



# Pet Essential Nutrition Quarterly

Q4 2017



The historic Royal Agricultural University located in the UK, hosted the 21st Congress of the European Society of Veterinary and Comparative Nutrition, from 20th to 23rd September, 2017. The event explored the latest nutritional research in a wide-ranging number of species including zoo animals,

dogs, cats, horses and humans. Representatives from academia and the animal nutrition industries from all around the world attended the event, thus providing all excellent networking opportunities.



Roger Bouillon (KU Leuven, Belgium), presented the latest understandings and areas of further research required on the extra skeletal benefits of vitamin D on the immune system, cancer development and heart health. He also reviewed the strategy of increasing vitamin D content of

foods to help improve general vitamin D status of a widely vitamin D deficient human population. He highlighted the fact that dogs and cats cannot produce vitamin D when exposed to sunlight, and are therefore dependent on dietary vitamin D. Dogs have been found to have wide variations in serum vitamin D, as low as 25 nmol/L, which in humans is associated with rickets to 200 nmol, which is associated with toxicity in humans. Establishing safe, yet adequate intakes of vitamin D for pets is therefore vitally important for our pet's long-term wellbeing. Ellen Dierenfeld (Nottingham Trent University, UK) reviewed comparative and specific species considerations of vitamin D nutrition in the invertebrate, fish, amphibian, reptile, mammal and bird groups, and how multiple aspects should be considered when assessing their vitamin D nutrition.

The lectures clearly demonstrated that in addition to bone health, emerging science reveals a non-skeletal benefit of vitamin D for several other health outcomes. As a result, I will not be missing out on my daily vitamin D supplement! The 22nd European Society of Veterinary and Comparative Nutrition (ESVCN) Congress will take place at the University of Munich, in September 2018. I hope to meet you there.

Sincerely,

Sarah-Jane Godfrey

Technical/Marketing Manager, Europe



The name “Vitamin” or “Vitamine” is derived from the Latin word “vita” meaning “life” combined with the chemical term “amine”. Unfortunately, the discoverer of vitamins and creator of the term, Polish American Biochemist Casimir Funk, hypothesized all vitamins were amines. He was incorrect; however, they are Vital for Life.

*Vitamins are as essential for companion animals as they are for humans, and here is the reason they should be an important part of a pet’s daily dietary intake:*

**Vitamin A** is important for vision, reproduction, growth, cellular differentiation, and morphogenesis. It is needed for the growth and maintenance of teeth, nails, hair, bones, and glands. For example, improved skin and hair coat quality in adult dogs was associated with a premium dry dog food containing 22972 IU vitamin A/kg diet.

**Vitamin D** regulates calcium and phosphorus metabolism. It supports strong bones and teeth. The metabolite of Vitamin D also affects many biological functions of the body such as skin health and regulation of cell differentiation. Most immune cells have vitamin D receptors and their immune function is enhanced by vitamin D.

**Vitamin E** is a major lipid soluble antioxidant in cell membranes, plasma, and tissues. It protects cells from damaging free radicals generated during normal energy metabolism, stressful conditions, and pathological situations, such as inflammation. It helps to improve immune function, prolong the life of red blood cells, and maintain a healthy circulatory system. It has been found that diets containing 552 IU vitamin E/kg diet significantly improved immune function in both young and old cats. In another study, dietary vitamin E concentration at 598 IU/kg and 540 IU/kg significantly reduced serum alkenal concentration, a product of oxidative damage, in dogs and cats, respectively.

**Vitamin K** is essential for healthy blood clotting and is a critical factor in bone formation and metabolism in dogs and cats.

**Vitamin B1 (Thiamin)** facilitates the metabolism of carbohydrates, lipids and amino acids. It supports healthy neurological functions and the maintenance of peripheral nerve tissues.

**Vitamin B2 (Riboflavin)** is central to energy metabolism and is involved in both one-electron and two-electron transferring. It also plays a key role in antioxidant capacity of the body through participating in the glutathione redox cycle. Riboflavin helps maintain healthy skin and eyes.

**Vitamin B6 (Pyridoxine)** plays a significant role in a broad range of physiological processes in

the body, such as glucose production, red blood cell function, nervous system function, immune response, lipid metabolism, hormone modulation and gene expression.

**Niacin (Vitamin B3)** is required for energy metabolism, fat synthesis, and protein metabolism. It is also essential for DNA repair, transcription, and replication.

**Pantothenic Acid (Vitamin B5)** is a part of Co-enzyme A that is involved in energy metabolism and glucose production. It is needed for the synthesis of fatty acids, steroids, and hemoglobin in dogs and cats.

**Vitamin B12 (Cobalamin)** is necessary for DNA formation and red blood cell production. It helps maintain the nervous system and is essential for healthy mental function. Vitamin B12, along with vitamin B6 and folic acid, is critical for heart health.

**Folic Acid (Vitamin B9)** is an important player in mitochondrial protein synthesis, blood health, and the metabolism of amino acids and nucleotides. It serves as donors and acceptors of one-carbon units.

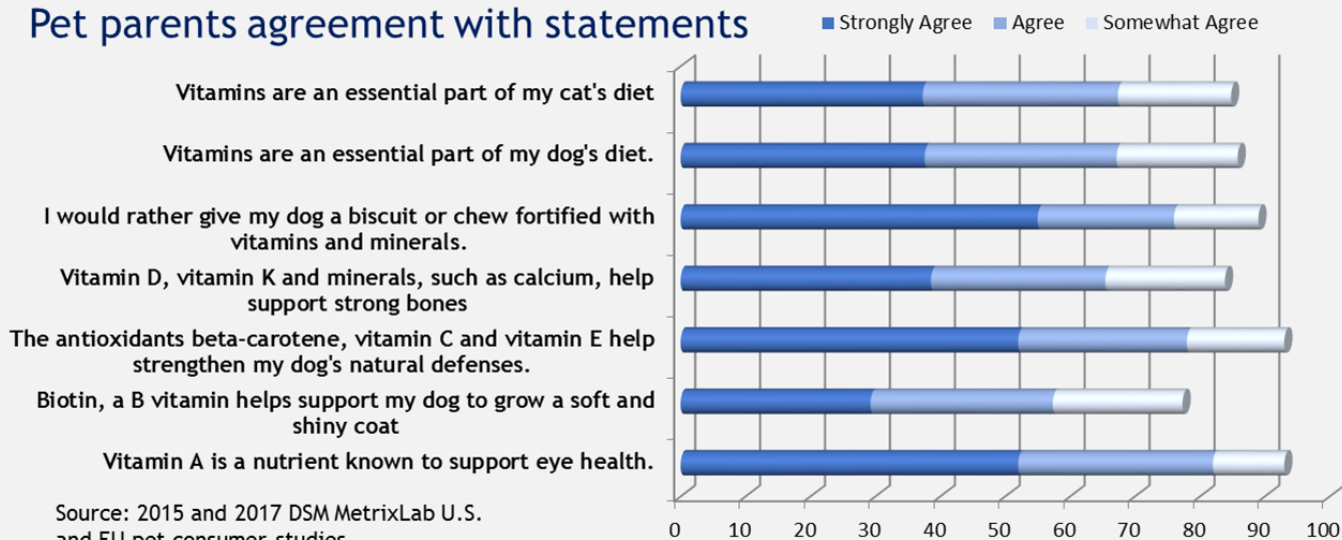
**Biotin (Vitamin H)** is needed in glucose synthesis, amino acid metabolism, energy metabolism, and fatty acid synthesis. It is important for healthy skin and hair coat quality. For example, dietary biotin concentration at 10 mg/4000 kcal ME was associated with improved skin and hair quality in dogs.

**Vitamin C** aids in the production of collagen, which provides support to muscles, vascular tissues, bones, and cartilage. It is an important water soluble antioxidant. Vitamin C can be synthesized in dogs and cats. However, a number of studies have demonstrated health benefits of vitamin C supplementation in dog and cat foods. For example, Stay-C. 50, a special form of vitamin C, improved canine and feline periodontal health. Together with  $\beta$ -Carotene and vitamin E supplementation, dietary vitamin C at 70 ppm decreased oxidative stress in healthy adult dogs.

**Choline** is critical in lipid metabolism and for healthy liver function. It provides active methyl groups for methylation reactions in the body, including synthesis of methionine, an essential amino acid, creatine, a muscle power enhancer, carnitine, a healthy body weight facilitator, and acetylcholine, a neuro-transmitter used throughout the nervous system.

**Beta-Carotene** is a powerful antioxidant and immune modulator. It is also a pro-vitamin A in dogs. Beta-Carotene stimulates both cellular and humoral immune responses. For example, it supplementation increased plasma antibody concentration and enhanced the delayed-type hypersensitivity response in both dogs and cats.

## Pet parents agreement with statements



### Vitamins are long-established nutritional ingredients that are recognized for their health benefits with a worldwide awareness.

With the growth and dynamic nature of the premium brand sector of the pet food industry, health and wellness related claims are exploited the most. This is driven by the humanization trend and the increasing consumer awareness regarding nutrition topics. These high-priced brands require a strong point of differentiation and substantiation to justify the additional consumer spend. Often these brands reach for unique ingredient offers that match the latest trends in human nutrition (e.g. proposed skin benefit of quinoa). The greatest challenge with this approach is the awareness level behind the featured ingredient and the lack of science supporting the related health claim.

Vitamins, however, have a long standing high-level of awareness across a broad spectrum of consumers. Many vitamins, like **Vitamin C**, have a “halo of good health”, meaning most consumers would believe in vitamin C supporting many different health issues (e.g. immune function, antioxidant, skin and gum health). Vitamin E is similar.

Since 2015, DSM commissioned MetrixLab to conduct a major pet consumer survey in the U.S., U.K., Spain, and Germany. From these studies, we found many similar pet parent perceptions and attitudes about vitamins and their benefits. Although an extensive list of positive attributes was collected, the following is a sampling of what can be shared to emphasize the value of leveraging vitamins to support and substantiate the heavily sought-after health claims for premium brands:

#### Vitamins in general

The majority of health-conscious consumers

dog and cat consumers agree vitamins are an essential part of their pet’s diet. In the [www.jwtintelligence.com](http://www.jwtintelligence.com) article “Vitamins get a makeover”, the author states “According to experts, vitamins are now beginning to pick up a growing interest in clean ingredients and holistic supply chains.” This outlook becomes relevant for the pet food industry because many new premium brands are leveraging clean ingredient and holistic type messaging on pack. Vitamins offer not only the believability factor but many pertinent health claims can be substantiated by a large body of scientific evidence in most pet species.

#### Vitamin specific claims

Based on the MetrixLab study results, it is easy to see how pet parents link specific vitamins to important health benefits.

- **Vitamins D and K** supporting bone health
- The antioxidant vitamins, **Beta-Carotene, Vitamins C and E** support for canine immune function
- **Biotin** addressing coat health, a critical outward sign of overall health
- **Vitamin A** support for eye health

It is of further interest to see that vitamin supplementation via snacks strongly resonated as true by pet consumers. This aligns well with the growth in fortified human snacks and use of dietary supplements.

Veterinarians are quick to advise that proper nutrition and exercise are the most critical factors affecting the health and wellbeing of pets. Well-known and understood vitamins provide brand owners with a tool that will strengthen their brand messaging, both today and in the future. Contact your DSM representative or email your request for more information to [petfood.nbd@dsm.com](mailto:petfood.nbd@dsm.com)