



# DSM - the Life Sciences and Materials Sciences Company

October 2011

HEALTH · NUTRITION · MATERIALS

# Overview

- Who we are
- Strategy: DSM in motion: *driving focused growth*
- Bright Science. Brighter Living.™ in action

HEALTH • NUTRITION • MATERIALS



## DSM – Bright Science.Brighter Living.™

Royal DSM N.V. is a global science-based company active in health, nutrition and materials.

By connecting its unique competences in Life Sciences and Materials Sciences DSM is driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders.

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 22,000 employees deliver annual net sales of about € 9 billion. The company is listed on NYSE Euronext.

## Mission

Our purpose is to create brighter lives for people today and generations to come.

We connect our unique competences in Life Sciences and Materials Sciences to create solutions that nourish, protect and improve performance.



## Key activity areas

### Health

Advanced, cost-effective health and medical innovations, and healthier food and beverages, to meet the needs of a growing and ageing global population



### Nutrition

World's leading producer of vitamins and nutritional ingredients meeting the growing need for more nutritious and more sustainable food and animal feed



### Materials

Enabling lighter, stronger, more advanced and more sustainable performance materials



## People, Planet, Profit

Sustainability is DSM's core value.

DSM is driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders.



## Global presence



## 2010 Key figures

2010 Key figures	
Net sales, continuing operations (x €million)	8,176
Operating profit plus depreciation and amortization (EBITDA), continuing operations (x €million)	1,161
Operating profit (EBIT), continuing operations (x €million)	752
R&D expenditure (including associated IP expenditure), continuing operations (x €million)	424
Workforce (at year-end)	21,911

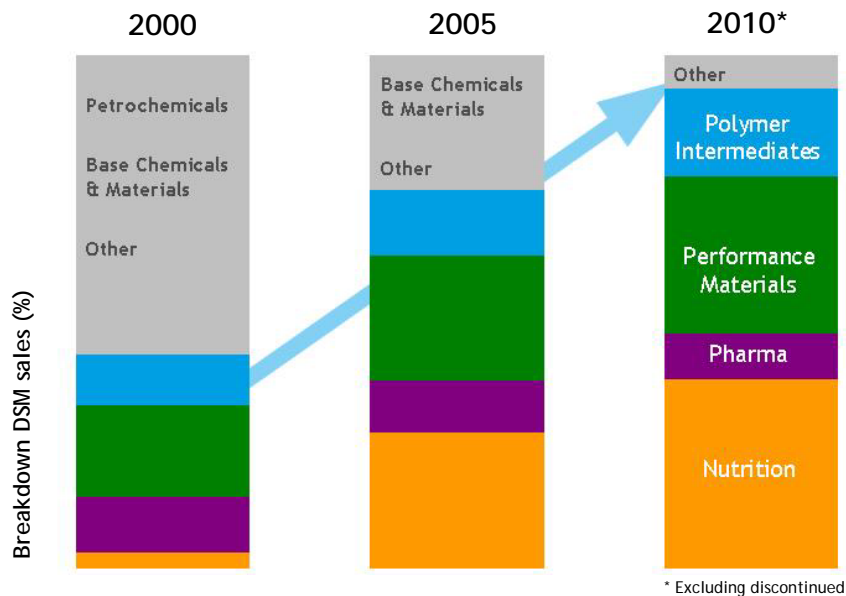
# Overview

- Who we are
- Strategy: DSM in motion: *driving focused growth*
- Bright Science. Brighter Living.™ in action

HEALTH • NUTRITION • MATERIALS



## DSM: Transformation completed

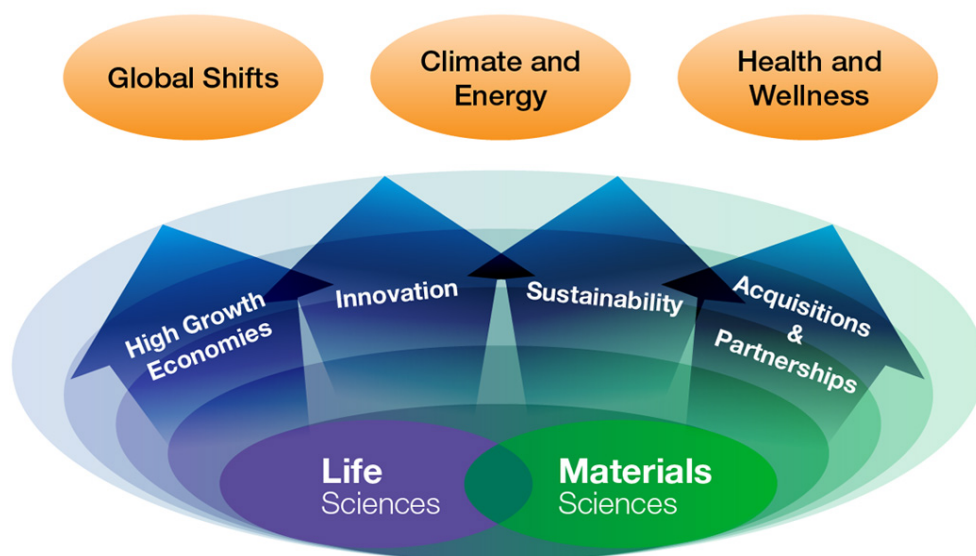


\* Excluding discontinued



- Fundamental changes have taken place in DSM's portfolio over the past ten years. As a result of a series of major and minor divestments (such as the petrochemicals business and a number of base chemical businesses) as well as a number of acquisitions, DSM's profile today is very different from that of ten years ago.
- After the successful divestment program - part of Accelerated Vision 2010 - DSM's portfolio now has a clearer focus, and the quality of earnings has significantly improved. A large proportion of group revenues and earnings are now in high-margin, high-quality businesses that have significantly lower cyclicity.
- DSM has transformed itself from a predominantly 'chemical' company in 2000 to a focused Life Sciences and Materials Sciences company. More than 50% of DSM's portfolio in 2000 has been divested. Net sales of DSM's Nutrition business have increased more than tenfold in ten years as a result of the Roche Vitamins acquisition and organic growth. Life Sciences as a percentage of total DSM sales (continued operations) increased from 14% in 2000 to more than 45% today.

## DSM in motion: *driving focused growth*



Page 10



- DSM in motion: *driving focused growth* marks the shift from an era of intensive portfolio transformation to a strategy of maximizing sustainable and profitable growth of 'the new DSM'. The current businesses compose the new core of DSM in Life Sciences and Materials Sciences.
- The Emerging Business Areas (EBAs) provide strong, long-term growth platforms, which optimally combine the available competences in Life Sciences and Materials Sciences. DSM has formulated an ambitious growth perspective for the EBAs DSM Bio-based Products & Services, DSM Biomedical and DSM Advanced Surfaces.
- DSM's focus on Life Sciences (Nutrition and Pharma) and Materials Sciences (Performance Materials and Polymer Intermediates) is fueled by three societal trends: Global Shifts, Climate and Energy and Health and Wellness. The main underlying drivers of these trends are the world's population growth and increasing life expectancy on the one hand, and increasing economic prosperity and consumption in the high growth economies on the other. DSM aims to meet the unmet needs resulting from these societal trends with innovative and sustainable solutions.
- Regional organizations, functional excellence groups and shared services enhance the performance of the business groups which together create 'One DSM'. DSM will capture regional business opportunities and synergies and implement excellence throughout the global organization.
- It is DSM's ambition to fully leverage the unique opportunities in Life Sciences and Materials Sciences, using four growth drivers (High Growth Economies, Innovation, Sustainability and Acquisitions & Partnerships) and bringing all four drivers to the next level. At the same time DSM aims to make maximum use of the potential of all four growth drivers to mutually reinforce each other.
- The culture change program that is currently in progress (focusing on external orientation, accountability for performance and inspirational leadership) will be further anchored with an emphasis on collaboration and speed of execution to support this strategy. All this is based on sustainability as DSM's core value and its belief in diversity, including internationalization.

## Driving focused growth, ambitious targets

Profitability targets 2013	
EBITDA	€ 1.4 - 1.6bn
ROCE	> 15%
Sales targets 2015	
Organic sales growth	5% - 7% annually
China sales	from US\$ 1.5bn to > US\$ 3bn
High Growth Economies sales	from ~ 32% towards 50% of total sales
Innovation sales	from ~ 12% to 20% of total sales
Emerging Business Areas aspiration 2020	
Emerging Business Area sales	> € 1bn

- DSM has set itself ambitious targets for the next strategy period. With its transformation completed, DSM can now focus on, and accelerate, growth. The company has high aspirations, based on an assessment of the opportunities, particularly in high growth economies.
- For 2013 two profitability targets have been set: an increase in EBITDA to a level of € 1.4 - 1.6 billion and an increase in Return on Capital Employed (ROCE) to more than 15%.
- The following sales targets have been set for 2015. DSM aims for organic sales growth of 5%-7% per year, enhanced by acquisitions and partnerships. It strives to more than double its sales in China from USD 1.5 billion to more than USD 3.0 billion in 2015. Towards 50% of DSM's total net sales should be in High Growth Economies by 2015.
- Innovation sales - which from now on will be measured as sales from innovative products and applications introduced in the last five years - are targeted to be approximately 20% of total net sales by 2015.
- For the period 2011 - 2015 capital expenditure can be expected which is comparable to that in the accelerated Vision 2010 period (€ 500-550 million per year on average). For the total period, capital expenditure is expected to amount to € 2.5 - 2.7 billion, of which approximately USD 1 billion in China. In addition, DSM aspires to have working capital as a percentage of net sales below 19%.
- For the Emerging Business Areas (EBAs) DSM aspires to achieve combined sales of more than € 1 billion for 2020.

## Clear sustainability aspirations support strategy

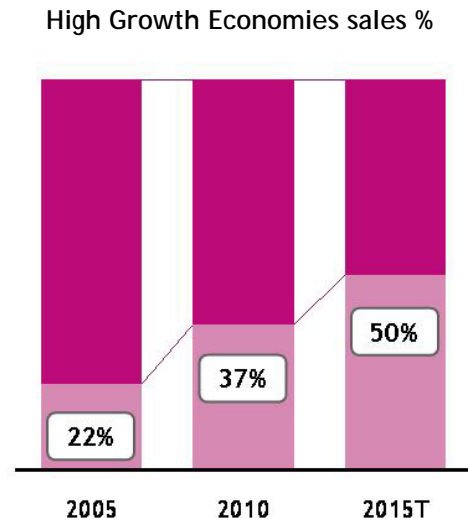
Sustainability aspirations 2011 - 2015	
Dow Jones Sustainability Index	Top ranking ("Gold")
ECO+ (innovation pipeline)	At least 80% of pipeline is ECO+
ECO+ (running business)	from ~34% towards 50%
Energy efficiency	20% improvement from 2008 till 2020
Greenhouse gas emissions	25% reduction from 2008 till 2020
Engagement Survey	towards High Performance Norm

- As part of its new strategy, DSM in motion: driving focused growth, DSM has formulated the ambition to go to the next level in sustainability: from responsibility to a business driver.
- DSM's strategy is strongly connected to the company's mission to create brighter lives for people today and for generations to come. DSM believes sustainability will be a key differentiator and value driver over the coming decades and that the company is uniquely positioned to capture new value-creating opportunities.
- ECO+ solutions are products and services that, when considered over their life cycle, offer clear ecological benefits (in other words, a clearly lower eco- footprint) compared to the mainstream solutions they compete with. These ecological benefits can be created at any stage of the product life cycle - from raw material through manufacturing and use to potential re-use and end-of-life disposal. ECO+ solutions, in short, create less environmental impact on human health, ecosystem quality and resources. The qualification ECO+ is based upon internal expert opinions where various impact categories are evaluated, for a growing number of products by Life Cycle Assessments.
- In the field of sustainability a number of ambitious aspirations have been set. For 2011 - 2015 the following value creating performance aspirations have been defined regarding sustainability:
  - Top ranking ('Gold') in the Dow Jones Sustainability Index.
  - Percentage of ECO+ products in the innovation pipeline should be at least 80%.
  - ECO+ products as percentage of running business should increase from about 34% towards 50%.
  - Energy efficiency improvement: 20% by 2020, compared to 2008.
  - Greenhouse-gas emissions: -25% (absolute) by 2020, compared to 2008.
  - Engagement Survey: towards High Performance Norm.

## Accelerating growth in High Growth Economies

### From reaching out to becoming truly global

- Sales to high growth economies in 2010 was 37% of total sales
- Over 70% of DSM's growth in period to 2015 is expected to come from high growth economies



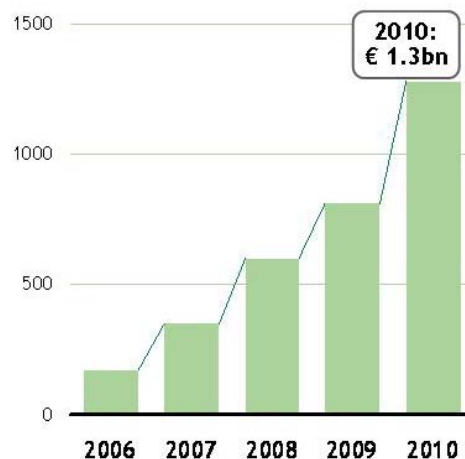
- In High Growth Economies, DSM's ambition is to go to the next level: from reaching out to being truly global.
- DSM has actively pursued growth opportunities in high growth economies across all businesses. In the past five years the share of sales from these economies has increased from 22% in 2005 to 37% in 2010. DSM has built a strong local presence in different regions in the last few years. A significant factor in DSM's Vision 2010 was the fact that DSM exceeded the ambitious sales growth target of USD 1.5 billion in China (in 2007 this target was increased from USD 1.0 billion).
- DSM's ambition now is to broaden this approach and accelerate growth in multiple economies and regions. By 2015 DSM expects sales from High Growth economies to grow towards 50% of its total net sales (2015 Target (or 2015 T)). Over 70% of DSM's growth in the period to 2015 is expected to come from High Growth economies.

## Innovation

### From building the machine to doubling the output

- € 1.3bn innovation sales (2010)
- € 1.0bn 2010 target exceeded despite strong headwinds
- 2015: innovation sales 20% of total sales (new definition)
- 2020: Emerging Business Area sales >€ 1bn

Total innovation sales (€m)

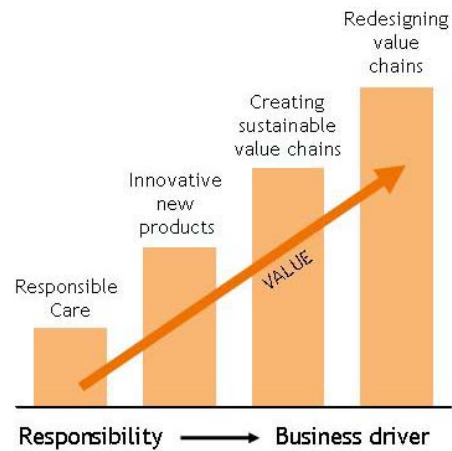


- In innovation, DSM's ambition is to go to the next level: from building the machine to doubling innovation output.
- DSM is proud to have clearly exceeded its Vision 2010 target of generating an additional € 1 billion in sales from innovation by 2010 compared to 2005. In 2010 innovation-driven sales were about € 1,280 million compared to about € 810 million in 2009.
- Furthermore, DSM has made a big step in improving innovation practices and culture in the company and has succeeded in considerably increasing the number of innovation launches (from about 25 back in 2006 to a steady launch rate of approximately 60 per year now).
- The number of innovation launches in 2010 (65) remained at the high level achieved in 2009 (62). The large diversified portfolio of innovations yields a stable income profile, which will be complemented by a broad range of new launches that the company is currently developing. With its well-filled pipeline DSM is confident the innovation contribution will remain high after 2010.
- DSM has adopted a new innovation target definition which is more in line with other mainstream innovators in the industry: percentage of sales created by new products and applications introduced in the last five years, replacing the previous target of an absolute amount of additional sales through innovation.
- DSM aims to increase innovation sales from ~ 12% towards 20% of total sales by 2015. This target reflects DSM's aspiration to further boost innovative growth as well as portfolio renewal and the speed of innovation.
- In addition, the Emerging Business Area programs have resulted in strong, long-term growth platforms which optimally combine the available competences in Life Sciences and Materials Sciences. The EBAs should grow to a combined turnover of more than € 1 billion in 2020.

## Sustainability

### From responsibility to business driver

- 2011: no. 1 in Dow Jones Sustainability Index (DJSI) for Chemicals; no. 1 in 6 out of 8 years
- ~ 89% of DSM's innovation pipeline is ECO+
- ~ 40% of DSM's running business is ECO+

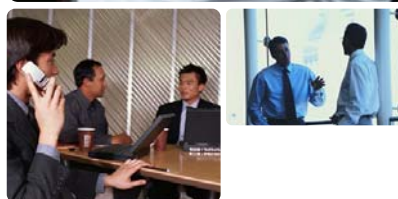
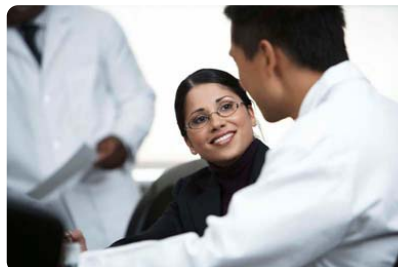


- In sustainability, DSM's ambition is to go to the next level: from responsibility to a business driver. DSM is consciously expanding its sustainability approach. From an internal value and a tool for making a responsible contribution to society, sustainability has become a strategic business driver.
- In 2010 DSM was once again ranked the global number one in sustainability in the chemical sector of the Dow Jones Sustainability Index. In 2004, 2005, 2006 and 2009 DSM had also been named the global number one in this sector and in 2007 and 2008 it ranked amongst the top leaders in the sector.
- Many DSM products and services help improve ecological performance by for example reducing CO<sub>2</sub> and other GHG emissions along the value chain. In 2010, ~ 89% of DSM's innovations pipeline and ~ 40% of DSM's running business were ECO+ solutions - products and services that, when considered over their whole life cycle, offer clear ecological benefits compared to the mainstream solutions they compete with.
- In 2010 DSM executed its third worldwide Employee Engagement Survey. The survey had an excellent response rate of 90%, which is one of the highest response rates compared to other companies. The results showed a 3 percentage point improvement in the level of engagement of employees (the percentage scoring favorable) compared to the second survey in 2009, which was already a significant improvement on the results of the 2007 survey. Taking all responses together, 71% scored favorably on the DSM Engagement Index and 19% scored a neutral response.
- Using 2010 as a reference, DSM is working with suppliers to reduce their carbon footprint by 20% by 2020. This has already resulted in a number of incremental improvements via more efficient synthetic routes, and there are also a number of radical improvements in the pipeline (suppliers moving from chemical routes to biorenewable synthesis and energy providers coming up with breakthroughs in the area of renewable energy).
- DSM CEO Feike Sijbesma received the prestigious 2010 Humanitarian of the Year Award from the United Nations Association of New York for his outstanding commitment to corporate social responsibility and in particular for DSM's partnership with the United Nations' World Food Programme (WFP).

## Acquisitions and partnerships

### From portfolio transformation to growth

- Partnership with Sinochem (China) in anti-infectives
- Acquisition of Martek (US) and Vitatene (Spain) in nutritional ingredients
- Partnership with Kemrock (India) for composite resins
- JV with Tatenergo (Tatarstan/Russia) in feed premixes
- Acquisition of AGI (Taiwan) in UV curable resins
- Acquisition of Shandong ICD High Performance Fibre Co Ltd (China) in fiber solutions
- Two joint ventures with KuibyshevAzot (Russia) in engineering plastics



- In Acquisitions & Partnerships, DSM's ambition is to go to the next level: from portfolio transformation to driving focused growth.
- The agreement with Sinochem Group to form a 50/50 global joint venture for the business group DSM Anti-Infectives is one of the first major milestones of DSM's new strategy.
- In February 2011 DSM completed the acquisition of Martek, a US based producer of high value products from microbial sources that promote health and wellness through nutrition.
- In March 2011 DSM and Kemrock announced a joint venture in composite resins to provide customized solutions to the fast growing Indian and global composites markets.
- DSM and Tatenergo (Russia) in June 2010 formalized the JV co-operation to start the construction of an Animal Nutrition & Health premix plant in the Republic of Tatarstan.
- In July 2011 DSM completed the acquisition of Vitatene S.A.U., based in León (Spain), a producer of natural carotenoids. The acquisition was announced on 10 May 2011. The acquisition of Vitatene allows DSM to strengthen the natural carotenoids offerings of its nutrition business as consumer demand for natural products continues to grow.
- In July 2011 DSM completed the acquisition of 51% in AGI Corporation (Taiwan). This will allow DSM to not only strengthen its UV technology platform, an innovative and environmentally friendly technology, but also expand its position in high growth economies. It is therefore consistent with all four growth drivers.
- DSM announced in February 2011 an agreement to acquire the majority shareholding in Shandong ICD High Performance Fibre Co Ltd. ("ICD"), based in Laiwu, Shandong province, China. The acquisition of the majority share in ICD will bring complementary manufacturing and technology assets to DSM in addition to strengthening DSM's presence in this key market.
- In July 2011 DSM started a strategic cooperation with Russia-based KuibyshevAzot OJSC with two joint ventures. In both of these, DSM Engineering Plastics will hold a majority share. In addition, KuibyshevAzot will be granted a license under DSM Fibre Intermediates' technology for the production of cyclohexanone.

## Overview

- Who we are - Facts and figures
- Strategy: DSM in motion: *driving focused growth*
- Bright Science. Brighter Living.™ in action

HEALTH • NUTRITION • MATERIALS



## Bright Science. Brighter Living.™

Bright Science. Brighter Living.™ symbolizes:

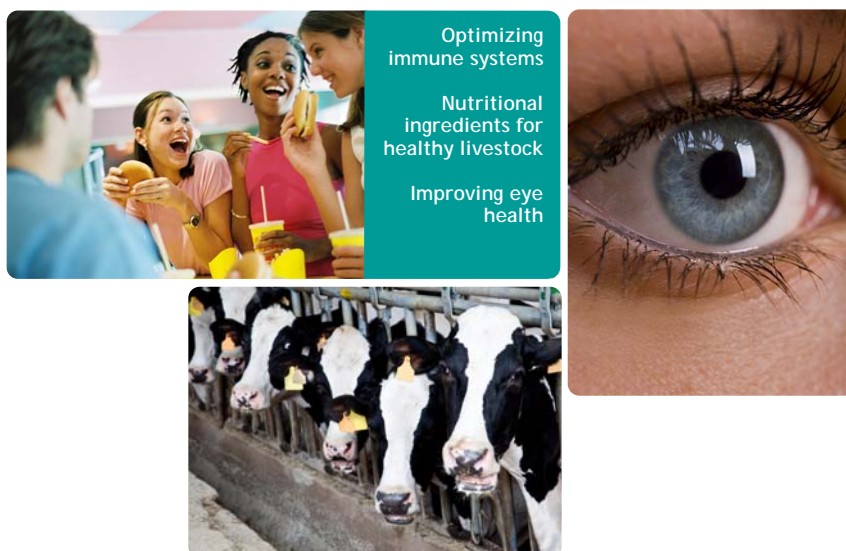
- the transformation of our portfolio;
- a new era of growth: the Life Sciences and Materials Sciences company;
- the DSM culture;
- the DSM core value of Sustainability: our People, Planet, Profit approach;
- DSM's commitment to creating innovative solutions that make a positive difference to people's lives - in partnership with customers and other stakeholders.



- As DSM's transformation into a Life Sciences and Materials Sciences company active in health, nutrition and materials is complete, a new corporate brand is a logical step. The new DSM brand demonstrates very clearly - to customers, suppliers, shareholders, the communities in which the company works as well as to DSM employees - that DSM has turned a page. The new brand is a symbol of the company's transition to 'the new DSM': a Life Sciences and Materials Sciences company addressing key global societal trends.
- The new brand is a reflection of the overall positioning - internal and external - of the company. It stands for the newly created DSM (the Life Sciences and Materials Sciences company) and the DSM culture (adapting to the new portfolio). In addition, it represents DSM's values and the One DSM philosophy and fits in with the mission to create brighter lives for people today and generations to come.
- Bright Science refers to the unique way in which we combine Life Sciences and Materials Sciences disciplines. In partnership with customers and other stakeholders with whom we share ideas, insights and inspiration, we 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 for generations to come.

## HEALTH | NUTRITION

# Delivering healthier food and feed



Page 19



## Delivering healthier food and feed

DSM is the world's leading supplier of vitamins, carotenoids and other fine chemicals to the food, dietary supplements and feed industry.

DSM is the leading global producer of ingredients and vitamins, carotenoids and premixes for the food and feed industry: More than half a billion people consume our vitamins each day.

### Optimizing immune systems

- DSM Nutritional Products combines a broad portfolio of innovative, high-quality and safe nutrients with consumer insights, market knowledge and application expertise. DSM's health benefit solutions portfolio contains a combination of nutritional ingredients to optimize the immune system.

### Nutritional ingredients for healthy livestock

- As a major supplier of vitamins, carotenoids, feed enzymes and other fine chemicals we serve the animal farming industry throughout the world. Dairy and beef cattle as well as sheep and goats are important segments of animal farming. Our portfolio of nutritional feed additives promotes optimum lifetime performance, feed efficiency, animal health and welfare in these animals. Our vitamin supplementation guidelines for ruminants are used by nutritionists and veterinarians worldwide.

Our ability to provide micronutrients not only helps sustainable animal production but also helps preserve the environment under intensive farm management.

### Improving eye health

- DSM brings visible improvements to eye health. Eye health is not just the 'luck of the draw'. A healthy lifestyle contributes greatly to eye health, and a nutritious, balanced diet containing a wide range of vitamins, carotenoids (pigments) and trace elements plays an important part in protecting eyes and, ultimately, preventing blindness. The risk of eye problems increases with age and after cataracts and glaucoma, age-related macular degeneration (AMD) - a progressive disease that affects older people - is the third biggest cause of blindness globally and the leading cause of blindness in Americans age 60 and older. Between 20 and 25 million people are affected by AMD worldwide, and this figure is expected to triple in the next 30-40 years due to the ageing of the population.
- DSM has developed two dietary supplements - FloraGLO® Lutein and OPTISHARP® Zeaxanthin - which replicate the naturally occurring pigments and help to significantly increase the density of macular pigmentation. These help to halt, and even reverse, the negative effects of age-related macular degeneration (AMD).

## HEALTH | NUTRITION Nutrition for all



Combating  
vitamin D  
deficiency

Feeding the  
planet

WFP partnership



### Nutrition for all

#### Combating vitamin D deficiency

- Caused primarily by poor nutrition and a lack of exposure to direct sunlight, vitamin D deficiency has been linked to a variety of health problems such as osteoporosis (the softening of bones), cardiovascular disease, diabetes, asthma, hypertension and more. Using research and drawing on its Life Sciences expertise, DSM, the world's largest provider of vitamins, is leading the development and provision of vitamin D3 for food, beverage, and dietary supplement manufacturers. Available in pure crystalline, oil and powder forms, **Quali-D®** from DSM is helping to meet health-conscious consumers' demands for safe and convenient products that address the problem of vitamin D deficiency. Perhaps most impressive of all, Quali-D® has been inspired by nature itself as unlike other forms of vitamin D, it is sustainably derived from lanolin taken from the wool of healthy live sheep found in Australia and New Zealand.

#### Feeding the planet

- DSM is the leading global producer of ingredients and vitamins, carotenoids and premixes for the food industry. In fact more than half a billion people consume our vitamins each day.

Our advanced ingredients make an important contribution to the world's favorite food brands - in dairy, baking, fruit juice, beer, wine and savory products. We achieve this through market and application knowledge, technologies and long-standing experience; all of which contributes to solutions that provide superior value to our customers.

- As consumers become more demanding, manufacturers need to react with products that deliver on multiple levels. For example most of us want healthier food from sustainable sources, but without sacrificing convenience and great taste. The truth is, even when we believe we're eating for health, we may not be... In fact, 99% of foods don't contain sufficient nutrients. It's here where our nutritional ingredients play a vital role.

#### DSM - WFP partnership

- DSM aims to provide solutions to global health needs. Nutrition security and access to nutrition are becoming increasingly important, and there is also a growing demand for safer and healthier foods. As the largest producer of vitamins worldwide, DSM is very much involved in promoting health across the world. That's why DSM became a partner to the United Nations' World Food Programme (WFP) to fight hunger and malnutrition worldwide. In addition, DSM has its own non-profit humanitarian initiative, *Sight and Life*, which focuses on the global fight against micronutrient deficiencies.

## HEALTH | MATERIALS

# Driving advances in healthcare



Joint  
replacements

Surgical  
modeling

Targeted drug  
delivery

## Driving advance in healthcare

### DSM in Medical: pushing the boundaries - inside and out

- Today our polymers and resins are being used in everything from biomedical devices such as artificial limbs and prosthetics and complex organs like the heart and brain to pioneering drug delivery systems, stereolithography and more sanitary medical flooring. Tomorrow our sights are set on life-changing new treatments like regenerative medicine.
- At a conservative estimate there are six million people walking the earth today with DSM inside their bodies.
- Our strength in biomedical comes from a unique convergence between our expertise in materials (especially polymers) and life sciences. The result is biomedical products that are capable of interacting with the body safely over a long period.
- Our **Dyneema Purity®** brand, for example, is the world's strongest fiber. It enables medical device manufacturers to make their products stronger and smaller, which is important for intricate and minimally invasive surgical procedures. **Dyneema Purity®** is just one of a family of polymeric biomaterials from DSM now being used in everything from pacemakers to shoulder, hip and knee joints, as well as more delicate and intricate body parts like the brain, lumbar discs and vertebrae.

### Joint replacements

- More and more people choose to stay active longer. The health benefits are clear, but there are side effects. The damage to various joints from sustained, intense physical activity has led to a dramatic rise in orthopedic procedures.
- The achievements in total joint replacements, especially hip and knee arthroplasty, are spectacular. Innovative medical procedures to repair and restore long-term function to torn rotator cuffs and ripped anterior cruciate ligaments (ACL's) are practiced on a routine basis. More recently, there have been substantial developments in the treatment of the spinal area.

### Surgical modeling

- Our advanced **Somos®** resins are now driving an entirely new approach to medical device design and processing: stereolithography. Using this prototyping technology we can now produce a functional medical device prototype in just days rather than months. It also opens the door to new, patient-specific surgical tools that can be used in actual surgeries.

### Drug delivery systems

- The search for better, safer therapies with improved efficacy never stops. Which is why DSM is now developing implantable 'drug depots' made of re-absorbable polymers delivered to the precise areas of the body that need them - releasing medication gradually over time.

## HEALTH | NUTRITION | MATERIALS

### Protection for all



Page 22



## Protection for all

### Sun care: UV filters

- Our **PARSOL®** range of UV protective products includes the leading organic UV filter in the marketplace. In fact, we're developing a whole new generation of UV filters by re-engineering the chemical building blocks so that, for example, sun cream stays on the skin absorbing UV radiation without that 'heavy skin' feel.

### Saying goodbye to solvents

- No matter what the application, our biggest collective challenge in the paint market is clear: the need for cleaner, solvent-free paints.
- Our response has been a string of innovations such as **NeoPac® PU-480**, an ultra high-performance waterborne product for topcoats and stains that offers high gloss, outdoor durability, hardness, flexibility and water resistance. There's also **Neocryl®**, a family of waterborne acrylic resins that enable paint manufacturers to cut their overall volatile organic compound emissions by up to 50%. Our waterborne technology delivers the same quality, performance and appearance as traditional solvent-based paint.

## Food protection solutions

- Every day, around 27% of all the world's edible food is wasted by retailers, food companies and consumers. It's a staggering number and merely confirms that food protection is more critical to your business than ever, especially in areas like the cold chain, where multiple parties are involved in storage and distribution. Fewer returns means less waste - which equals more profit. DSM is a trusted partner to offer solutions to protect food. Examples are **Delvacid®**, a range of natamycin-based liquids and powder formulations for protection against spoilage by mold and yeast, and **Delvocoat®**, a family of liquid coatings for cheese surface protection

## MATERIALS

# Lighter, stronger, more energy efficient



Lighter and more fuel efficient planes

Energy efficient lighting

Greener cars



### Lighter and more fuel efficient planes

Although modern aircraft have become more fuel efficient, little has been achieved in making the materials used in the aircraft body more sustainable. This, however, is about to change. DSM has developed a carbon fiber composite resin which makes light aircraft even lighter and more aerodynamic. This allows flight at greater speeds with less fuel consumption and lower environmental impact. Pictured here is LH Aviation's LH-10 - made of DSM's Aeronite® carbon fiber resin. It is the fastest plane in its class with the lowest environmental footprint. With a fuel tank of 70 liters, it can fly for 8 hours with a top speed of 370 km/h and a maximum range of 1480 kilometers. That's the equivalent of Paris to Lisbon, with a lower fuel consumption than the average car!

### DSM in Automotive / transportation: smarter, lighter, greener, brighter

- Our advanced plastics, resins and fibers help build lighter, stronger, safer and more sustainable vehicles, from under-the-hood and powertrain applications to steering wheels, the chassis, airbags, pipes, hoses, interiors and exteriors.

### Energy efficient lighting

- Stanyl® TC is a new portfolio of thermally conductive materials. The first key use of this material is in LED lamps.

## MATERIALS

# More renewable energy

Sustainable  
windmill blades

Enabling  
wind powered  
shipping

Capturing the  
power of the sun

Biogas



Page 24



## More renewable energy

From resins used in gargantuan wind turbines, to superstrong materials for towing kites to antireflective coatings for solar modules...we're putting all our energy into saving - and creating - energy.

### Sustainable windmill blades

- In wind turbines our **Synolite™** 1790-G composite resin is now being used to make lighter, stronger and more durable blades. Our resins help reduce the carbon footprint of the windmills and turbines themselves as the curing procedure of the blades can be performed at room temperature, which enables manufacturers to reduce total system costs by up to 40% (much of it energy) compared to epoxy resin based systems.

### Enabling wind powered shipping

- Continuing the theme of wind power, **Dyneema®**, the world's strongest fiber™, is used to make the ropes that pull and hoist the gigantic SkySails towing kites now being used to propel commercial ships - reducing fuel consumption and emissions by up to 35%.

### Capturing the power of the sun

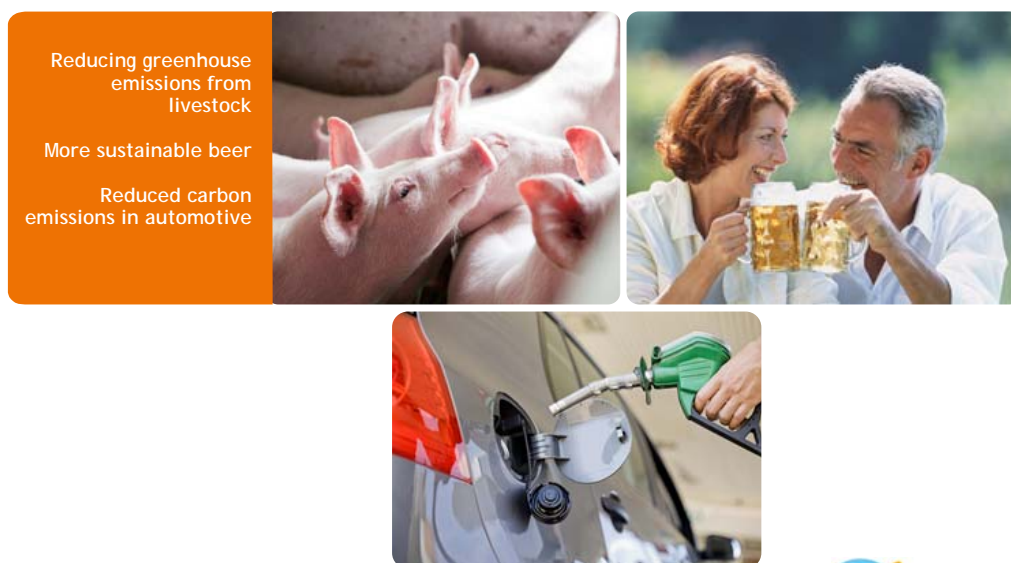
- Our **KhepriCoat™** anti-reflective coating technology increases light transmission in glass cover plates for solar modules, which in turn increases the solar module efficiency. In fact, **KhepriCoat™** was used on photovoltaic modules that broke the world record for multi-crystalline solar transmission.

### Biogas

- DSM is a world leader in biogas - a renewable energy source generated from waste streams and low-value energy crops with the aid of biotechnology. Our enzymes are now being used by more than 100 biogas plants to increase their efficiency by up to 15%. We advise plant operators, plant owners and investors on biomass operation and efficiency improvements. The result: a stable biogas plant and more revenues.

HEALTH | NUTRITION | MATERIALS

## Enhancing customer sustainability



Page 25



### Enhancing customer sustainability

#### Environmentally friendly animal production

- DSM's **Ronozyme® WX** animal feed enzyme improves the pigs' digestion of bran and other feed raw materials resulting in feed savings and lower methane emissions from manure. If **Ronozyme® WX** were used in all European pig feed, this would reduce the contribution to global warming from pig farming by around 4 million tons of CO<sub>2</sub> equivalent. This corresponds to the annual emission of nearly 1 million cars.

#### Greener beer

- Brewing is a highly competitive and cost-sensitive business. But while all players are focusing on operational efficiencies and driving down costs, outside stakeholders are taking an increasing interest in their performance in terms of environmental sustainability. But while technology has long been harnessed to cut down costs, new technology based on natural enzymes are only just beginning to be taken seriously as a way of reducing the impact that beer making has on the environment. Comparative Life Cycle Analysis demonstrates that the use of **Brewers Clarex®** can lead to a reduction of between 5% and 8% of the total carbon footprint associated with beer manufacturing compared with the use of synthetic stabilizers.

This equates to an energy bill saving of €100,000 per million hectoliters. These significant savings can be achieved without the need for additional investment, and can make a substantial contribution to supporting brewers in meeting their CO<sub>2</sub> reduction targets. What's more, **Brewers Clarex®** lengthens shelf life, meaning that beer can last up to fifteen months - a significant improvement over traditional stabilizers.

#### Reduced carbon emissions in automotive

- Carbon emissions carry an environmental cost to all of us which is why car makers can face fines if their cars emit excessive amounts of carbon dioxide.
- Our solution? To develop a carbon neutral plastic called **EcoPaXX™** that's 70% bio-renewable (the highest in the industry so far). Similarly, our **Stanyl®** Timing Chain Tensioner reduces CO<sub>2</sub> emissions by up to 2g per km.
- Our composite resins are increasingly used for key applications like fender support systems because of their ability to punch way above their weight in terms of strength, durability, and of course sustainability. Take **Palapreg® ECO**, our new 55% bio-renewable resin - the highest bio-renewable content available on the market today - with no drop in processing standards or product performance.

HEALTH | NUTRITION | MATERIALS

## Leading the green industrial revolution



### Leading the green industrial revolution

The climate change threat and growing energy scarcity are highlighting the need for a bio-based economy. At DSM, we're committed to helping achieve it.

#### What is DSM doing to achieve a bio-based economy?

- We believe that a bio-based economy is inevitable. It is needed for a sustainable future and it is the right thing to do for our planet. But how can we achieve it? By moving from fossil fuel towards the sustainable use of renewable sources. This will fundamentally reshape our industrial landscape and replace many processes and products. Businesses that fail to adapt will not survive. Others, like DSM, will thrive.
  - DSM is at the forefront of this transformation, through the development of bio-based chemicals and bio-based performance materials - the building blocks of a sustainable economy. We have the know-how and the drive to create performance materials that are 100% sustainable.
  - DSM has produced two major biotechnology breakthroughs that have opened up a potential market worth billions.
- The first is our technology for producing **second generation biofuels**: biofuels derived from agricultural waste and inedible crops, such as corn stalks, wood chips and switch grass. The second is the technology for producing **bio-based succinic acid** that we have developed with Roquette, a global starch and starch derivatives company operating the biggest biorefinery in Europe. Succinic acid is an important chemical building block, and bio-based succinic acid is a cost-effective alternative to the oil-based version.

