

Empyreal® 75 Update

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New Format, Collaterals & Topics

By [Patrick Holverson](#), Director of Marketing & Sales, Pet Food Ingredients

Welcome to our new “Official” newsletter format. We’ve received several comments you liked the format we introduced in April/May, and we’ve adopted it for this year. We’ve kept the same sections: **From the Manager’s View**, **The Market Commentary**, **R&D** – with key articles on topics of interest in the industry, and inputs from **Marketing and Sales**. This issue’s article is about [Satiety](#) and ingredients in pet food that may help you and your customers control their pet’s weight or prevent an overweight pet through ingredient or protein manipulations in their food or treats.

Satiety has been well researched in human diets, and it’s well known, protein and fiber are two of the most popular ingredients used to stimulate satiety. [Mintel](#) notes that over 50% of satiety-enhancing food products are formulated with fibers and proteins. The article in this newsletter, by [Dr. Don Shandera](#), further addresses satiety in pet food and effects of protein as an ingredient.

As exposure and uses for Empyreal® 75 continue to expand, we’ve also expanded our collateral materials to help meet customer needs and answer their questions. We now have available, “[Attribute](#)” cards that are specific to 4 categories key to our industry. The categories are: [Pet Well-Being](#), [Functional Benefits](#) (manufacturing), [Food Safety](#), and [Certifications](#). For easy identification, the cards are compact (9” x 4”) and color coded by specific category, as shown in the previous sentence. Each general category has product specific attributes that may benefit manufacturers, retailers, your customers, or our pets, when a specific diet or formula includes Empyreal® 75.

An example of one attribute in [Pet Well-Being](#) is: **[Urinary Tract Health](#)**. Complete with a chart, the reader of this card can see that Empyreal® 75 is extremely low in Ash, Magnesium, Phosphorus, and Calcium, while having high levels of Glutamic acid and Leucine, overall making it a good protein source for Cat diets, especially for concerns around urinary tract claims.

We kept the “deck” of cards to 12 attributes, spread over all 4 categories. These cards are [available as a set](#), by category, or as individual cards, for anyone [contacting us](#) with a request for themselves or their customers.

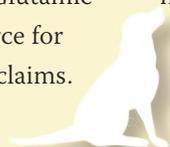
I hope you enjoy this newsletter and please keep sending us comments on subjects you’d like to hear more about, or how to improve future editions.

From the Manager’s View

By [Eric Bell](#), Product Line Manager, Protein Products

It seems like summer is just getting started, but my children started school two weeks ago. Doesn’t that seem just way too early to head back to the classroom? The fact is, as I get older the faster time seems to move. I saw a quote a while back by Andy Rooney “Life is like a roll of toilet paper. The closer it gets to the end the faster it goes.” While humorous, I do find a couple key take aways from the message. While you may love your work, it should not be your whole life; make time for those you love and your passions. Realize your personal greatness; do what you’ve always wanted to accomplish, act now, for procrastination is your enemy.

The tendency we’ve seen in today’s world of economic uncertainty and rising unemployment, is to take the conservative approach, avoid risks, reduce costs, and across the board cuts. The question is, will these responses really position you or your organization competitively in the future? Is economic crisis really hardship or is it opportunity? I believe the challenge is around how we create real value, the ability to focus on sustainable efficiency, not short-term savings. Now is not the time to focus only on cost reductions, wait it out, and hope for the best. Now is the time for action! The world has changed, and we shouldn’t expect it to return to normal as we knew it, before the current recession. You need to move yourself and your business forward.



Protein is a Tool for Completing Satisfaction in the Eating Experience

By [Don Shandera](#), PhD, Feed Ingredients R&D Manager

The eating or meal experience is more than the attraction to the food and its palatability. The ability of the meal to generate a feeling of satisfaction afterwards is also critical, largely through generating a feeling of “fullness” and wellness. The terms “satiety or satiation” describes this feeling of satisfaction that leads to cessation of eating or a decreased desire for eating (and maybe the desire for a nap and self grooming). If satiation is not met, then hunger is still present and the food or meal simply provided nutrients without complete satisfaction. This is a negative experience for both the pet and the caretaker, as the pet will still feel the need to display manipulative behavior to negotiate more food, potentially beyond the food manufacturer’s recommendation, and put itself at risk for obesity. Alternatively, if the pet is on a reduced or restricted calorie diet for weight control, the use of ingredients to bring about satiation under these conditions is a value proposition any pet owner who has experienced the emotional turmoil in choosing between their pets immediate happiness or long term health can relate to.

A diet that can regulate eating behavior through satiating the pet while delivering required calories and regulated nutrients would mutually benefit the pet’s wellbeing, prevent obesity, and assist the pet caretaker from overfeeding. This process can be manipulated through the composition and physical properties of the food consumed to influence hunger between meals and possibly regulate feeding intake levels. Satiety can be the foundation of nutrient regulation, especially for energy.

To read the entire article by [Don Shandera, PhD](#), click [here](#).

Market Commentary

By [Lee Bohling](#), Sales Manager, Pet Food Ingredients

CGM prices should continue to trend lower as grains are on the defensive. Prices have dropped over \$120/ton from their summer highs as the market continues to deal with the inverse in the futures market from September into December. Ratios are still high, which is a reflection on tighter supply than normal, even though demand has backed off. We have seen ratios 8 – 13% higher over the last 3 years compared to the previous 7 years. Price rationing has kicked in at these levels so I would expect the market to be more responsive to any down side pressure as supply improves.

Ideal weather across the corn belt continues to push the grain market lower as the trade anticipates record corn and bean yields. The delayed plantings in the eastern belt are a mute point as the only fear the market will have now is an early frost. The western corn belt continues to see below normal temps and normal to above on precipitation, which is ideal for pollination. The USDA Crop Production report showed record corn yields and the second highest corn production number in history time will tell if this comes true. We still need to determine how much domestic demand has been hurt due to the poor profit margins in the livestock sector.

The U.S. Labor Department said that jobless claims were up 15,000 last week to 576,000, more than the 550,000 expected. It’s been two weeks in a row the claim’s numbers have increased; leading pundits back to the inevitable conclusion that consumption is still lagging economic enthusiasm.

Empyreal® 75 gives you more because it gives them more.

The infographic features two white silhouettes of a dog and a cat against a blue background. Lines connect various text boxes to specific parts of the animals, highlighting the benefits of Empyreal 75. The dog silhouette is on the left, and the cat silhouette is on the right. The text boxes are arranged around the silhouettes, with some overlapping.

- Antioxidants, Beta-Carotene & Zeaxanthin for healthy immune systems** (points to the dog's head)
- Concentrated source of Leucine, Glutamine, and Methionine promotes digestive health, lean muscles** (points to the dog's body)
- Lutein and Vitamin A promote eye health and better vision** (points to the dog's eye)
- High palatability—Testing shows cats prefer higher inclusions of Empyreal 75** (points to the cat's head)
- Essential Fatty Acid, Linoleic for healthy skin and coat** (points to the cat's body)
- High protein builds, repairs, and maintains muscle** (points to the dog's body)
- Ideal for high-protein low-carbohydrate diets** (points to the cat's body)
- Low ash and magnesium for urinary tract health** (points to the cat's body)

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Protein is a Tool for Completing Satisfaction in the Eating Experience

By Don Shandera, PhD, Feed Ingredients R&D Manager

The eating or meal experience is more than the attraction to the food and its palatability. The ability of the meal to generate a feeling of satisfaction afterwards is also critical, largely through generating a feeling of “fullness” and wellness. The terms “satiety or satiation” describes this feeling of satisfaction that leads to cessation of eating or a decreased desire for eating (and maybe the desire for a nap and self grooming). If satiation is not met, then hunger is still present and the food or meal simply provided nutrients without complete satisfaction. This is a negative experience for both the pet and the caretaker, as the pet will still feel the need to display manipulative behavior to negotiate more food, potentially beyond the food manufacturer’s recommendation, and put itself at risk for obesity. Alternatively, if the pet is on a reduced or restricted calorie diet for weight control, the use of ingredients to bring about satiation under these conditions is a value proposition any pet owner who has experienced the emotional turmoil in choosing between their pets immediate happiness or long term health can relate to.

A diet that can regulate eating behavior through satiating the pet while delivering required calories and regulated nutrients would mutually benefit the pet’s wellbeing, prevent obesity, and assist the pet caretaker from overfeeding. This process can be manipulated through the composition and physical properties of the food consumed to influence hunger between meals and possibly regulate feeding intake levels. Satiety can be the foundation of nutrient regulation, especially for energy.

Satiety results from a combination of several physical and biochemical responses that regulate food consumption. The feeling of satiety is a combined response to gastric distention, hormonal responses, insulin/blood sugar regulation and the release of gastrointestinal peptides by intestinal cells that stimulate the central nervous system. The most popular ways to

enhance satiety of a diet are with fiber and protein, which can be used to influence the duration of postprandial (after meal) satiety and postpone interprandial feelings of hunger.

The relative impact of food components on producing satiation in isocaloric diets can be compared to the (uncooked) starch component as a baseline for substitution. Substitution of starch with sugar can bring about a rapid rise in blood glucose and immediate satiation, but this evokes an intensive response of insulin production that can lead to following period of hypoglycemia within a few hours after a meal, thus leading to

more long term hunger. Fat consumption produces an effective satiation through slowing gastric emptying and increased free fatty acids in the blood, but foods with high energy density produce less gastric distension and less of a feeling of fullness, and in combination with palatability enhancement, can lead to overeating. The lower energy density of fiber, although usually

less palatable, brings about a feeling of fullness due to greater gastric distension in isocaloric comparisons. Dietary fiber with a high water-binding and holding capacity can volumetrically cause an increased stimulation of gastric stretch receptors (distension) and slows the rate of passage through the digestive tract. Several literature and patent citations also claim benefits of soluble fibers through promoting intestinal fermentations resulting in interprandial volatile fatty acid production which can stimulate L-cells in the terminal ileum and colon to secrete the satiety gut hormone peptide tyrosine-tyrosine (PYY). However, addition of fiber in significant amounts can compromise stool quality and increase stool volumes. In comparison to these other food components, protein has been consistently shown to correlate positively with longer termed satiation without affecting palatability, stool quality, or health.

An overwhelming body of evidence conducted in humans and



several animal models support the use of high protein dietary intake for satiety. Protein is routinely used by the human dietetic sector as a key ingredient in weight control snacks and meal substitutes. Human dietary trends such as the Atkins Diet and The South Beach Diet are designed to double or in some cases, triple the amount of dietary calories consumed as protein, at the expense of carbohydrates. Theories for the weight loss associated with these diets include decreased calorie consumption, increased oxidation of fat and higher thermogenesis, which augments energy expenditure. Protein facilitates a reduction in energy consumption under ad libitum dietary conditions due to energy density and a greater feeling of satiety. Higher protein likely also has a stimulatory effect on muscle protein anabolism, favoring retention of lean muscle mass while improving metabolic profile in comparison to higher carbohydrate or fiber ratio diets when restricting calories.

Differing protein sources have been shown to produce different levels of satiety, while foods with higher amounts of branched amino have been correlated to greater satiating power likely due to their slower breakdown to energy and their roles in metabolism. Leucine, isoleucine, and valine contain a side chain with a branched carbon chain. The essential amino acid isoleucine is also essential in stabilizing and regulating the body's energy levels as well as the levels of blood sugar. Higher concentrations of branched chain amino acids has also be shown to maintain muscle protein synthesis and reduce nitrogen losses associated with very low energy diets. Many vegetable based proteins are high in branched chain amino acids; Empyreal 75 corn protein concentrate contains about 19% of these amino acids on a commercial basis. The structure, composition, and rate of digestion of the protein will also influence the post- and interprandial satiety response.

The mechanism and role various protein types plays in satiety is relatively complex, but the following discussion highlights the known facts. Classic understanding of hunger and satiation is based on the hormones ghrelin and leptin, which are well recognized that regulate hunger and satiety, respectively. Obese dogs have been shown to have higher plasma ghrelin levels while dogs with higher body condition scores have been shown to have higher leptin levels. Ghrelin is produced mainly by the stomach and the pancreas and levels typically decrease after meals. Ghrelin administration to dogs has been shown to have a relatively short physiological retention time, but one administration was shown to increase the total daily food intake. Some studies suggest that higher protein diets effectively decrease postprandial ghrelin concentrations, but other studies claim that plasma ghrelin may actually increase during high protein consumption. These studies indicated that the central nervous system may display increased sensitivity to leptin levels during high protein feeding periods as leptin levels are also not always correlated to decreased appetite. Such studies have shown that satiety in high protein diets is not completely explained by changes in the hunger hormone, ghrelin, or in the satiety hormone, leptin.

Other studies suggest that the satiety response during high protein feeding is beyond ghrelin or an insulin response, but stimulates production other gastrointestinal tract hormones such as cholecystokinin (CCK), glucagon-like peptide-1 (GLP-1) and tyrosine-tyrosine (PYY). CCK administered to the bloodstream of various species has been shown to produce the behavior of postprandial satiety. CCK production is stimulated in the upper small intestine in response to the digestion of fat and protein and slows gastric emptying. Species CCK response

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Concentrated source of Leucine, Glutamine, and Methionine promotes digestive health, lean muscles

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High palatability—Testing shows cats prefer higher inclusions of Empyreal 75

Essential Fatty Acid, Linoleic for healthy skin and coat

High protein builds, repairs, and maintains muscle

Ideal for high-protein low-carbohydrate diets

Low ash and magnesium for urinary tract health

EMPYREAL® 75
dependably pure.

may vary, but variants of CCK induce satiety by acting on CCK receptors distributed widely throughout the central nervous system. PYY is secreted from cells of the jejunum, ileum, and colon in response to a meal, slowing gastric motility and mediating pancreas hormone production to reduce appetite. GLP-1 is secreted by cells in the lumen and has been shown to increase satiety likely through its effect on slowing gastric emptying while improving glucose homeostasis, likely through decreasing glucagon secretion from the pancreas and promoting insulin sensitivity. GLP-1 concentrations have been increased in overweight subjects as a result to feeding high protein or soluble fiber diets. Other studies showed that satiety in animal models was associated with levels of apolipoprotein AIV concentrations in the small intestine and hypothalamus, while food deprived animals showed a pronounced decrease in gene expression of AIV. Higher protein diets have also been shown in energy restricted diets to maintain thyroid hormone levels (T3 and T4) and reduce insulin responses to a meal. In summary, the digestive tract produces an array of satiation signals due to non-carbohydrate nutrients, and these can be potentially prolonged through contact between nutrients and intestinal chemoreceptors.

Nutrient delivery systems with modifications such as rate of digestibility and absorption can also play key roles in promoting the feeling of satiety. In the human food area, for instance, it has been long recognized that complex food systems such as whole grain breads provide a longer satiety effect than refined sugars. Vegetable proteins' expansion functionality can be manipulated during extrusion to form intercellular networks, kibble cell structure (expansion for gastric distension) and temporarily bind other ingredients to slow the food's breakdown and absorption in the gut thus giving the animal a timed nutrient release and longer overall satiety. We have demonstrated that Empryreal

75's protein trait of low solubility can be used to manipulate the food's satiety functionality in the above manner. Using this tool for manipulating volumetric delivery of food is for the pet owner that believes the pet needs their bowl filled to a predetermined level in spite of the feeding recommendations. Empryreal 75 is a very good ingredient for manipulating cell structure and managing volumetric and energy density.

The concepts of palatability and satiation of a food does not have to be at odds with each other. I believe for years we have "chased" health and wellness and the relationship of eating. Recent studies have gone a long way to address the balance between our drive to consume "tasty" items that are key to our survival within healthy amounts when food is in abundance. I believe that our pets are also experiencing the same primal urges to consume high energy foods when available, however, the average domestic pet has an abundant supply of nutrients available daily, so feeding becomes a "negotiated" experience between the owners expression of love and the pets ability to exhibit manipulative behavior. As an industry, we spend a tremendous amount of time getting the pet to accept our foods with excitement. A value added proposition to our consumers is to integrate recommended feeding amounts, nutritional delivery, and a feeling of satiety for the pet into one product. In this way, the issue of obesity due to the owner compromising the amount of recommended consumption doesn't have to be at odds between the owner and pet begging for more. Protein has repeatedly been shown to be a key food component that assists regulation of satiation and while also promoting maintenance of muscle mass. Accordingly, protein is useful in weight control diets without having a negative impact on palatability, health, or stool quality. Formulation of high protein diets with Empryreal 75 can assist you in delivering novel solutions promoting meal satisfaction and weight maintenance to your customer.

Palatability



Empyreal® 75 offers excellent palatability.

A nutrient-rich ingredient is of little value if animals reject it due to palatability problems. Fortunately, that’s not an issue with Empyreal 75.

Third-party tests show that cats actually prefer diets that include Empyreal 75 over corn gluten meal and chicken byproduct meals. And their preference actually increases with a higher inclusion of Empyreal 75.

Testing results with dogs indicate there is no significant difference between corn gluten meal, and Empyreal 75; additionally, higher inclusions of Empyreal 75 do not negatively impact palatability.

A Highly Palatable Ingredient

- Improved product palatability, enhancing smell, taste, and texture.
- Excellent digestibility in both dogs and cats.
- Good stool quality in both dogs and cats.
- HACCP/GMP programs in place.

Feline Diets Compared in Palatability Trials

| Ingredients/% Inclusion | CGM | Empyreal 75 | Hi E75 | Lo E75 | CBPM |
|--------------------------|-----|-------------|--------|--------|------|
| Corn Protein Concentrate | | 20 | 35 | 7 | |
| Corn Gluten Meal | 25 | | | | |
| Chicken Byproduct Meal | 20 | 20 | 14.2 | 34.3 | 42.7 |
| Wheat | 10 | 10 | 10 | 10 | 10 |
| Corn | 10 | 10 | 10 | 10 | 10 |
| Brewers Rice | 17 | 22 | 12.7 | 20.8 | 19.4 |
| Chicken Meat | 5 | 5 | 5 | 5 | 5 |
| Animal Fat | 10 | 10 | 10 | 10 | 10 |
| Digest | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

34.5% Protein, 15% Fat, <8% Ash, 3700 ME kcal/kg

Manufacturer Friendly

EMPYREAL[®]
75
dependably pure.



Empyreal[®] 75: A manufacturer-friendly protein source.

Pet food companies appreciate the unique manufacturing benefits provided by Empyreal 75. Lower drying costs, superior extrusion properties, and exceptional kibble quality are just a few ways Empyreal 75 increases manufacturing efficiency, and, eliminates unpleasant surprises in the production process. Empyreal 75 delivers superior, consistent functionality for your premium products' appearance, density, and texture.

Manufacturing Advantages

- Repeatable, predictable expansion and binding.
- Functionality, with low starch content and low solubility.
- Lower water requirements for processing, resulting in lower energy consumption.
- Superior elasticity, binding, and coating properties.
- Enhanced surface smoothness of dry kibble.



Empyreal 75



Other Protein Source

Consistent

EMPYREAL[®]
75
dependably pure.



Empyreal[®] 75 is the picture of consistency.

With Empyreal 75, pet food manufacturers know exactly what they'll be getting—a consistent, naturally pure source of protein. Our strict quality control measures assure that product uniformity, flowability, and nutrient composition are consistent in every shipment. That consistency is your assurance of a uniform finished product. And, ultimately, satisfied customers.

A Consistently Pure Protein Source

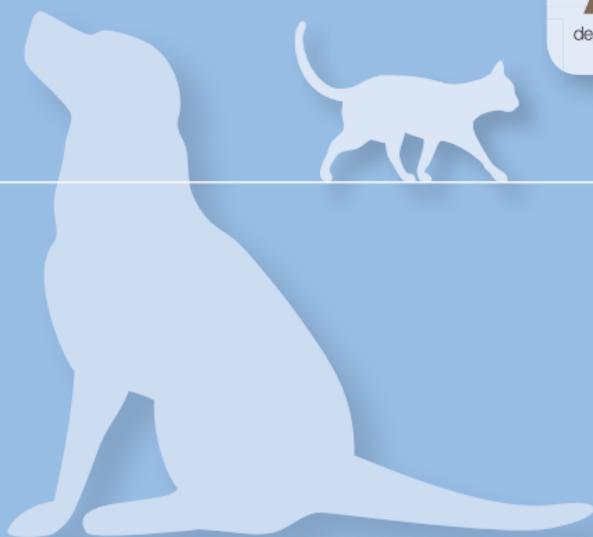
- Superior consistency ensures predictable functionality—in every shipment, every time.
- Superior manufacturing processes backed up by a stringent quality control system provide a consistent ingredient.
- Consistent supply of Empyreal 75 eliminates plant interruptions.
- Consistent appearance and texture ensures consistency for your product.

Every Shipment.

Every Time.

High Protein Density

EMPYREAL[®]
75
dependably pure.

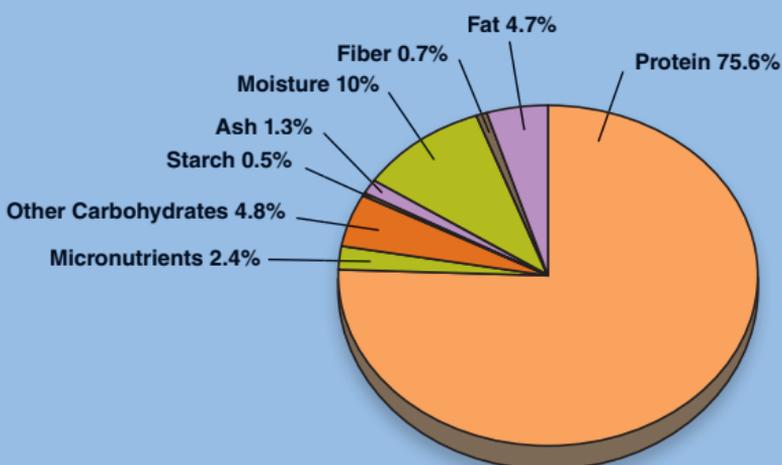


Empyreal[®] 75 provides naturally pure, high-protein density.

Nutrient density creates “space in the diet,” giving pet food manufacturers a high degree of freedom to vary ingredients to fit specific needs. This helps protect against unforeseeable price increases and ingredient availability issues. Empyreal 75 provides the option to lower production costs by allowing for new ways to optimize ingredient selection and order.

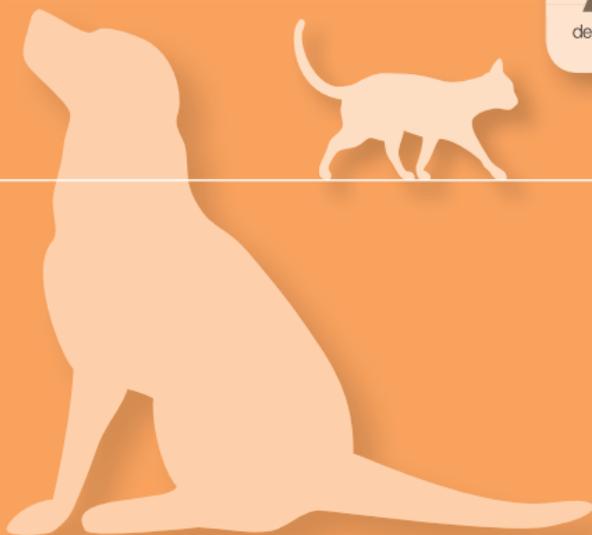
Highly Concentrated Protein

- High purity.
- Provides space in the diet.
- New definition delivers clearer customer communication and new marketing opportunities.
- Can work well with “made with organic” diets.
- Gluten-free.
- Complements animal proteins—allows flexibility to vary ingredients.



Dependably Pure

EMPYREAL[®]
75
dependably pure.



Empyreal[®] 75 puts first things first.

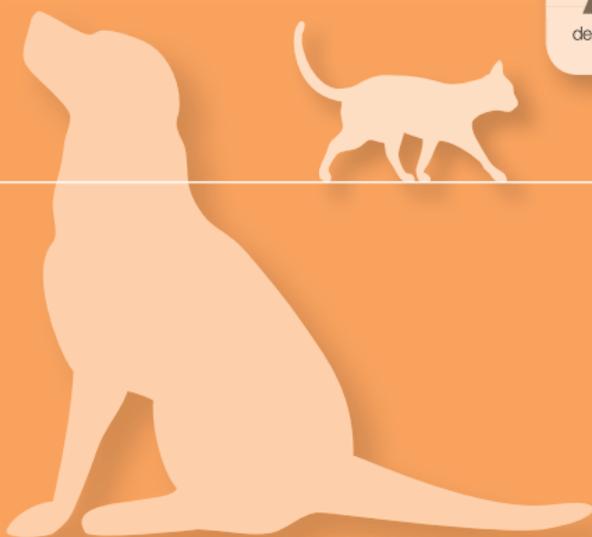
We believe in “Dependably Pure.” And we practice it every day, starting with a natural source of pure plant protein, processed under the most stringent controls, in an AIB-inspected facility. With Empyreal 75, “dependably pure” is more than an advertising slogan. It is assurance your product, and your reputation, are safe.

The Highest Standards. Every Shipment. Every Time.

- Quality, naturally pure ingredient.
- Produced in a food plant from U.S.-sourced grain.
- Inspected and audited by AIB International.
- Certificate of Analysis issued for every shipment.
- No added preservatives or additives.
- No starch.
- Reduced mycotoxins and contaminants.



Safe Ingredient



Empyreal® 75 provides protection in an imperfect world.

Empyreal 75 was developed with pet food safety as a priority. We have HACCP/GMP programs in place to ensure quality food safety and security. We use a “patented process,” that incorporates pasteurization and washing to destroy bacteria and reduce harmful levels of mycotoxins and other potential contaminants. We even transport Empyreal 75 in our dedicated trailers and railcars to ensure product safety and security. Every shipment. Every time.

Safe, Natural Ingredient

- HACCP/GMP programs in place.
- Manufactured solely from U.S.-sourced grain.
- Product of the wet milling industry, backed by 40+ years of experience.
- Pasteurized for ensured safety.
- Washed to remove impurities.
- Natural protein source, no preservatives added.
- Delivered by our dedicated rail and trucks to maintain ingredient integrity.



Urinary Tract Health

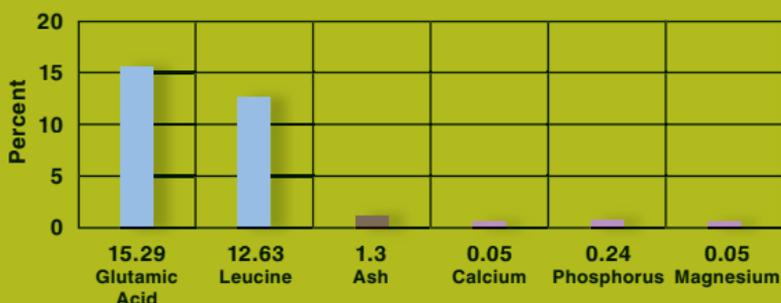


Empyreal® 75: A natural choice for urinary tract health diets.

Empyreal 75 is a natural source of pure protein that contains low levels of ash and magnesium to promote a cat's urinary tract health. The amino acids found in Empyreal 75, such as Glutamine, Glutamic Acid, and Leucine are digestible energy sources that support both a cat's and dog's digestion. These amino acids are converted to energy, potentially reducing urea production, making Empyreal 75 an ideal choice for urinary tract health diets.

Urinary Tract

- Low ash concentration, making Empyreal 75 an ideal choice for urinary tract health diets.
- Contains very low levels of magnesium, calcium, and phosphorous.
- Contains amino acids such as Glutamine, Glutamic Acid, and Leucine as digestible energy sources that are converted to energy.



Strong Immune System

EMPYREAL[®]
75
dependably pure.



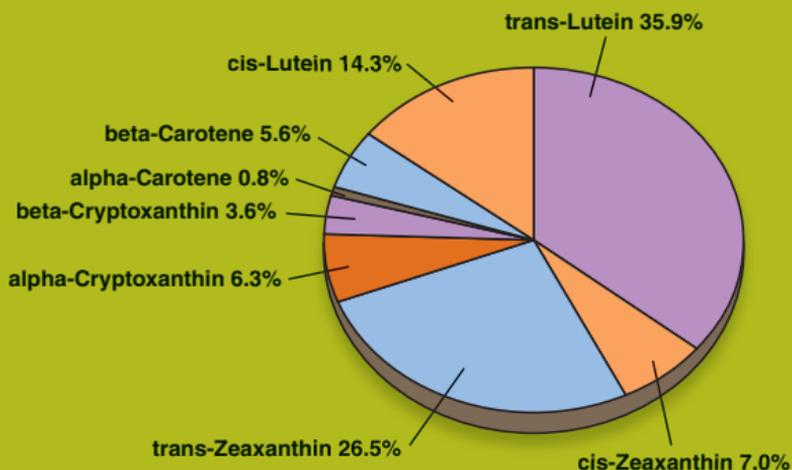
Empyreal[®] 75 promotes healthy immune systems with key nutrients and antioxidants.

Empyreal 75 provides a naturally concentrated source of antioxidants that support your pet's immune system and help provide the protection it needs to stay healthy. Increased antioxidants can promote a stronger defense against several diseases and ailments caused by viruses, bacteria, and parasites.

Strong Immune System

- Naturally concentrated source of antioxidants, such as Lutein, Beta-Carotene, and Zeaxanthin to support healthy immune systems.
- Contains a natural, concentrated blend of several carotenoids, flavonoids, and pigments for enhanced antioxidant protection.

Key Antioxidant Distribution





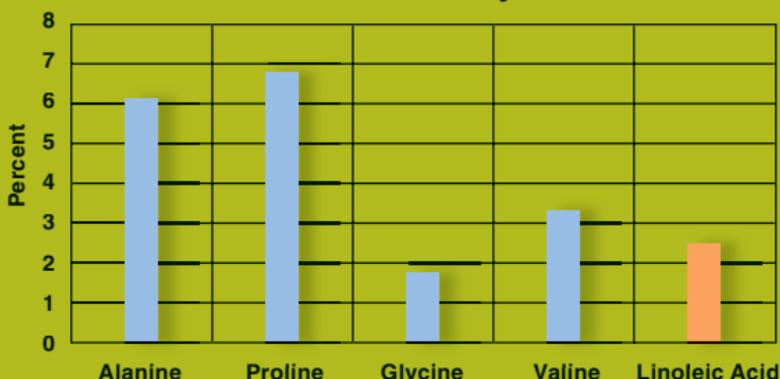
The essential amino acids and antioxidants in Empyreal[®] 75 promote healthy skin and radiant coats.

Dry coats, hair loss, and skin inflammation are among the leading reasons pet owners seek veterinary care for their animals. A diet containing Empyreal 75 may help alleviate these problems. Empyreal 75 is an excellent source of essential amino acids and vital antioxidants that support better skin and coat health for your pet. Empyreal 75 also contains Linoleic fatty acid.

Skin and Coat

- Excellent source of essential amino acids and vital antioxidants.
- Source of essential fatty acid, Linoleic, which supports healthy skin and coat.
- A good source of Proline, Alanine, Glycine, and Valine, such as Elastin, Keratin, and Collagen, to promote healthy skin, coat, and nails.

Amino Acid & Essential Fatty Acid Content



Healthy Eyes & Vision



Empyreal® 75 provides naturally high levels of Lutein and Vitamin A which promote eye health and good vision.

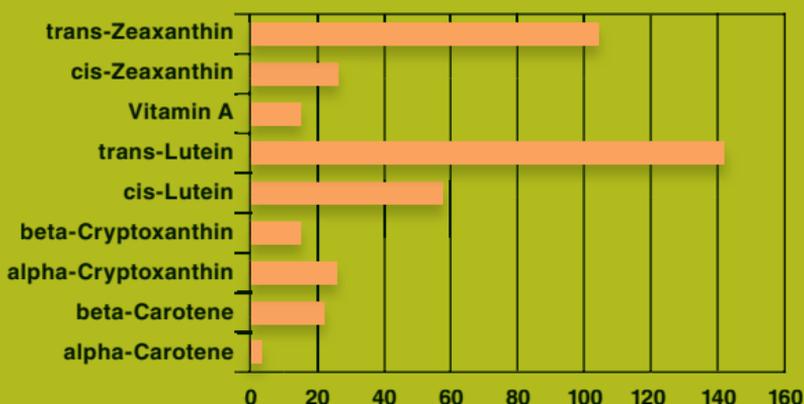
Diets containing Empyreal 75 can help preserve and promote eye health for both dogs and cats, because Empyreal 75 is a concentrated source of Vitamin A, Beta-Carotene, and Lutein.

Lutein, a carotenoid, is also present in the retina of healthy eyes. It helps protect against ultraviolet radiation damage. Vitamin A, also abundant in Empyreal 75, has antioxidant properties that can combat free-radical damage to the lens of the eye.

Healthy Eyes and Vision

- Naturally pure source of Lutein, Beta-Carotene, and Vitamin A to promote eye health and better vision.
- Contains a concentrated, natural blend of several carotenoids, flavonoids, and pigments, including Zeaxanthin, for enhanced antioxidant protection.

Key Antioxidant Concentrations (ppm)



Digestion & Lean Muscle



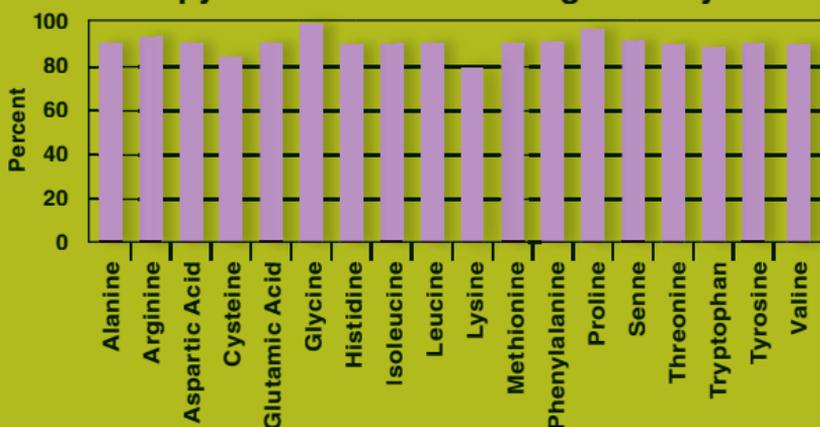
Empyreal® 75 promotes a healthy digestive system and can help build and maintain lean muscle tissue.

Empyreal 75, on a pound-for-pound basis, delivers a high concentration of essential amino acids and vital antioxidants, making their full nutritional value available for both dogs and cats. It's a good source of Glutamine and Glutamic Acid, shown to be important in metabolizing sugars and fats as well as transporting potassium.

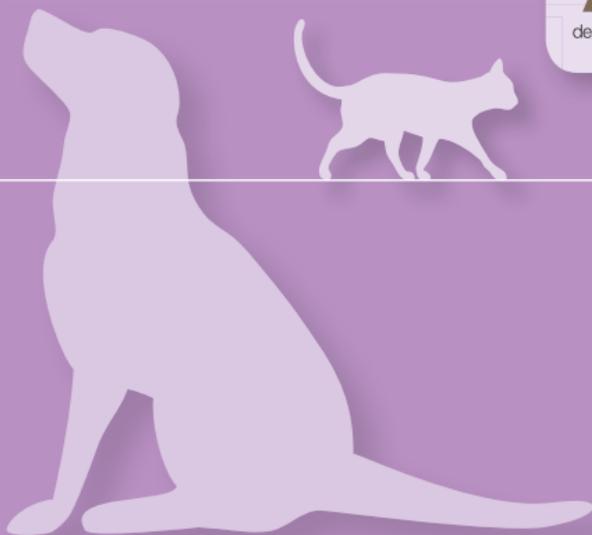
Digestive Health and Lean Muscle

- Recent research indicates that high concentrations of Glutamine/Glutamic Acid assist in intestinal health and well-being.
- A concentrated source of Leucine, Glutamine/ Glutamic Acid, and essential amino acids promotes synthesis of muscle proteins and maintenance of healthy, lean muscle.
- Gentle drying process promotes easy digestion.

Empyreal 75 Amino Acid Digestibility



Certifications



Empyreal® 75 has earned virtually everyone's stamp of approval.

Now we're ready to earn your business. So, if you're looking for a natural, pure, gluten-free source of protein, processed in a food plant under the strictest quality control measures, Empyreal 75 is it. You have our word on it.

Certified Quality

- Meets AAFCO definition for corn protein concentrate AND a *natural* ingredient.
- Gluten-free.
- Produced in an AIB-inspected facility.
- GRAS status.
- Kosher-certified.
- Halal-certified.



EMPYREAL™

75

dependably pure.



Protection in an imperfect world.

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Empyreal is a trademark of Cargill Corn Milling.

New Empyreal™ 75. A naturally pure source of protein. Every shipment. Every time.



Empyreal 75 is a new generation, high-energy corn protein concentrate that provides pet food manufacturers with a consistently pure source of protein for dog and cat diets. It contains a minimum of 75 percent (82% db) protein, produced through a patented process sourced solely from U.S. grain. This, along with full product pasteurization ensures a safe, consistent, high-protein source. Empyreal 75 is a natural source of highly digestible protein.

Strict quality control measures also guarantee that product purity, uniformity, flowability and nutrient composition are consistent in every shipment. Independent research confirms Empyreal 75 is both highly palatable and easy for pets to digest.

Kibble Quality

A higher-quality kibble starts with a higher-quality, consistent ingredient. Empyreal 75 provides:

- Uniform cell structure for consistent results.
- Greater product elasticity, binding, coating, and ingredient commingling.
- A smooth surface for an appealing kibble and greater palatability.

Risk Management

High protein density and purity of Empyreal 75:

- Creates ingredient flexibility for both the formulating and purchasing groups.
- Provides options to deal with shortages and public scares that may result from BSE, Avian Flu and other animal diseases—strategies the USDA has advised manufacturers to put in place.

Formulation Flexibility

Empyreal 75's natural, high protein density:

- Creates “space in the diet,” giving a high degree of freedom to manufacturers to vary ingredients to fit their specific needs.
- Reduces the impact of ingredient availability and price volatility.
- Is an extremely low ash content and high purity complements animal proteins and is ideal for use in urinary tract health diets.
- Reduces the number of animal protein grades needed in a diet, which reduces the number of ingredients to be managed.
- Reduces formulation costs by reducing dependency on low-ash products.
- Provides a cost-effective source of essential amino acids and high concentrations of natural antioxidants that promote animal health.

Manufacturing Benefits

Empyreal 75 offers pet food companies several unique benefits, including:

- Reduced drying costs because less water is required in the extrusion process.
- Superior extrusion qualities that reduce fines and allow greater fat inclusion.
- Natural antioxidants that extend product shelf life as well as promoting animal health.
- Possesses high-protein/low-ash properties that allow the manufacturer to differentiate products in the marketplace with low-ash guarantees. It can also significantly lower formulation costs, by allowing the use of higher ash animal proteins.



New Empyreal™ 75. A naturally pure source of protein. Every shipment. Every time.

Health Management

Independent studies confirm Empyreal 75 provides a highly digestible energy source for both dogs and cats.

It offers:

- An excellent source of methionine, lutein, and antioxidants with no preservatives added.
- Flexibility in balancing rations, because of a high methionine-to-lysine ratio.
- Good options for prescription and weight management formulations, further reducing the possibility that pets will become obese.



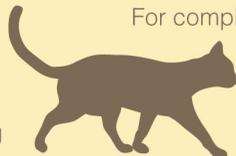
Satiety Agent

Because of its superior expansion properties plus low carbohydrate and fat levels, Empyreal 75:

- Enables manufacturers to better manage energy density in premium diets.
- Because of its expansion capabilities, it allows larger recommended feeding volumes, satisfying the pet owner's need to feel they're feeding enough food.
- Is a key ingredient in the battle against pet obesity.
- Extrusion properties allow good expansion with low starch levels, a way to manage "calorie density," especially in diets high in animal-based proteins and fats.

High-Protein, Low-Cost Alternative

Empyreal 75 allows for better management of formulation constraints and achievement of marketing goals by giving pet diets the benefit of a high-protein concentrate, at the lowest cost of any comparable protein ingredient.



Empyreal 75 is the low-ash, preservative-free, highly digestible and palatable source of energy for pet diets.

Dependably Pure.

Pet food ingredient safety was our number one priority long before it became international headline news.

Empyreal 75 begins with a wholesome, natural source of vegetable protein. Then, through our pasteurization and washing processes, we destroy bacteria and reduce the levels of mycotoxins, organophosphates and any other contaminants.

Every precaution is also taken in transporting Empyreal 75. Our dedicated fleet of trailers and railcars moves Empyreal 75 safely and securely. Every shipment. Every time.

Empyreal 75 is a new, registered product category, enabling several unique marketing and labeling opportunities as well as product identities.

Empyreal 75 Guaranteed Analysis

| | |
|---------------------------------------|-------|
| Crude Protein, min | 75.0% |
| Crude Fat, min | 2.0% |
| Crude Fiber, max | 2.5% |
| Starch, max | 1.0% |
| Ingredients: Corn Protein Concentrate | |

Learn More

For complete details on Empyreal 75, visit:

www.emyreal75.com or call:
866.369.5498.

EMPYREAL 75 HAS RECEIVED KOSHER CERTIFICATION, GRAS STATUS, AND IS MANUFACTURED IN AN AIB-AND NFPA-INSPECTED FACILITY.

