



Ingredients for Pet Nutrition

Product handbook and catalog 2014/2015

Table of Contents

DSM – Bright Science. Brighter Living™	2
DSM Nutritional Products	3
History of DSM	4
Nutritional Ingredient Production	6
Premixes and Blending	8
Peace of Mind	10
Responsibility	11
Nutritional Ingredients	12
Formulation	16
Innovation	19
Pet Nutrition Concepts	20
Application	22
Table of Products	24

DSM – Bright Science. Brighter Living™

Our company

Royal DSM N.V. is a global science-based company active in health, nutrition and materials. By connecting its unique competencies in Life Sciences and Materials Sciences DSM is driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders simultaneously. DSM delivers innovative solutions that nourish, protect and improve performance in global markets such as food and dietary supplements, personal care, feed, pharmaceuticals, medical devices, automotive, paints, electrical and electronics, life protection, alternative energy and bio-based materials. DSM's 24,500 employees deliver annual sales of €10 billion. The company is listed on NYSE Euronext. More information can be found at www.dsm.com.

Who we are

Who we are as a company is the result of strategic choices that we have made. These in turn are based on our mission and our core value; they define what we believe in and how we go about our business.

Our mission

Our purpose is to create brighter lives for people today and generations to come. We connect our unique competences in Life Science and Materials Sciences to create solutions that nourish, protect and improve performance.

Our core value

Our mission is supported by our core value: Sustainability. Everything we do should contribute to a more sustainable world. To us, achieving sustainability means simultaneously pursuing economic performance, environmental quality and social responsibility. In other words, we strive to create value on the three dimensions of People, Planet and Profit simultaneously.

Our brand promise

Bright Science. Brighter Living™. This sums up who we are, what we stand for and what we aim to achieve.

These four words are the shorthand for our mission, our beliefs and our behaviors – a promise that we make to the world in which we operate.

Bright Science refers to the unique way in which we combine Life Sciences and Materials Sciences disciplines, technologies and talents. We partner with customers and other stakeholders – then we share ideas, insights and inspiration to create innovative and sustainable solutions that address the key challenges facing society today.

Brighter Living refers to our commitment to creating products and solutions that make a positive difference to people's lives. We are constantly seeking new ways to improve quality of life, and we seek to make a positive contribution to the lives of people today and generations to come.



DSM Nutritional Products

DSM Nutritional Products is organized around three market-facing entities: Animal Nutrition & Health, Human Nutrition & Health and Personal Care.

Animal Nutrition & Health addresses the nutrition additives segment of the feed and pet food markets. Human Nutrition & Health largely addresses nutrition and functional ingredients segment of the food markets. Personal Care is focusing on the actives and ingredients in the sun care, skin care and hair care industries.

DSM is the only producer who can supply the complete range of vitamins and carotenoids in the most suitable forms for all possible animal and human uses.

DSM has established leadership positions across all three areas of the ingredients business: feed, food and personal care. DSM is the world's leading producer of vitamins. DSM is working from its strong basis as a global market leader in key value-added ingredients offered through an international infrastructure and reach unequaled by any competitor.

DSM is uniquely involved in all three steps of the value chain: the production of pure active ingredients, their incorporation into sophisticated forms, and the provision of tailored premixes. Being the only fully integrated player allows DSM to differentiate itself all the way through the chain.

Managing the interdependencies between active ingredients, forms and premixes, which have important implications for innovation, logistics, and value delivery, is a core competence of DSM.

Value added product and services

Acquisitions over the past five years emphasize DSM's strategy of driving focused growth in its nutrition cluster. Related products and services have become part of DSM Nutritional Products' value add to customers.

- Martek Biosciences has added a new growth platform of algal poly-unsaturated fatty acids, specifically DHA and EPA omega-3, and vegetarian ARA omega-6 ingredients used to fortify all types of human and animal products.
- Vitatene allows DSM to strengthen the natural carotenoids offerings of its nutrition business as consumer demand for natural products continues to grow.
- Microbia, a successful industrial biotechnology research and development specialist, enables DSM to incorporate a proprietary platform and world class research and development capabilities to support DSM's ongoing development of the natural carotenoids market.
- Ocean Nutrition Canada, the leading provider of refined and deodorized fish-oil offerings, rich in the poly-unsaturated fatty acids EPA and DHA omega-3, firmly establishes DSM Nutritional Products as the preeminent supplier of these products to the dietary supplement and food & beverage industries.
- Fortitech, the innovative leader in customized, value added food ingredient blends for food and beverage, infant nutrition and dietary supplement industries, combined with DSM Nutritional Products' broad range of ingredients, deepens DSM's ability to fully meet the ever increasing premix needs of existing and future customers.
- Tortuga, as the Brazilian market leader in organic trace minerals for animal nutrition and health with a focus on pasture raised beef and dairy cattle, strengthens DSM Nutritional Products' position in nutritional supplements and additives.

A pioneer in innovation

Innovation is a survival skill. DSM Nutritional Products fosters this skill to the benefit of both the customers' future and that of the company. Lateral thinking and innovative attitudes are valuable tools with which to secure that future. These lead to discoveries that DSM then links to customers' needs, extending the range of offering and creating new business opportunities.

Starting in 1935 with the chemical synthesis of vitamin C, Hoffmann-La Roche had always been a pioneer in the industrial synthesis of vitamins and carotenoids. Today DSM's Nutrition cluster, which includes DSM Nutritional Products, maintains this tradition and invests more than 5% of its sales value in R&D, which is significantly higher than peers in the industry.

DSM's Research & Development activities are concentrated in the regions of Switzerland, the Netherlands, China and the United States in six Research Centers: Animal Nutrition & Health, Human Nutrition & Health, Personal Care, Process Research and Development, Product Form Development and Analytics.

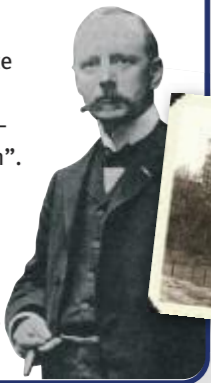
History of DSM

Re-invention of a successful company



1902

DSM founded as Netherlands state owned mining company "DSM – De Staats Mijnen". Mining activities focus on the Limburg region in the South of the Netherlands.



1920

Bituminous quality of coal leads to diversification into fertilizers, utilizing the ammonium from coking gas resulting in production of first ammonia based fertilizer.

1940

Construction of Central Laboratory in Geleen.

1963

DSM's first Steam-cracking installation opened.

1970's – 1980's

DSM diversifies into high performing plastics and fine chemicals.



1975

Dutch Prime Minister officially closed the country's last mine.

1989

DSM shares floated at the Dutch stock exchange (today Euronext).

1990's

DSM moves into products for the food and pharmaceutical industries as well as performance materials for the automotive and electronics sector.



2008

New regional headquarter inaugurated in Shanghai (China).



2012

DSM acquires Ocean Nutrition and Fortitech

2011

DSM acquires Martek Biosciences

2013

DSM acquires Tortuga

2011

Rebranding of One DSM



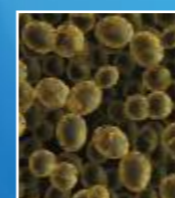
2005

World's largest production plant for vitamin E opens in Sisseln Switzerland.



1996

DSM acquires biotech and fermentation company Gist-Brocades, a global leader in yeast, yeast extracts, antibiotic production and enzymes, broadening DSM into a life science company.



2003

DSM acquires Roche's Vitamins and Fine Chemicals Division, forming DSM Nutritional Products, providing the full range of fat-soluble and water-soluble vitamins, carotenoids, long chain polyunsaturated fatty acids, enzymes and nutraceuticals to the feed, pet food, food, pharmaceutical and personal care industry.

2006

Global premix strategy initiated to grow the global premix network for high-quality mixes.

1938

Establishment of industrial production of vitamin A, B1, B2, E and K.



1950's

In response to global decline in coal use and increasing importance of polymers, DSM focuses on providing industrial chemicals and raw materials for synthetic fibers and yarns based on oil and natural gas.

1950

Development of the chemical synthesis of β -carotene.

1933

Commences industrial synthesis of vitamin C based on the process of Nobel prize winner Tadeusz Reichstein.



Hoffmann-La Roche



Industrial biocatalysis:

In the early 1970's DSM implemented the first industrial biocatalytic process.

Chiral amino acids are produced using specific enzymes, able to synthesize target enantiomers with exceptional purity. A whole toolbox of enzymes and chemical catalysts is now available for producing chiral ingredients for the pharmaceutical industry.



The world's strongest fiber:

In the 1990's DSM developed Dyneema®, the world's strongest

fiber. Initially developed for cut resistant fabrics and bullet proof vests it is 40 times stronger than steel. Now used in numerous applications ranging from fishing lines to ropes in offshore applications, high performing fabrics or reinforced and durable materials for vehicles and power plants. Latest focus is on the use of Dyneema in invasive medical applications.



Clean antibiotics production:

In 1996 DSM pioneered the first commercial production of semi-

synthetic antibiotics based on microbial fermentation instead of chemical synthesis. Identifying new enzymes and constructing new biosynthetic pathways by modern genetic technologies allowed a dramatic decrease in the environmental impact of antibiotic production.



High yielding cell culture technology:

Since 2002 DSM, in collaboration with Cruceel (NL), has

developed a leading technology for the production of antibodies applying human cell lines. The technology allows human cells to be cultivated in high density resulting in an efficient biosynthesis at high quality. DSM is licensing out this technology to its customers and acts as development and manufacturing partner.



Sustainability through enzymes:

40 years experience in enzyme application has resulted in a large range of enzymes

based solutions. DSM's global alliance with Novozymes (DK) provides a wide range of feed enzymes which, together with enzyme solutions for second generation biofuel and biogas processes, makes a tremendous impact on a sustainable development of global food production.



Bio-based performance materials:

In 2010 DSM started to introduce a series of bio-based resins

for the automotive industry, proven to match the high performance and speed of traditional chemical products. Palapreg® ECO and EcoPaXX® are composed of more than 50% renewable resources helping the industry to meet sustainability targets. They are used in bodyworks, engine compartments and transparent casings for head lamps.

Nutritional ingredient production

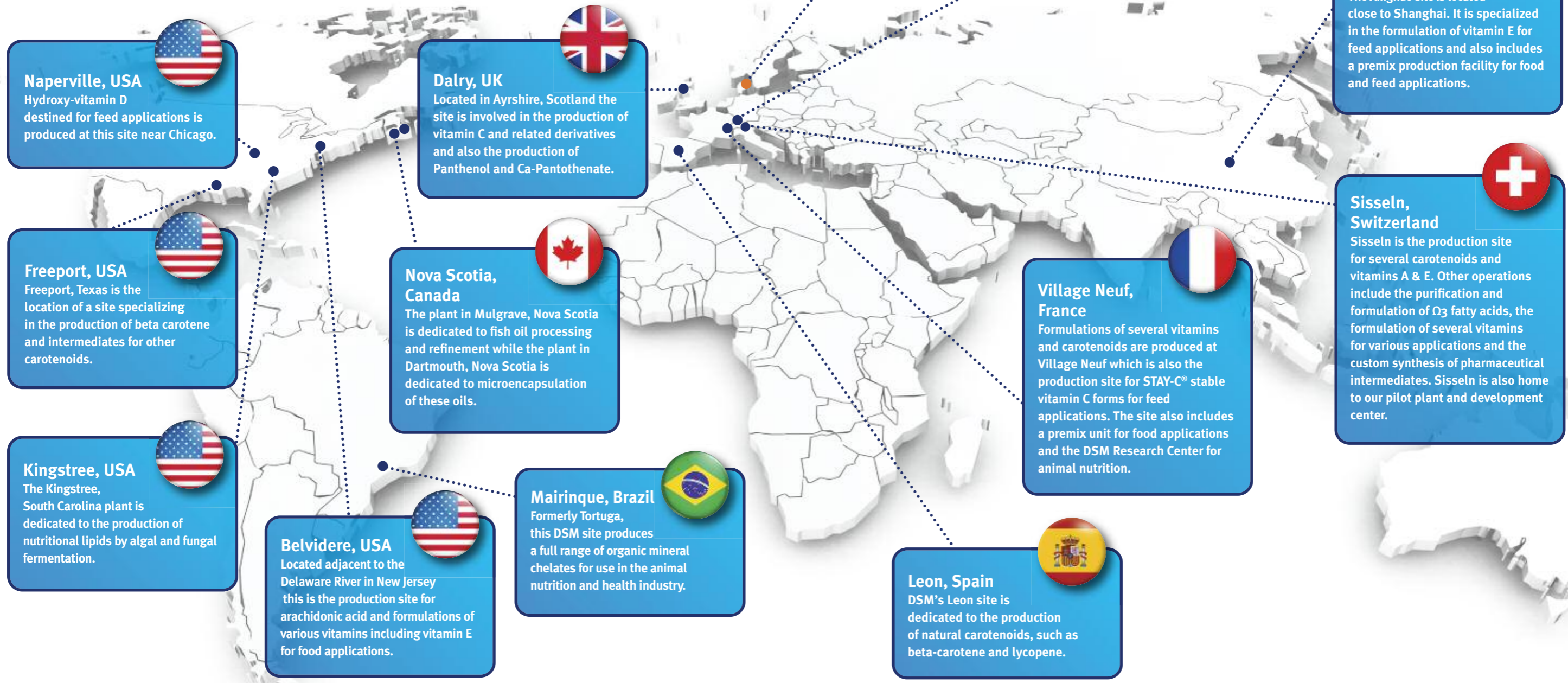
Backward integration underpins superior quality standards

DSM Nutritional Products operates nine bulk manufacturing and formulation sites across Europe, the United States, Latin America and China. These sites produce the majority of DSM's nutritional ingredients, which are sold either as straight products or as premixes and vitamin concentrates.

Our products are micro ingredients whose functionality is specific and whose impact can be enormous. It is therefore imperative to manufacture, package, store and ship them in accordance with the highest quality standards. Whether provided as straight products in bulk or as premixes tailored to

individual customer needs, our products always meet the most stringent quality requirements. We work to a unique global quality standard. This is rooted in the official regulations that give us our license to operate and is supplemented by our own

internal quality systems. Full backward integration allows us to assure quality at every step of the supply chain. We deliver to our customers via a dedicated logistics network based on three main distribution centers. These are located in Venlo (NL), Belvidere (USA) and Singapore.



Naperville, USA

Hydroxy-vitamin D destined for feed applications is produced at this site near Chicago.

Freeport, USA

Freeport, Texas is the location of a site specializing in the production of beta carotene and intermediates for other carotenoids.

Kingtree, USA

The Kingtree, South Carolina plant is dedicated to the production of nutritional lipids by algal and fungal fermentation.

Belvidere, USA

Located adjacent to the Delaware River in New Jersey this is the production site for arachidonic acid and formulations of various vitamins including vitamin E for food applications.

Dalry, UK

Located in Ayrshire, Scotland the site is involved in the production of vitamin C and related derivatives and also the production of Panthenol and Ca-Pantothenate.

Nova Scotia, Canada

The plant in Mulgrave, Nova Scotia is dedicated to fish oil processing and refinement while the plant in Dartmouth, Nova Scotia is dedicated to microencapsulation of these oils.

Mairinque, Brazil

Formerly Tortuga, this DSM site produces a full range of organic mineral chelates for use in the animal nutrition and health industry.

Novozyymes, DK

Novozyymes is DSM's Feed Enzymes Alliance partner for more than 10 years, researching, producing and formulating a portfolio of enzymes for use in the animal nutrition and health industry across the globe.

Village Neuf, France

Formulations of several vitamins and carotenoids are produced at Village Neuf which is also the production site for STAY-C® stable vitamin C forms for feed applications. The site also includes a premix unit for food applications and the DSM Research Center for animal nutrition.

Leon, Spain

DSM's Leon site is dedicated to the production of natural carotenoids, such as beta-carotene and lycopene.

Grenzach, Germany

Located adjacent to the Rhine in Southern Germany, this site primarily focuses on the production water soluble B vitamins, vitamin D and vitamin C derivatives. In addition intermediates used in the production of carotenoids are produced.

Xinghuo, China

The Xinghuo site is located close to Shanghai. It is specialized in the formulation of vitamin E for feed applications and also includes a premix production facility for food and feed applications.

Sisseln, Switzerland

Sisseln is the production site for several carotenoids and vitamins A & E. Other operations include the purification and formulation of Ω_3 fatty acids, the formulation of several vitamins for various applications and the custom synthesis of pharmaceutical intermediates. Sisseln is also home to our pilot plant and development center.

Premixes and blending

Product services where customers need them

DSM has a comprehensive global network of plants with over 40 plants dedicated to the production of premixes for the animal nutrition and health industry. This network helps ensure high levels of customer service and delivery, backed by the highest levels of traceability, quality and food safety. Being close to our markets allows us to respond quickly to changing market demands.

Europe

Our comprehensive network of premix plants in Europe comprises 13 plants. The plant network was recently expanded with a facility in Russia (Tatarstan), Romania and Italy.



Latin America

DSM is represented in most Latin American countries with a total of 13 premix plants.



Asia Pacific, Oceania

DSM has production capabilities in all the major feed producing and exporting countries in the region and was recently expanded with plants in the Philippines and New Zealand.



North America

Our four North American facilities assure customers of our outstanding service reliability in the supply of feed premixes.



China

DSM has the fastest expanding network of premix plants in China and serves most areas of the country from five sites. The new state of the art Sichuan facility uses advanced segregation control.



Our promise to you

Ask anyone who has worked with DSM and you'll hear these words over and over again:

The highest quality.

The highest standards of sustainability and traceability.

Total reliability.

That's why we are uniquely able to talk about creating Peace of Mind. It's what every DSM customer experiences every time they engage us. And that's the solid value of the DSM brand promise.



How We Create Peace of Mind:

Quality

Our reputation for quality manufacturing has been built over decades and continues to be earned everyday. This is why quality always comes first at DSM.

Reliability

We combine the expertise of global business with the insight and logistics of a local one to meet our customers' need with total consistency.

Traceability

We provide assurance that materials come from dependable sustainable sources globally.

Sustainability

This core value in DSM's corporate philosophy is integrated throughout all operations, as it is not only socially responsible but a key business driver.

HEALTH · NUTRITION · MATERIALS



DSM and responsibility



DSM in partnership with the World Food Programme

In March 2007 DSM announced an official partnership with the United Nation's World Food Programme (WFP). WFP is the largest provider of food aid to the world's hungry. They feed and nourish an average of 90 million people in over 80 countries each year.

The WFP – DSM partnership program, 'Improving Nutrition. Improving Life.' is a commitment to fight hunger and malnutrition around the world. DSM provides technical and scientific expertise and high nutrient products as well as financial assistance to improve the WFP food basket through the addition of essential micronutrients. Together, DSM and WFP make a difference to millions of people. Improving nutrition means fighting 'hidden hunger', improving lives, breaking the vicious circle of poverty and hunger. This is a major contribution to unleashing potential in countries and their economies.

For more information, please visit www.wfp.org

Sight and Life™ for better nutrition and improved well-being

Sight and Life™ is a humanitarian initiative of DSM which works with global and local partners and leading universities to sustainably and significantly improve human nutrition and health by encouraging partnerships, the generation and exchange of scientific information, and network building.

For more information, please visit www.sightandlife.org

Nutrition Improvement Program – Unlocking human potential

The Nutrition Improvement Program of DSM Nutritional Products Ltd is dedicated to improving human health and prosperity by eliminating micronutrient malnutrition. We support and promote the addition to staple foods of essential micronutrients (nutrients that cannot be synthesized in the body and are required only in minute quantities daily, such as vitamins, trace elements and most minerals) that are lacking in a population's diet.

For more information, please visit www.nutritionimprovement.com

Dow Jones Sustainability World Index

Royal DSM has once again retained its number one position in the chemical industry sector in the Dow Jones Sustainability World Index. DSM has held this top position in worldwide sustainability six times in total since 2004. In 2007 and 2008, the two years when DSM wasn't ranked number one, it was still among the leaders in the sector.

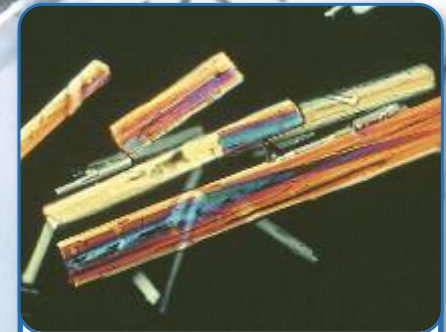


Nutritional ingredients

A brief guide to vitamins

DSM produces an extensive portfolio of nutritional ingredients for use in pet food products and supplements including minerals, vitamins, carotenoids, nutraceuticals and long chain polyunsaturated fatty acids. These products deliver a wide range of health benefits to all pet species.

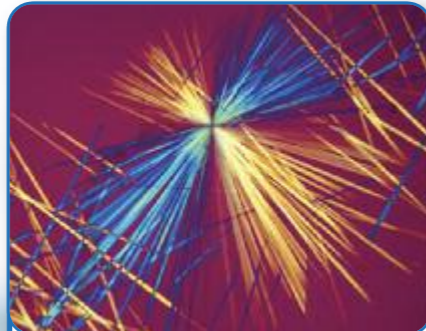
Vital for the efficiency of a broad array of functions in the body, the DSM vitamin range contains all the vitamins crucial for healthy, thriving, long-living pets.



Vitamin H, Biotin
Necessary for synthesizing fatty acids and breaking down protein and carbohydrate molecules. Helps in the maintenance of the thyroid and adrenal glands, nervous system, reproductive tracts, and skin.



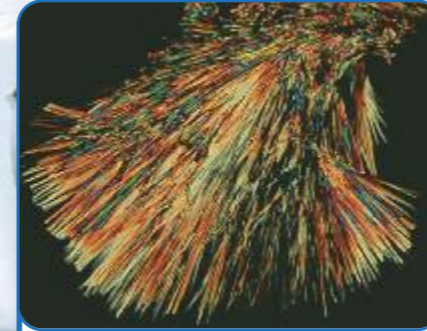
Vitamin A
Necessary for vision, growth, and tissue differentiation. Is important for keeping the skin, eyes, and inner linings of the body healthy and resistant to infection. Vitamin A is also needed for the maintenance and growth of teeth, nails, hair, bones and glands.



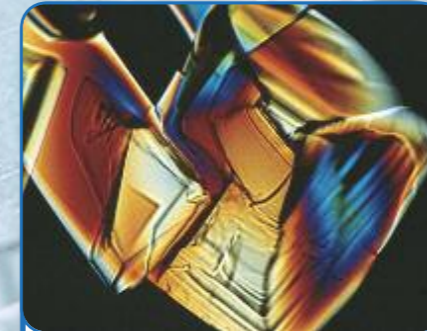
Vitamin D
Helps the body maintain and utilize the levels of calcium and phosphorus needed to build strong bones and teeth. Recent studies have shown additional benefits such as supporting immune health, weight management, and cancer prevention.



Vitamin E
Helps protect cell membranes, maintain the immune system, prolong the life of red blood cells, maintain a healthy circulatory system, and improve vitamin A use. Important for the health and proper functioning of body tissues. Is an antioxidant, neutralizing free radicals.



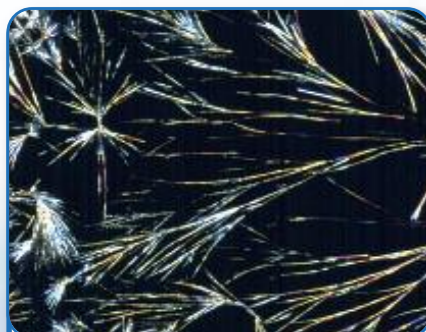
Vitamin B3, Niacin
Niacin and niacinamide are essential for fat synthesis, protein metabolism, and the conversion of food to energy.



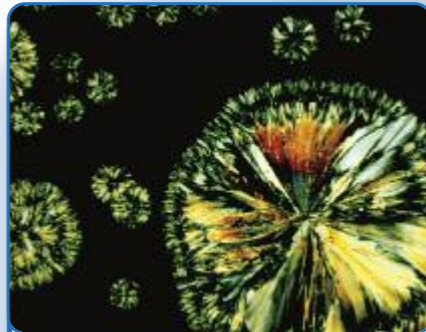
Vitamin B5, Pantothenic Acid
Essential for the formation of certain nerve-regulating substances and hormones. It is also required for metabolism of proteins, fats, and carbohydrates.



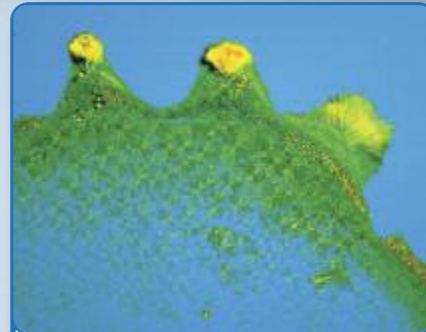
Vitamin B6, Pyridoxine
Necessary for energy metabolism, the formation of certain proteins, and the use of amino acids. It also helps the nervous system to function properly and is essential to a healthy immune system and heart health.



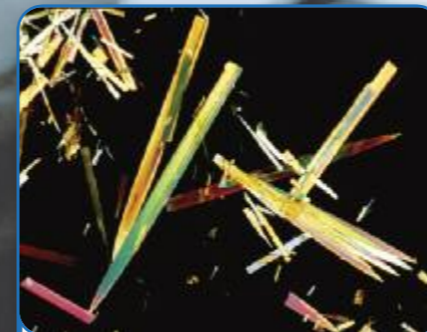
Vitamin K
Essential for the clotting of blood and may help maintain bone health.



Vitamin B1, Thiamine
Helps the body use its major source of energy, carbohydrates. Thiamine is also essential for proper muscle coordination, the maintenance of peripheral nerve tissue, and for normal growth.



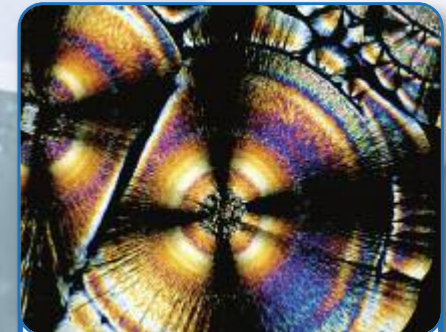
Vitamin B2, Riboflavin
Helps the body transform proteins, fats, and carbohydrates into energy. Helps maintain healthy skin and eyes and is also necessary for building and maintaining body tissues.



Vitamin B9, Folic Acid
Required for the formation of red blood cells, certain body proteins, and genetic materials for the cell nucleus. Emerging science suggests it may play an important role in reducing risk of cardiovascular disease, dementia, and certain cancers.



Vitamin B12, Cyanocobalamine
Necessary for the formation of DNA and the production of healthy red blood cells. Helps maintain the nervous system and is essential to maintaining mental function. Vitamin B12, along with B6 and folate, is essential to heart health.



Vitamin C, Ascorbic Acid
Aids in the production of collagen, which provides support to muscles, vascular tissues, bones, and cartilage. Aids the absorption of iron and improves teeth and gum health. Is an important water soluble antioxidant. Enhances the immune response and plays a protective role against cardiovascular disease, cataracts, and certain cancers.

Nutritional ingredients

Delivering healthier pets

DSM's portfolio of nutritional ingredients includes a broad range of carotenoids used as antioxidants, functional ingredients or colorants. Additionally, nutraceuticals developed for the human food market are made available to the pet food industry.

Carotenoids



β-Carotene (ROVIMIX®, CaroCare®)

β-carotene is an important source of vitamin A, converted into vitamin A as required. The additional health-promoting effects of β-carotene include antioxidant functionality protecting cells, tissues, and organs from free radical damage and as a contributor to the robustness of the pet's immune system.



Zeaxanthin (OPTISHARP®) and Lutein (FloraGLO®)

Zeaxanthin and Lutein are the carotenoids found in the retina and lutein in the tissue of the lens. They act as antioxidants and absorb near-to-UV blue light. Higher dietary intake of foods rich in lutein and zeaxanthin has been associated with a reduced risk retinal degeneration and cataracts.



Lycopene (redivivo®)

Lycopene is the carotenoid responsible for the red color in tomatoes. It has been associated with a healthy prostate, lung, stomach, and cardiovascular function.

Minerals and trace elements

Examples of important minerals and trace elements

Selenium (Se)

Selenium is an antioxidant that protects cell membranes.

Iodine (I)

Iodine is essential for proper thyroid gland function.

Copper (Cu)

Copper is involved in energy production, connective tissue formation, iron metabolism, normal red blood cell formation, normal nervous system function, neurotransmitter synthesis and metabolism, melanin formation for pigmentation of hair and also has an antioxidant function as part of super oxide dismutase.

Manganese (Mn)

Manganese contributes to the formation and quality of the bones and joint cartilage while also playing an active role in the functioning of the mitochondria.

Zinc (Zn)

Zinc is involved as a co-enzyme in many cellular enzyme systems and impacts carbohydrate, lipid, protein and nucleic acid metabolism. It is crucial for collagen and keratin synthesis contributing to skin integrity and coat quality. It is also needed by the immune system and plays an important role in reproduction.

Iron (Fe)

Iron is an essential component of the oxygen carrying hemoglobin in the red blood cells and intramuscular myoglobin, helps support immune function, and is an integral part of many important enzymes systems including those supporting energy production, DHA synthesis, and functionality as a cellular antioxidant.

Nutritional lipids



Omega-3 from algae

DHA omega-3 derived by algal fermentation containing docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), fatty acids that support cardiovascular, eye, and brain health (e.g. memory), and directly reduce cellular inflammation supporting joint, skin, and coat health.



Omega-3 from fish

Highly refined and deodorized fish oils containing both eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).



Omega-6

Rich source of γ-linolenic acid (GLA) or arachidonic acid (ARA) which restore the natural skin-water barrier and indirectly reduce cellular inflammation.

Nutraceuticals

Coenzyme Q10 (ALL-Q®)

Coenzyme Q10 (CoQ10) is an antioxidant involved in energy metabolism in all cells. Cells that benefit the most from CoQ10 are those that have a more rapid turnover, including heart, gingiva, mucosal cells of the intestine, and immune system cells.

Resveratrol (resVida®)

Resveratrol is a polyphenol and the component in red wine that may confer heart health benefits despite a high fat diet. Studies demonstrate resveratrol mimics the effect of caloric restriction, the only known intervention to extend lifespan in mammals. It also has been shown to preserve the health of aging mice through maintenance of cardiac function, muscle function, and blood sugar control.

Tomato-based extract (Fruitflow®)

Fruitflow® is a natural tomato extract. Human trials have proven consumption of Fruitflow® maintains healthy platelet aggregation and improve blood flow.

Protein hydrolysate (PeptoPro®)

PeptoPro® is a casein hydrolysate, a source of dipeptides and tripeptides that are readily absorbed. Human trials have shown PeptoPro® improves endurance and performance, stimulates muscle growth, accelerates recovery, and reduces muscle soreness.

Oat β-glucan (OatWell®)

OatWell® is refined oat containing the natural fiber (1-3 & 1-4 linked) β-glucan. The health benefits associated with OatWell® include lowering cholesterol levels, controlling blood glucose, improving bowel function, and imparting satiety in humans.

Formulation

Effective products for food, pet food and feed applications

The pet food sector is becoming increasingly sophisticated with the demand for a wide range of ingredients with different matrices, textures, colors, shapes and nutritional functionality as suppliers look to differentiate their products on the retailers' shelves.

External factors influencing vitamin stability

VITAMIN	Temperature	Oxygen	Humidity	Light	pH Acid	pH Alkaline
Vitamin A	XX	XX	X	XX	X	o
Vitamin D ₃	X	XX	X	X	o	X
Vitamin E - Acetate	o	X	o	o	o	X
Vitamin K ₃	X	X	XX	X	XX	XX
Vitamin B ₁	X	X	X	o	o	XX
Vitamin B ₂	o	o	X	X	o	X
Vitamin B ₆	XX	o	X	o	o	o
Vitamin B ₁₂	XX	X	X	X	o	o
Pantothenic acid	X	o	X	o	X	X
Nicotinic acid	o	o	o	o	o	o
Biotin	X	o	o	o	o	o
Folic acid	XX	o	X	XX	XX	o
Vitamin C	XX	XX	XX	X	o	X

o = Stable X=Slightly sensitive to sensitive XX=Very sensitive

Product form requirements

	Heat stable	Moisture stable	Shear tolerant	Resistant to oxidation	Not adversely affected by enzyme activity	Low coloration and/or small particle size	Compression tolerant	Resistance to UV light	Proper solubility or miscibility
Extrusion	•	•	•	•	•				
Baking	•	•	•	•	•				
Retorting / Steaming	•	•	•	•	•				
Fresh / Frozen		•	•	•	•				
Injection molding	•	•	•	•	•				
Dry mixing / Powder	•					•			
Tableting / Compression	•					•	•		
High fat liquid	•	•	•	•	•			•	•
Low fat liquid / Milk	•	•	•	•	•			•	•
Clear water	•	•	•	•	•			•	•

Form requirements

Certain basic characteristics are required if the ingredient form is to achieve the envisioned nutritional value of the pet food product:

Bioavailability:

The nutrient should have a chemical structure which is fully metabolized and the product formulation should provide protection but release the nutrient upon ingestion.

Stability:

The ingredient must remain stable "as is" or in blends and premixes. Therefore the ingredient must be adequately stabilized in a chemical and/or product form which when stored, transported, milled, or mixed, maintains its activity. The product form must be resistant to activity loss due to environmental factors such as temperature, moisture, and oxygen.

Uniformity:

The particle size and size distribution determines how well the nutrient is dispersed throughout the finished product, impacting the nutrient activity per serving. A uniform product minimizes the tendency for nutrients to segregate when mixed and transported with other micro-ingredients, allows adequate flow through equipment during production and reduces dust formation when handled.

Consistency in potency:

For reliable dosing of a nutrient in production, potency must be consistent both particle-to-particle and lot-to-lot. The availability of appropriate dilutions supports the accuracy of dosing during production.

Dissolution behavior:

The form of the nutrient dictates its aqueous (water) or non-aqueous (fats or oils) solubility or miscibility. These physical characteristics influence the distribution of the functional ingredient in the final pet product, its color, texture and/or shelf life.



Production of ingredient forms

Production: Functional ingredients such as vitamins or carotenoids are produced either by chemical synthesis, by fermentation, by extraction (often from a natural source) or by a combination of these technologies.

Modification: Once the basic functional compound is produced it may be further processed to develop a more stable chemical form, using processes such as crystallisation of an organic salt, esterification and phosphorylation.

Formulation: To achieve specific product characteristics the ingredients then undergo a formulation process. Such formulation creates highly specified nutrient forms optimally equipped to meet the specifications within a pet food, food or feed product.

Formulation technologies

Crystalline grades

Nutrient compounds are chemically modified to form organic salt which after drying are not further formulated but used "as is".

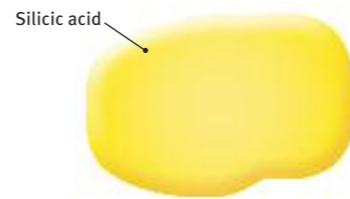
Optionally crystalline material can be coated with ethyl cellulose which slows any possible detrimental influence of other ingredients present in the formula.



Nutrient in crystalline form

Adsorbates

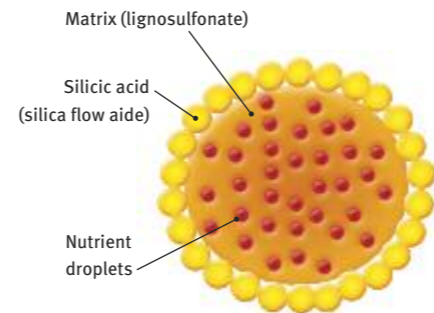
Suitable carriers such as silica particles are prepared for absorbing mainly fat soluble nutrients. Adsorption has the advantage of delivering an economically attractive dry form of an intrinsically stable nutrient, and results in a free-flowing powder with good mixability, flowability and dust characteristics.



Nutrient adsorbed on silica particle

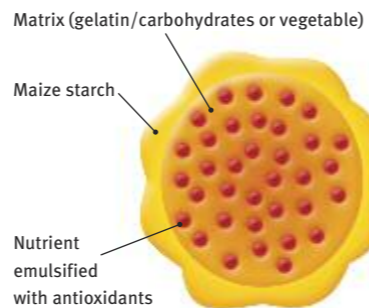
Spray-dried powders

Spray-drying is applied for many of the water soluble nutrients to enhance stability, handling and distribution. The nutrient compound is added into a dextrin solution. The solution is spray dried into a powder, which offers a variety of advantages including stabilizing the nutrients and delivering it in a digestible matrix.



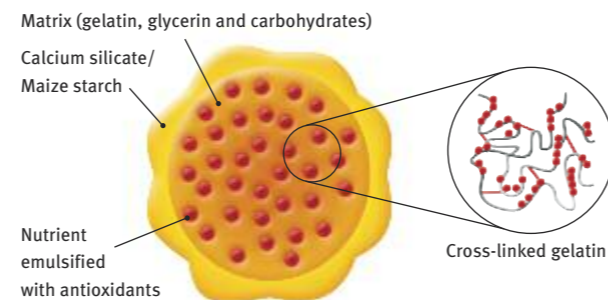
Beadlets

In beadlet technology nutrient compounds are emulsified in a gelatin, starch and glycerin matrix, with an antioxidant sometimes added to increase stability. The emulsion is then sprayed to form beadlets which are coated with corn starch to absorb excess moisture. Moist beadlets are dried to produce the finished beadlet. Micronization of the often oily functional ingredient allows the production of stable, yet dispersible beadlets for clear liquids.



Cross-linked Beadlet

Additional chemical bonds are introduced to create a hardened beadlet most commonly referred to as a cross-linked beadlet. A chemical reaction occurs which creates cross-linked bonds thereby creating a more rigid structure. This technology provides excellent stability and is used to protect nutrients in high temperature applications.



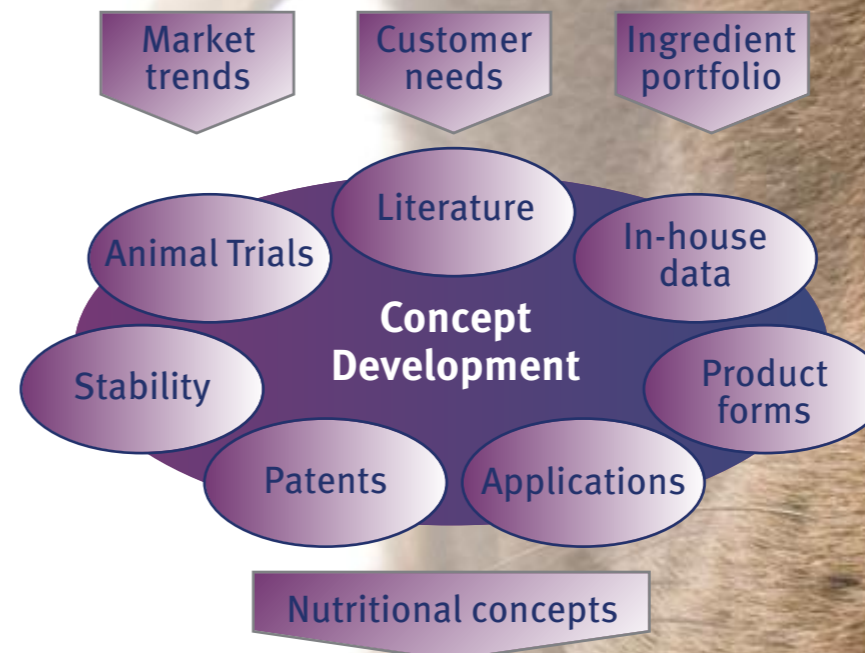
Innovation

New ingredients for pet nutrition

At DSM, our aim is to provide innovative nutritional solutions to meet current and future nutritional requirements and health concerns. Our R&D centers specialize in the development of nutritional ingredients and related applications. Close customer integration is provided through our regional food application laboratories while our involvement in the human food sector allows us to leverage knowledge which can be beneficial for pet food developments.

Nutritional concepts

In a rapidly developing market place, it is important that new opportunities are fast tracked to meet demand from customers. Our novel nutritional concepts approach ensures this happens while fostering customer involvement in our innovation and targeting R&D investment.



Building meaningful customer relationships

Our customers are the reason we exist and our goal is to work closely with them throughout all stages of the innovation process from ingredient development through to new product development and product re-launches.

We value customer feedback and strive to incorporate their views on areas such as premix and product formulation, product marketing and brand characteristics.

Pet Nutrition Solutions by DSM

Wherever we are, we are all consumers and we all care about healthy living for ourselves and our companion animals. With the spread of humanization among pet parents, pet product companies are challenged to stay current with companion animal nutritional science and track consumer awareness in the dynamic human nutrition and health markets. DSM is uniquely positioned to help you make your products attractive to health-conscious pet product consumers.

We have the world's broadest portfolio of innovative, high-quality health nutrients and work with other leading ingredient companies to offer complete nutritional solutions. DSM also serves both the human and production animal markets giving us a unique perspective on developing trends. This is the solid basis for the pet nutrition concepts. But that's just the start ...

- DSM can support you with thorough scientific expertise and technical know-how.
- Our premix operations are active on all continents.
- With a presence in over 50 countries, our sales force is always close to hand.

Last but not least, our total quality assurance and dedication to a sustainable and responsible way of doing business is how we create our Peace of Mind promise. A promise that is grounded in a company culture that strives for continual growth in the areas of quality, reliability, traceability, and sustainability. We are focusing our value proposition on key health benefits that concern pet products consumers everywhere starting with:

- **Defying age**
Nutritional support for longevity
- **Supporting a good start**
Essentials for puppies and kittens

- **Shaping the body**
Weight management and calorie control
- **Enhancing mobility**
Nutrition for healthy joints and strong bones
- **Safeguarding vision**
Proactive nutrition for maintaining eye health
- **Stimulating the defense**
Stronger immune support for everyday challenges
- **Nourishing the coat**
Nutrition for skin, hair, and fur
- **Freshening breath**
Oral care based on vitamin C
- **Living an active life**
Pet companionship at its best
- **Protecting the paws**
Resistance to outdoor challenges
- **Encouraging attention**
Cognitive performance through all life stages



Optimum Vitamin Nutrition



DSM vitamin supplement guidelines

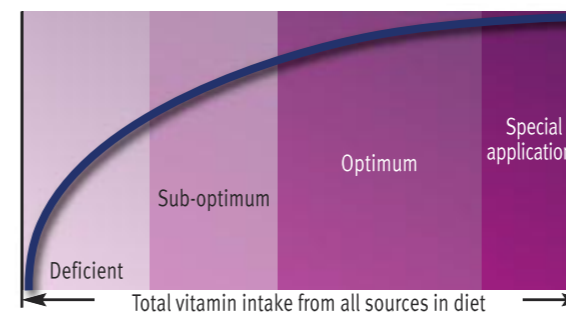
COMPANION ANIMALS

Category/Phase	Vit. A	Vit. D ₃	Vit. E ⁽²⁾	Vit. K ₃ (Menadiolone)	Vit. B ₁ ⁽⁴⁾	Vit. B ₂	Vit. B ₆	Vit. B ₁₂ ⁽⁵⁾	Niacin	D-Pantothenic acid	Folic acid	Biotin ⁽⁶⁾	Vit. C ⁽⁷⁾	Choline	β-Carotene ⁽⁸⁾
	I.U.	I.U.	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg
Dogs	15000-22000	780-1300	100-250	1 - 2	4 - 8	13 - 22	6 - 11	0.03-0.05	50-170	30 - 60	0.6 - 2	0.25-0.8	100-200	1300-2700	30 - 50
Cats	15000-40000 ⁽¹⁾	780-1300	150-300	1 - 2 ⁽³⁾	5 - 10	22 - 27	11 - 14	0.03-0.1	50-170	30 - 60	0.6 - 2	0.25-0.8	100-200	1300-2700	30 - 50

Recommendations are expressed per kg air-dry food. The values are based on the diets containing 4000 kcal ME/kg dry matter. Diets that deviate in energy content >12.5% or have feeding recommendations that restrict energy intake should have the supplemental vitamin levels adjusted accordingly.



⁽¹⁾ Vitamin A: preformed vitamin A is vital in diets for cats. ⁽²⁾ Vitamin E: supplemental levels should at least be 5 mg/kg of dry food for each 1% of PUFA in the diet. Higher levels above are recommended to support the total antioxidant capacity of the dog and cat. ⁽³⁾ Vitamin K: supplementation is particularly important in canned catfoods that contains >25% fish when fed for long periods. ⁽⁴⁾ Vitamin B₁: levels of up to 18 mg/kg dry food for dogs and 35 mg/kg for cats are reported to help improve meal acceptance and stimulate appetite. ⁽⁵⁾ Vitamin B₁₂: increased supplemental levels up to 0.8 mg/kg dry food help in the support of liver function. Supplementation might need to be increased in vegetarian diets as plants are a poor source of this vitamin. ⁽⁶⁾ Biotin: Higher levels, up to 2 mg/day, are recommended in high fat diets and also as an aid in the improvement of coat and skin condition for cats and dogs and to help hepatic glucose excretion and thus fasting blood glucose levels in dogs with diabetes. ⁽⁷⁾ Use ROVIMIX[®] STAY-C[®] (ascorbyl-monophosphate) for reducing losses during processing and supporting the total antioxidant capacity of the animal. ⁽⁸⁾ β-Carotene: recommended for supporting the total antioxidant capacity of the dog or cat and as an immune system modulator and for supporting reproductive physiology.



OVN[®] supplementation levels

- exceed levels needed to prevent clinical deficiency signs
- compensate for various factors influencing an animal's requirements
- ensure fortification not limiting the animal's natural defense against disease

OVN[®] is applied knowledge

OVN[®] is about understanding changes in nutrient requirements, nutrient supply and interactions in metabolism, circumstances and knowledge of nutritional biochemistry for pet health and well-being. This includes the proper application of nutritional ingredients in the pet food manufacturing process.

Age progression



Applications for pet nutrition

A variety of technologies for shape, size, texture, moisture and form

The pet food market is characterized by a wide variety of different product forms. This occurred because ingredient forms were developed to support changes in formulation, process conditions, and packaging.

Specially formulated nutritive and functional ingredients are often the key to the successful development of foods, treats, and supplement products. As a leader in nutritional ingredient form development, DSM offers a comprehensive range of ingredients suitable for the full range of manufacturing processes and formulation options our customers use to create products with distinct points of differentiation.

Extruded products

Extrusion, one of the harshest processing technologies, is used to produce food and treat products. This process typically requires ingredients to be exposed to high temperatures, pressure, moisture, shear, rapid expansion, and a drying step.

For this application, nutritive ingredients need to be resistant to rapid changes in temperature, pressure and moisture heat, shear, and oxidation throughout manufacturing plus remain shelf stable for 18–24 months.



Baked products

Food, treat, and flaked products are manufactured using baking. Initially, dough is formed exposing the ingredients to moisture and sometimes enzymes. The formed dough is heated to the desired degree of cook and dryness.

For this application, nutritive ingredients need to be resistant to heat, moisture, enzymes, and oxidation throughout manufacturing plus remain shelf stable for 18–24 months.



Wet products

Wet food styles include loaf (pate) and chunk-in gravy foods and treats. Initially, meat and other ingredients are mixed with or without heat for various periods of time. This mixture is either placed in a container, sealed and cooked at a high temperature or cooked using a



steam tunnel, formed into chunks, sealed in a container with gravy, and cooked again at a high temperature.

For this application, nutritive ingredients need to be resistant to moisture, oxidation, enzymes, and extreme changes in temperature throughout manufacturing. Finally the finished product color must not be adversely affected plus remain shelf stable for 24 months.

Compressed tablets

Tablets are swallowed, chewed or dissolved to deliver their functional ingredients. During manufacturing the ingredients may be ground and screened to obtain a uniform particle size. The final blend experiences pressure and shear while forming the tablets. Depending on the packaging, the tablets may be exposed to moisture and oxygen.

Some tablets are formulated to effervesce when added to water subsequently exposing the ingredients to moisture, changes in pH, and further oxidation for an undefined period of time.

For this application, nutritive ingredients need to be resistant to pressure, shear, oxidation, and possibly reduction in particle size, changes in pH and moisture.



Injection molding

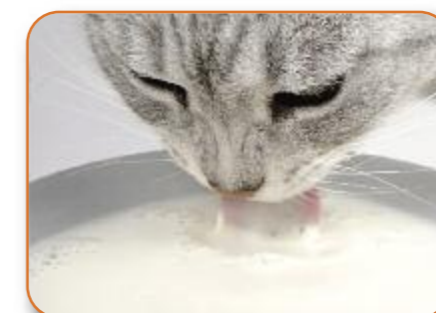
This process is used to manufacture treats and chews where appearance, structure and actual product design are major challenges. This process usually involves high temperatures with a low shear and moisture.

For this application, nutritive ingredients need to be resistant to high and changing temperatures, and oxidation. The finished product color and hardness must not be adversely affected and remain shelf stable for 24 months.



Milk and fatty liquids

High fat (oil) paste and liquid products range from infant food to lubricants for the gastro-intestinal tract to aid mobility and control hairballs. During manufacturing these types of fatty liquids often experience high shear during mixing and homogenisation, high temperatures during sterilization, and unwanted enzyme activity.



For this application, nutritive ingredients may need to be resistant to UV light, oxidation, shear, high and rapidly changing temperatures, enzyme activity, display high miscibility and emulsification properties during manufacturing plus remain shelf stable for 3 to 24 months without causing sedimentation or other negative product attributes.

Dry mixes and powders

Dry mixture products range from supplements to milk replacers. Dry blends require ingredients that can be dispersed readily throughout the mixture, not prone to particle segregation/separation and are chemically stable. Some are designed to be added to liquids and must be readily soluble or miscible.

For this application, nutritive ingredients usually need to be uniform in particle size and density, chemically and heat stable, have a low propensity to create an electrostatic charge, not attract moisture plus resist oxidation through manufacturing and storage. The finished product color must also not be adversely affected.



Clear solutions

Bottled waters are sometimes used to deliver functional ingredients. Unlike other liquid products, formulating while maintaining clarity is the challenge.

In addition to the attributes associated with manufactured liquid products, nutritive ingredients for this application must not react to other ingredients, UV light or oxidation causing a loss of nutritive value, coloration or sedimentation.



Table of Products

Carotenoids	
β-Carotene	26
Canthaxanthin	
Astaxanthin	
Lutein	27
Lycopene	
Zeaxanthin	
<hr/>	
Fat soluble vitamins	
Vitamin A	28
Vitamin D ₃	
Vitamin E	29
Vitamin K, Menadione	
<hr/>	
Water soluble vitamins	
Vitamin B ₁ , Thiamine	30
Vitamin B ₂ , Riboflavin	
Vitamin B ₃ , Niacin	
Vitamin B ₅ , Pantothenate	31
Vitamin B ₆ , Pyridoxine	
Vitamin B ₉ , Folic acid	
Vitamin B ₁₂ , Cobalamine	
Vitamin H, Biotin	32
Vitamin C, Ascorbic acid	
<hr/>	
Nutritional lipids	
Omega-3 fatty acids from algae	33
Omega-3 fatty acids from fish	
Omega-6 fatty acids	
<hr/>	
Nutraceuticals	
ALL-Q [®] , Coenzyme Q ₁₀	34
resVida [®] , Resveratrol	
PeptoPro [®] , Protein hydrolysate	
Fruitflow [®] , Tomato-based extract	
OatWell [®] , Oat β-glucan	35
<hr/>	
Minerals	
MICROGRAN [™] , Mineral Preparations	36
VEVOMIN [™] , Mineral Chelates	


Ingredient forms:

- : Feed grade
- : Food grade

Not all products are available in every country but registration is possible.

Application:

- Dry: Dry pet food and treats
- Wet: Wet pet food and treats
- Inject.: Injection molded chews
- Tabl.: Tablet supplements
- Pow.: Powder supplements
- Milk: Milk and low fat liquid products
- Water: Water based liquid products

Icons like this  provide a general indication the ingredient category is commonly registered for use in diets or supplements for that species.

Carotenoids

β-CAROTENE



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® β-Carotene 10%	stabilized beadlet	5, 20	France	●	●	●	●	●			
● ROVIMIX® β-Carotene 10% P	cross-linked beadlet	20	France	●		●					
○ β-Carotene 10% CWS	beadlet, cold water dispersible	1, 5, 25	Switzerland		●	●		●	●	●	
○ β-Carotene 10% CWS/S	beadlet, cold water dispersible	5, 20	Switzerland		●	●		●	●	●	
○ β-Carotene 10% B	cross-linked beadlet	5, 25	Switzerland	●							
○ BetaTab® 20% S	beadlet, tablet grade	5, 25	Switzerland				●				
○ CaroCare® Nat. β-Carotene 1% CWS/M	powder, cold water dispersible, medium chain triglycerides	5, 20	Switzerland		●	●		●	●	●	
○ CaroCare® Nat. β-Carotene 30% S	fluid suspension	5	France		●					●	
○ CaroCare® Nat. β-Carotene 10% CWS/S	spray-granulated powder, cold water dispersible	10	Spain		●	●	●	●	●	●	

LUTEIN

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
○ FloraGLO® Lutein 20% SAF	fluid suspension in Safflower Oil	1, 5, 20	USA		●	●				●	●
○ FloraGLO® Lutein 5% CWS/S-TG	beadlet, tablet grade and cold water dispersible	5, 25	Switzerland	●	●	●	●	●	●	●	●
○ FloraGLO® Lutein 10% CWS/S-TG	beadlet, tablet grade and cold water dispersible	5, 25	Switzerland	●	●	●	●	●	●	●	●

LYCOPENE

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
○ redivivo® (Lycopene) 10% FS	fluid suspension	5, 20	France		●	●				●	●
○ redivivo® (Lycopene) 10% CWS/S-TG	beadlet, tablet grade and cold water dispersible	5, 25	Switzerland	●	●	●	●	●	●	●	●

CANTHAXANTHIN



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● CAROPHYLL® Red 10%	beadlet	5, 20	France	●	●	●	●	●			
○ Canthaxanthin 10% CWS/S	beadlet, cold water dispersible	1, 5, 20	Switzerland		●	●	●	●	●	●	

ASTAXANTHIN



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● CAROPHYLL® Pink 10%-CWS	beadlet, cold water dispersible	5, 20	France	●	●	●	●	●			

ZEAXANTHIN

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
○ OPTISHARP® (Zeaxanthin) 20% FS	fluid suspension	5, 20	France		●	●				●	●
○ OPTISHARP® (Zeaxanthin) 5% CWS/S-TG	beadlet, tablet grade and cold water dispersible	5, 25	Switzerland	●	●	●	●	●	●	●	●



Fat soluble Vitamins

VITAMIN A



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® A 1000 (1000 kIU/g)	cross-linked beadlet	20, 500	Switzerland	●	●	●					
● ROVIMIX® AD ₃ 1000/200 (1000 kIU A/g) (200 kIU D ₃ /g)	cross-linked, stabilized beadlet	20, 500	Switzerland	●	●	●					
● ROVIMIX® A 500 WS (500 kIU/g)	spray-dried, water dispersible powder	20	France			●	●	●	●	●	●
● ROVIMIX® A 500 N (500 kIU/g)	cross-linked beadlet, no porcine gelatin	25	China	●	●	●		●			
○ Vitamin A Palmitate 1.0 mIU/g	oily solution (peanut oil), stabilized with tocopherol	5	Switzerland							●	●
○ Vitamin A Palmitate 1.7 mIU/g	oily liquid, stabilized with tocopherol	5, 190	Switzerland			●				●	
○ Dry Vitamin A Acetate 500 B (500 kIU/g)	beadlet, tablet grade	5, 25	USA	●	●		●	●			
○ Dry Vitamin A Palmitate, Type 250 S/N (250 kIU/g)	spray-dried, starch based	20	USA			●		●	●		

VITAMIN E



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● Tocopheryl Acetate Technical Grade (100% Basis)	clear viscous oil	190	Switzerland	●	●	●					
● ROVIMIX® E 50% Adsorbate (500 IU/gm)	vitamin E oil adsorbed on silicon dioxide	25, 700, 900 25, 900 25, 500	Switzerland USA China	●	●				●	●	●
● ROVIMIX® E 50% SD (500 IU/gm)	spray-dried, water-dispersible powder	20, 600	France		●	●	●	●		●	●
○ Dry Vitamin E 50% CWS/S (500 IU/g)	spray-dried, cold water dispersible	20	Switzerland				●			●	●
○ Dry Vitamin E 50%, Type SD (500 IU/g)	spray-dried, powder	15	Switzerland	●	●			●	●		
○ Dry Vitamin E 75 HP (750 IU/g)	beadlet, high potency	20	USA						●		
○ dl-α-Tocopherol	liquid antioxidant	5, 20	Switzerland		●						●
○ Mixed Tocopherols 70 IP	liquid antioxidant, natural source, non-GMO	18, 190	Argentina		●	●					●
○ Mixed Tocopherols 95	liquid antioxidant, natural source	20, 190	USA		●	●					●
○ Dry Mixed Tocopherol 30%	dry antioxidant, natural source	20	USA	●	●	●	●	●	●	●	●

VITAMIN D₃

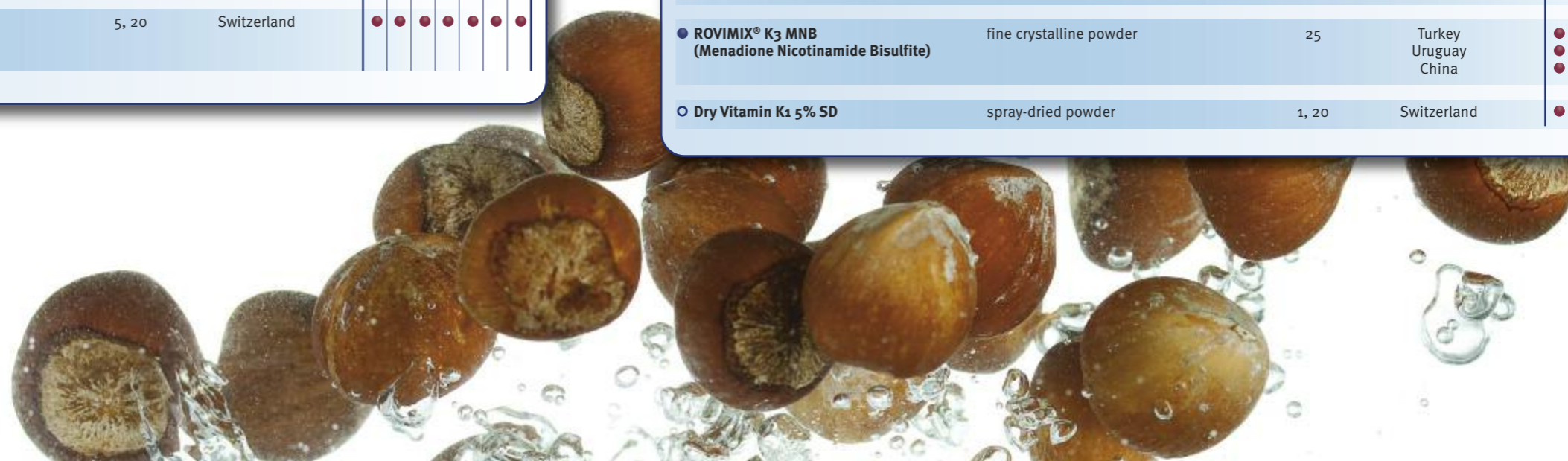


Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® D ₃ 500 (500 kIU/g)	spray-dried, water dispersible, stabilized powder	20	France			●	●	●	●	●	●
● ROVIMIX® AD ₃ 1000/200 (1000 kIU A/g, 200 kIU D ₃ /g)	cross-linked, stabilized beadlet	20, 500	Switzerland	●	●	●					
○ Vitamin D ₃ 1.0 mIU/g	oily solution, stabilized with tocopherol	5	Switzerland			●				●	
○ Dry Vitamin D ₃ 100 SD/S (100 kIU D ₃ /g)	spray-dried, cold water dispersible, stabilized with tocopherol	5, 20	Switzerland	●	●	●	●	●	●	●	●

VITAMIN K, MENADIONE



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● MSBC (Sodium bisulfite complex, 33%) available in USA only	fine crystalline powder	25	Turkey Uruguay China	●	●	●	●	●	●	●	●
● ROVIMIX® K ₃ MNB (Menadione Nicotinamide Bisulfite)	fine crystalline powder	25	Turkey Uruguay China	●	●	●	●	●	●	●	●
○ Dry Vitamin K ₁ 5% SD	spray-dried powder	1, 20	Switzerland	●	●	●	●	●	●	●	●



Water Soluble Vitamins

VITAMIN B₁, THIAMINE



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® B1 (Thiamine Mononitrate)	fine crystalline powder	25	Germany	●	●	●	●	●	●	●	●
○ Thiamine HCl (Thiamine Hydrochloride)	fine crystalline powder	20	Germany	●	●	●				●	●
○ Thiamine Mononitrate	powder	20	Germany	●	●						
○ ROCOAT® Thiamine Mononitrate 33 1/3%	coated powder	5	USA	●	●	●					

VITAMIN B₅, PANTOTHENATE

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® CalPan (Calcium Pantothenate)	spray-dried, water dispersible powder	25	Great Britain	●	●	●	●	●	●	●	●
○ Calcium D-Pantothenate	spray-dried powder	25	Great Britain	●	●	●	●	●	●	●	●

VITAMIN B₂, RIBOFLAVIN



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® B2 80-SD	spray-dried, water dispersible powder	20	Germany	●	●	●	●	●	●	●	●
○ Riboflavin Tablet Grade	tablet grade	10	Germany				●				
○ Riboflavin Universal	powder	10	Germany	●	●	●				●	●
○ ROCOAT® Riboflavin 33 1/3%	coated powder	5	USA	●	●	●					

VITAMIN B₆, PYRIDOXINE

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® B6	fine crystalline powder	25	Germany	●	●	●	●	●	●	●	●
○ Pyridoxine Hydrochloride	crystalline powder	20	Germany	●	●	●	●	●		●	●
○ ROCOAT® Pyridoxine Hydrochloride 33 1/3%	coated powder	5	USA	●	●	●					

VITAMIN B₃, NIACIN



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® Niacin	fine crystalline powder	25, 900	Switzerland	●	●	●	●	●	●	●	●
● ROVIMIX® Niacinamide	fine crystalline powder	25, 500, 1000	China	●	●	●	●	●	●	●	●
○ Niacin	powder	20	Switzerland	●	●	●	●	●			
○ ROCOAT® Niacinamide 33 1/3%	coated powder	5	USA	●	●	●					

VITAMIN B₉, FOLIC ACID

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® Folic 80 SD	spray-dried, water dispersible powder	20 20	France China	●	●	●	●	●	●	●	●
○ Folic Acid	powder	1, 25	Switzerland	●	●	●	●	●	●	●	●

VITAMIN B₁₂, COBALAMIN

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Injct.	Tabl.	Pow.	Milk	Water	
● Vitamin B12 1% Feed Grade	crystalline powder dilution	25	France	●	●	●	●	●			
○ Vitamin B12 Crystalline	crystalline powder	0.01, 0.1, 1	France	●	●	●				●	●
○ Vitamin B12 0.1% WS	crystalline powder dilution	5	Switzerland				●	●	●	●	●

VITAMIN H, BIOTIN



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® Biotin (2% Biotin)	spray-dried, water dispersible powder	20	France	●	●	●	●	●	●	●	●
● ROVIMIX® Biotin HP (10% Biotin)	spray-dried, water dispersible powder	20	France	●	●	●	●	●	●	●	●
○ D-Biotin	white crystalline powder	0.05, 1, 25	France					●	●		
○ Bitrit-1 Type A (1% Biotin)	triturate, powder	10, 50	USA	●	●	●				●	●

VITAMIN C, ASCORBIC ACID



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● ROVIMIX® STAY-C® 35% (L-ascorbyl-2-polyphosphate)	spray-dried powder, heat stable	25, 500, 800	France	●	●	●		●			
● ROVIMIX® C-EC	ethylcellulose-coated powder	25	Great Britain		●		●	●			
○ STAY-C® 50% (L-ascorbyl-2-polyphosphate)	spray-dried fine powder, heat stable	5, 20	France	●		●	●		●	●	
○ Ascorbic Acid	crystalline powder	25, 50	Great Britain						●	●	
○ Ascorbic Acid Fine Powder	fine powder	25	Great Britain			●		●			
○ Ascorbic Acid Fine Granular	fine granular powder	25	Great Britain				●	●			
○ Ascorbic Acid 95% Granular	granular powder	25	Great Britain				●	●			
○ Calcium Ascorbate	powder	25	USA		●	●			●	●	
○ Ascorbyl Palmitate	powder, antioxidant	5, 25	Germany	●	●	●			●	●	

Nutritional Lipids

OMEGA-3 FATTY ACIDS FROM ALGAE



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● DHAGold™ S17-B Min. 17% DHA	fine dry flakes of microalgae	15	USA	●	●	●					
○ DHASCO® Min. 40% DHA	microalgae derived oil	9, 18, 200	USA	●	●	●				●	
○ life'sDHA® Omega 60 Min. 30% DHA, 15% EPA, Min. 60% total omega-3	microalgae derived oil	25	USA	●	●	●					
○ life'sDHA® DHA S17-P100 Min. 17% DHA	free-flowing powder of microalgae derived oil	12.5	USA	●	●	●	●	●	●	●	●

OMEGA-3 FATTY ACIDS FROM FISH

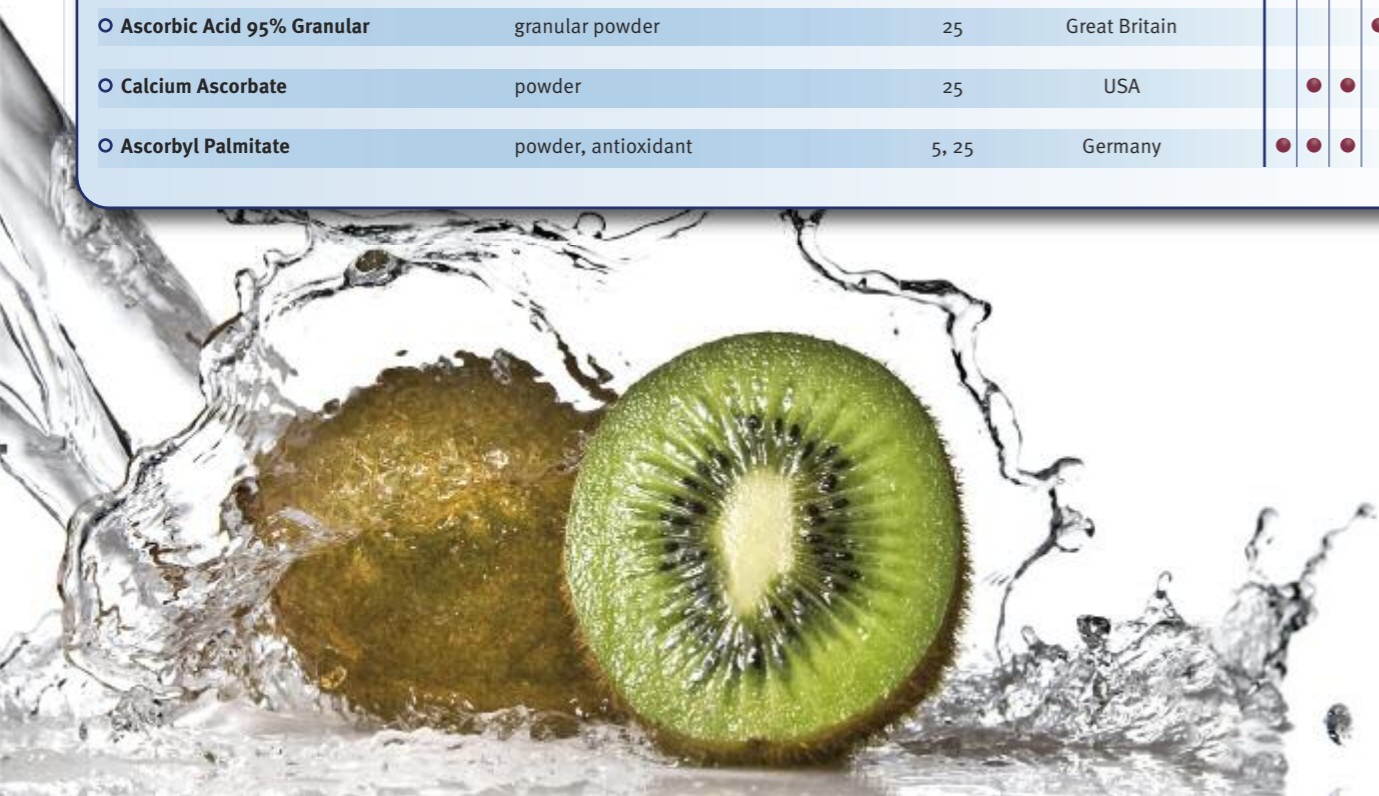


Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
○ MEG-3® 1812 TG Oil Min. 160mg EPA, 100mg DHA, and 300mg total omega-3 per g	marine fish oil	190	USA	●	●	●				●	
○ MEG-3® 4020 EE Oil Min. 360mg EPA, 180mg DHA, and 590mg total omega-3 per g	marine fish oil	190	USA	●	●	●				●	
○ MEG-3® 30% Powder Min. 150mg - Max. 220mg EPA + DHA, and 180mg total omega-3 per g	microencapsulated marine fish oil powder	10	USA	●	●	●		●	●		

OMEGA-6 FATTY ACIDS



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
● VEDOVAR® Min. 35% Arachidonic acid (ARA)	clear yellowish oil	18	USA	●	●	●				●	
○ life'sGLA™ '10' n-6 Oil Min. 9% g-linolenic acid (GLA)	refined evening primrose oil	5, 25, 185	Germany	●	●	●				●	
○ life'sGLA™ '25' n-6 Oil Min. 23% g-linolenic acid (GLA)	refined borage oil	5, 25, 185	Germany	●	●	●				●	



Nutraceuticals

COENZYME Q10



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
○ ALL-Q® (Coenzyme Q10) 10% CWS/S	beadlet, cold water dispersible	5, 25	Switzerland	●	●	●	●	●	●	●	●

RESVERATROL

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
○ resVida® (Min. 99% trans-resveratrol)	crystalline powder	1, 5, 20	India	●	●	●	●	●	●	●	●

PROTEIN HYDROLYSATE



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
○ PeptoPro® (Hydrolysed casein)	powder	15	Germany	●	●	●	●	●	●	●	●

TOMATO-BASED EXTRACT

Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
○ Fruitflow® I	water soluble, liquid syrup	20, 215, 1250	Italy		●						●
○ Fruitflow® II SD	spray-dried powder	1, 5, 20	France	●		●	●	●			●

OAT β-GLUCAN



Product Name	Product Description	Package Size (KG)	Country of Origin	Application							
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water	
○ OatWell® 14 oat bran with 13-15% β-glucan	powder	18, 600	Sweden	●	●	●	●	●	●	●	●
○ OatWell® 22 oat bran with 21-23% β-glucan	powder	18, 700	Sweden	●	●	●	●	●	●	●	●



Minerals

MINERAL PREPARATIONS



Product Name	Product Description	Package Size (KG)	Country of Origin	Application						
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water
● MICROGRAN™ Co 5%, BMP (preparation of cobalt carbonate)	free-flowing, micro granules	25, 500	Italy	●	●	●	●	●	●	●
● MICROGRAN™ Se 1%, BMP (preparation of sodium selenite)	free-flowing, micro granules	25, 500	Italy	●	●	●	●	●	●	●
● MICROGRAN™ Se 4.5%, BMP (preparation of sodium selenite)	free-flowing, micro granules	25, 500	Italy	●	●	●	●	●	●	●
● MICROGRAN™ I 10%, BMP (preparation of calcium iodate)	free-flowing, micro granules	25, 500	Italy	●	●	●	●	●	●	●

MINERAL CHELATES



Product Name	Product Description	Package Size (KG)	Country of Origin	Application						
				Dry	Wet	Inject.	Tabl.	Pow.	Milk	Water
● VEVOMIN™ Cu 13% (cupric chelate of amino acids, hydrate)	free-flowing powder	25	Canada	●	●	●	●	●	●	●
● VEVOMIN™ Fe 12% (ferrous chelate of amino acids, hydrate)	free-flowing powder	25	Canada	●	●	●	●	●	●	●
● VEVOMIN™ Mn 11% (manganese chelate of amino acids, hydrate)	free-flowing powder	25	Canada	●	●	●	●	●	●	●
● VEVOMIN™ Zn 13% (zinc chelate of amino acids, hydrate)	free-flowing powder	25	Canada	●	●	●	●	●	●	●

Notes



Contact Us

To find out more about our ingredients for pet nutrition, please contact your nearest DSM Nutritional Products office.

Headquarters

DSM Nutritional Products AG
P.O. Box 2676
4002 Basel
Switzerland
Email: petfood.nbd@dsm.com
www.dsmnutritionalproducts.com

Area Europe, Middle East and Africa

DSM Nutritional Products Europe AG
Heanor Gate Industrial Estate
Delves Road, Unit 41
Heanor Derbyshire DE75 7SG
United Kingdom
Phone: + 44 17 7353 6598
Fax: + 44 17 7353 6600
Email: marketing.dnpe@dsm.com

China

DSM (China) Limited
118 Baisha Road
Xinghuo Development Zone
Shanghai 201419
China
Phone: + 86 21 5750 4888
Fax: + 86 21 5750 4567
Email: petfood.nbd@dsm.com

Asia Pacific, Australia

DSM Nutritional Products Asia Pacific Pte. Ltd.
41 Edison Rd
Wagga Wagga, NSW 2650
Australia
Phone: + 61 2 6922 7015
Email: marketing.dnpap@dsm.com

Area Latin America

DSM Nutritional Products Latin America
Av. Eng. Billings, 1729-Predio 31
05321-010 São Paulo – SP
Brasil
Phone: + 55 11 3760 6300
Fax: + 55 11 3760 6492
Email: america-latina.dnp@dsm.com

North America

DSM Nutritional Products, LLC
45 Waterview Boulevard
Parsippany, NJ 07054-1298
United States of America
Phone: + 1 973-257-8504
Fax: + 1 973-257-8653
Email: petfood.nbd@dsm.com



This brochure does not constitute a recommendation or guidance for decisions concerning the purchase, use or application of products and does not relieve the user of the product of the obligation to undertake its own suitability, performance or quality testing.
THIS BROCHURE IS PROVIDED ON AN "AS IS" BASIS. ALTHOUGH THE INFORMATION SET FORTH IN THIS BROCHURE IS PRESENTED IN GOOD FAITH AND BELIEVED TO BE CORRECT, DSM NUTRITIONAL PRODUCTS AG AND ITS AFFILIATED COMPANIES (HEREINAFTER "DSM") MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE WITH RESPECT TO INFORMATION OR THE PRODUCTS TO WHICH INFORMATION REFERS. No information set forth in this brochure constitutes a solicitation or offer, or invitation to conclude any legal act of any kind whatsoever.
The content of any purchase contract (i.e. technical data, price and applications of the products of DSM) concerning the purchase of DSM products is constituted only by the purchase agreement as such and integral parts thereof (specifications in this brochure never form part of a contract).
All trademarks, product names, symbols and graphics appearing in this brochure are the property of DSM unless indicated otherwise. All DSM trademarks are either registered trademarks or trademarks of DSM Group of Companies in the Netherlands and/or other countries. No license to or right in any such trademarks, trade names, trade secrets, products or other proprietary rights of DSM is granted or conferred to any party without a written agreement.

© DSM Nutritional Products Ltd 2014