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# Pure whole egg powder as a source of high-quality and functional protein for pet food applications

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

**Pure whole egg powder is well recognized by the pet food industry as a source of high-quality nutritional, functional and palatable ingredients. Eggs are a source of high-quality and functional protein as well as highly bio-available dietary essential nutrients, offering both nutritional value and health benefits for cats and dogs. Their interesting functional properties for pet food manufacturing include excellent gel formation as well as very good water-binding and emulsifying properties.**

## **SOURCE OF ESSENTIAL NUTRIENTS**

An egg is a unique, encapsulated environment in which an embryo develops until the chick hatches. To support this process, an egg contains a concentrated source of essential nutrients and compounds to meet all requirements for embryonic development and protect the health of the developing embryo against infectious agents. The protein, essential amino acids, fatty acids, antioxidants, and vitamins contained in eggs also offer interesting possibilities to help meet the nutritional requirements of pets, such as cats and dogs.

## **DIFFERENT PROPERTIES FOR DIFFERENT PARTS OF THE EGG**

Depending on the bird species, eggs are comprised of approximately 60-65% white, 25-30% yolk, and 10% shell. Each part of the egg has specific nutritional value. The shell largely consists of calcium carbonate, while the other nutrients are contained in the white and yolk. The fat content of eggs is fully concentrated in the yolk.

Fat from egg yolk is an important ingredient in pet food as it provides energy, texture, and palatability. It is also a source of essential omega-3 and omega-6 fatty acids and supports the absorption of fat-soluble vitamins. While the yolk contains some protein, the white or albumen in particular has a very high protein content of over 80 percent. Egg white protein is considered to be of high nutritional value and can be used to increase the amount of essential amino acids or protein in pet food.

## **ESSENTIAL AMINO ACIDS**

Spray-dried, pure whole egg powder comprises a group of high-quality protein sources and contains all essential amino acids. Proteins are polymer chains of amino acids that constitute the principal structure of body tissues and functional compounds, such as enzymes, hormones, and antibodies. A number of amino acids cannot be synthesized by cats and dogs in sufficient quantities and therefore need to be supplied in their diet. These are the so-called essential amino acids.

All essential amino acids, except for taurine, are abundantly present in egg protein to meet the required minimum allowances for maintenance as well as growth and reproduction in cats and dogs. There are some differences in the amino acid profiles of yolk protein and white protein.

Studies have shown egg protein to have the highest protein efficiency ratio compared to other protein sources. In particular, vegetable-based proteins from sources such as potato, rice and peas generally have a less complete amino acid profile compared to animal-based or egg protein. This is of particular importance in limited-ingredient pet foods, where it is a challenge to balance the amino acid content when using a small, select number of ingredients.

## SOURCE OF ANTIOXIDANTS

The lipids in egg yolk provide a rich and bio-available source of the powerful antioxidants lutein and zeaxanthin. These xanthophyll carotenoids are fat-soluble yellow pigments that give egg yolk its color and are synthesized only by plants that are in turn eaten by chickens. Unlike many other carotenoids, they are not converted into vitamin A after absorption from the intestinal tract. In hens, these two antioxidants accumulate in egg yolk.

While the degree of intestinal absorption and bio-availability of carotenoids from vegetal sources varies greatly, egg yolk provides a vehicle for efficient absorption and high bio-availability of lutein and zeaxanthin. After intestinal absorption, they are selectively taken up into the retina of the eye. They are important for long-term eye health, acting as blue light filters and antioxidants. Research has shown long-term beneficial effects on eye health in dogs.



## IMPROVING PET FOOD PROPERTIES

Pure whole egg powder has applications in both wet and dry pet food. Besides the nutritional characteristics, pure whole egg powder has interesting functional aspects, such as gel formation, water-binding and emulsifying properties. These properties differ depending on the type of egg product. Egg yolk components in particular offer very good emulsifying properties, while egg white and egg yolk proteins offer excellent gelling properties and very good water-binding capacity. This is of great interest, for example, to increase the percentage of fresh meat to up to 60 percent in fresh meat slurries for dry pet food applications (see table 1).



% of fresh meat	Whole Egg (WE) binding
0 – 20%	yes
20 – 40%	yes
40 – 60%	yes
> 60%	not applicable

**Table 1: Application of pure whole egg powder in pet food**

Pure whole egg powder has a crude ash content of approximately 4-5 percent. The ash content in eggs is largely located in the egg shell, which can be easily separated from the white and yolk as the liquid egg fraction. Spray-dried liquid egg fractions have an ash content several times lower than most animal protein sources commonly used in pet food.

## PRODUCTION OF PURE WHOLE EGG POWDER

Pure whole egg powder is produced from by-products of the egg and poultry production industry, using eggs rejected by quality control due to superficial damage, such as cracks. These eggs are collected, filtered, and spray dried to form pure whole egg powder. The powder can be pelleted for improved handling at the pet food producer.

The gentle heat treatment during spray drying preserves the chemical integrity of essential nutrients, including essential amino acids, contained within the liquid egg fractions. The end result is a high-quality product with high digestibility that has applications in both wet and dry pet food.

## SUSTAINABILITY AND ANIMAL WELFARE

Pet parents are becoming increasingly aware of the impact of their choice of pet food. Pure whole egg powder offers them interesting sustainable and vegetarian solutions. Raw materials for pure whole egg powder can be sourced from various sources, including conventional, organic, cage-free, and free range. Since pure whole egg powder is produced from by-products of the egg and poultry production industry, and represent a relatively low amount of greenhouse gas emissions per gram of protein (see figure 1), it offers a sustainable product choice.



**Figure 1: Protein scorecard in terms of impact of greenhouse gas emissions and retail price per gram of protein**

	FOOD	IMPACT (GHG emissions per gram of protein)	COST (Retail price per gram of protein)
LOW	Wheat		\$
	Corn		\$
	Beans, chickpeas, lentils		\$
	Rice		\$
	Fish		\$\$\$
	Soy		\$
	Nuts		\$\$\$
	Eggs		\$\$
MEDIUM	Poultry		\$\$
	Pork		\$\$
	Dairy (milk, cheese)		\$\$
HIGH	Beef		\$\$\$
	Lamb & goat		\$\$\$

Lighter shade shows emissions from agricultural production, darker shade shows emissions from land-use change.

## PURE WHOLE EGG POWDER SOLUTION FROM IQI TRUSTED PETFOOD INGREDIENTS

Together with its partner Deveris, IQI Trusted Petfood Ingredients offers pure whole egg powder and soon also pelleted pure whole egg.

**For more information on pure whole egg and the finest ingredients for the pet food industry, please visit our [website](#) or contact us directly.**

### Want to know more?

[‘The amino acid composition and protein quality of various egg, poultry meal by-products, and vegetable proteins used in the production of dog and cat diets’](#)

## 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.

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