fatty acid. Algae DHA has a consistently high level of DHA long-chain fatty acid and very good palatability with high acceptance amongst cats and dogs. Algae, along with seaweed, is also a source of arachidonic acid.



HIGH-QUALITY ANTIOXIDANTS

Astaxanthin, derived from the freshwater microalgae *Haematococcus pluvialis*, is a powerful antioxidant with numerous health benefits for pets. Known as the “king of carotenoids,” it protects cells from oxidative damage and supports immune defense. Senior pets, in particular, benefit from astaxanthin as a highly bioactive ingredient, helping to combat oxidative stress and support overall well-being.

Astaxanthin also stimulates muscle function and recovery, especially for dogs, while improving skin and coat health, vision, and gut functioning. Novasta® EB15, produced by IQI’s partner AstaReal, is the safest and most studied brand of astaxanthin. Using encapsulation technology, it remains stable during processing, particularly heating. This ensures it’s suitable for incorporation into more ‘open’ formulations, such as pellets, meal mixes, and soft chew treats, with less concern about product stability and quality.

PLANT-BASED PET NUTRITION SOLUTIONS FROM IQI TRUSTED PETFOOD INGREDIENTS

Together with its different suppliers, IQI delivers a range of ingredients that are beneficial for plant-based pet food applications. These include seaweed, algae DHA, algae based Astaxanthin, fibers, Protéger™, ProtaSTAR® and FungiBite.

For more information on these different ingredients for plant-based pet food and the finest ingredients for the pet food industry, please visit our [website](#) or contact us directly.

Want to know more?

[Vegan versus meat-based dog food: Guardian-reported health outcomes in 2,536 dogs, after controlling for canine demographic factors](#)

[Proteins & ingredients: Satisfying the appetite of a growing planet](#)

[Vegan versus meat-based pet foods: Owner-reported palatability behaviours and implications for canine and feline welfare](#)

[Vegetarian versus Meat-Based Diets for Companion Animals](#)

[The state of research on vegetarian pet foods](#)

[IQI white paper ‘Microalgae as a clean source of long-chain omega-3 fatty acid for pet food’](#)

[IQI white paper ‘FungiBite: mushrooms as a protein alternative for hybrid pet foods’](#)

[IQI Productsheet ‘ProtaSTAR®: How to get the most out of the potato as a natural and sustainable source of protein?’](#)

[IQI white paper: ‘Offering fermented plant protein ingredients with Protéger™’](#)

[EB15 astaxanthin \(algae based\)](#)

ABOUT IQI TRUSTED PETFOOD INGREDIENTS

IQI Trusted Petfood Ingredients is a global provider of premium-claim ingredients to the top brands in the pet food industry. Founded in 1994 as a trading company in raw pet food materials, today IQI offers an extensive variety of services to aid and assist our customers and suppliers worldwide. IQI Trusted Petfood Ingredients employs highly skilled personnel, owns and operates a global network of logistical hubs, and relies on a global supply network to obtain the purest natural resources available.

For IQI, quality is key. IQI Trusted Petfood Ingredients goes to great lengths to ensure the quality of its products and develop innovative new products. IQI also invests a great deal in maximizing the quality of its partnerships. Since this business is all about trust, IQI needs to bond with its partners to succeed. By working closely with both its customers and suppliers, IQI creates full transparency in the supply chain. IQI oversees and controls every step in the process from source to shelf and supplies products that are pure and traceable to their source.



ABOUT GEERT VAN DER VELDEN

Geert van der Velden is IQI Trusted Petfood Ingredients' Innovation Manager responsible for Business Development, generating new products and concepts that meet the needs of existing and new customers. Geert has more than 25 years' experience in the international pet food industry and has gained knowledge and experience in many sections of IQI's business.

CONTACT INFORMATION:

IQI Trusted Petfood Ingredients

Geert van der Velden

Email: geert.vandervelden@iqi-petfood.com

Mobile: +31651063301

www.iqi-petfood.com



trusted petfood
ingredients

Disclaimer

The content of this white paper has been prepared with the utmost care. This white paper contains general information and that may not be applicable to all products of all companies in all situations. In addition, certain of the information included in the white paper may be derived from information received from third parties. IQI makes no warranties, guarantees or representations with regard to the accuracy, completeness or suitability of the information presented in the white paper, including any information derived from information received from third parties. Although IQI believes that the information contained in this white paper is correct at the time of publication, IQI accepts no liability for any inaccuracies in this white paper. IQI hereby disclaims any liability to any party for any loss, damage, or disruption, in whatever form or of whatever nature, suffered by or resulting from the use of or the information presented in this white paper, whether or not caused by IQI's errors, omissions or inaccuracies in the white paper, and whether or not such errors, omissions or inaccuracies result from tort, negligence, lack of care, incorrect actions, accident or any other cause. IQI is not responsible for the content in any document or any website or any other information from third parties referred to in this white paper. You should not use this white paper or rely on it if you do not agree to the above exclusion of liability and any use of or reliance on this white paper is in one's own name and at one's own risk.

IQI reserves all copyrights and other intellectual property rights on the content of this white paper. Unauthorized or improper use of this white paper and/or its content violates the intellectual property rights of IQI. Permission to use any content of this white paper or part thereof must be requested in writing to IQI. If you have any questions about the content of this white paper, please contact IQI. Email: info@iqi-petfood.com Website: iqi-petfood.com