



Bright Science solutions from DSM help to meet global food challenge

DSM's leadership in polyamide 6 and thermoplastic copolyester for thin film and specialty packaging technologies is helping customers to provide better solutions to the world's rapidly changing food packaging needs, meeting the demand for reduced food and packaging waste.

Global Trends

- Global population growth, coupled with continuing urbanization as people leave the land for cities in search of work, is leading to increased consumption of processed food. More people buy their food from supermarkets, and lifestyle changes are driving consumption of a greater number and variety of ready meals.
- Greater awareness of the economic and ecological impact of food waste is leading the food industry to look for packaging solutions that contribute to reduced food waste, by improving protection of goods in transit all the way from farm to fork, extending shelf lives, and providing visual warnings that packaged food is reaching its "use by" date.
- Retailers and brand owners are looking to reduce the environmental impact of packaging by down-gauging, extending their use of recyclable and recycled materials, and adopting bio-based solutions.

Key drivers

- Rising demand for processed food with packaging that is safe, convenient and sustainable.
- Greater awareness of, and regulatory interest in, reducing food waste through extending shelf life, requiring better and smarter packaging solutions, through the development of intelligent materials.

The global food challenge

With the world's population already over 7 billion and expected by the United Nations to grow to anywhere between 8 and 10.5 billion by 2050, there will inevitably be a significant strain on food resources all around the world. Add to this an increasing demand for safer and more sophisticated foods as societies advance, and it becomes clearer than ever that meeting nutritional needs will be a major global challenge.

The picture is incredibly complicated. The developed world is facing issues relating to both obesity and mal nutrition. At the same time the UN's Food & Agriculture Organization (FAO) estimates that around 13% of the global population goes hungry on a daily basis. One-third of all of the food produced throughout the world for human consumption goes to waste—that's around 1.3 billion tons each year¹. And with food-borne illnesses, arising from improper handling, preparation, or storage of food--and which in some cases can easily spread from one continent to another in a matter of hours--becoming more prevalent, we must act to protect our supplies and mitigate the risks.

In developed countries, societal trends such as smaller family units (which together with increasing longevity is also leading to populations with many more older people than in the past), a greater focus upon health and well-being, and the adoption of an 'on the go' lifestyle are all having a direct influence on shaping consumer preferences for food products that offer greater convenience and are readily available year-round.

1) Study by the Swedish Institute for Food and Biotechnology (SIK) on behalf of FAO

But damage or contamination while trying to meet these demands can still result in as much as 10% food waste²⁾.

New packaging solutions are one of the best ways the supply chain has to prevent unnecessary waste on its way to the consumer. Innovative flexible packaging technology is achieving positive results within developed markets, where the focus is on ensuring that food stays fresh and safe during its journey along the supply chain.

2) Source: WRAP 2008, The Food We Waste).

DSM experience and expertise

As a leader in performance materials, DSM combines extensive experience in the food industries with a fast, flexible approach. The company has developed a portfolio of materials for packaging solutions including Akulon® polyamide 6 (PA6) for flexible barrier films and Arnitel® thermoplastic copolyester (TPC) for breathable films. These materials are highly suited for the production of packaging film for fresh foods, where they deliver benefits - reducing food waste, as well as improving food quality and convenience of use.



Akulon®: Extending shelf life

Applying its Bright Science, DSM is helping to extend the capability of Akulon polyamide 6 in flexible packaging film applications through the ongoing development of innovative sustainable material solutions. As well as providing optimum barrier protection against oxygen – making it especially appropriate for the packaging of freshly produced meat, fish and cheese - Akulon provides puncture resistance in co-extruded or laminated multi-layer film structures. These are key attributes in maintaining product freshness, ensuring greater protection during transit, and extending shelf life.

DSM teamed up with partners like DEXPlastomers and extrusion equipment supplier Windmüller and Hölscher in employing an innovative concept in multilayer barrier packaging that can give synergistic properties that go beyond the individual layers. The sandwich structure of the film features 16 layers ranging from 1 µm to 25 µm – each with a specific function. Materials include Akulon polyamide 6 resin for oxygen barrier performance and mechanical properties as well as Stamylex polyolefin resin as moisture barrier. This nano-layer construction is made possible due to the exceptional quality and purity of each component material.



Arnitel®: from freezer to oven

DSM's, Arnitel (TPC) facilitates the development of breathable films with a high CO₂ / low O₂ permeability ratio, essential for many modified atmosphere packaging (MAP) for products such as vegetables, where air is flushed out of the package by an application-specific gas mixture.

The unique way in which Arnitel withstands a wide temperature range from -40°C to +205°C, makes the material equally ideal for shock freezing and for the oven – traditional as well as microwave. Removing the need for repackaging between freezer and oven eliminates any risk of contamination during the process, thereby pre-empting the potential for food waste while at the same time managing it at lower cost.

Arnitel® Eco

Because DSM is passionate about playing a leading role in the change of a fossil fuel dependent economy to a more sustainable, bio-based one, the company introduced Arnitel Eco, a unique addition to the Arnitel family. The material is up to 50% made of renewable resources, using rapeseed oil instead of mineral oil

Arnitel Eco's has its first commercial application in the production of high-temperature ovenable pan liners. Pan liners are used in food preparation, cooking and holding, to prevent food from "baking-on" and "burning-on" to the pot or pan surface. The main driver is the material's wide temperature resistance. Especially for food contact applications, Arnitel Eco offers an important feature: food does not stick to it. This gives a higher yield and quality of the food presented.

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“Not only were we able to fulfill the customers needs, but in doing so we also delivered a more eco-friendly solution via a bio-renewable and recyclable structure with a 65% smaller carbon footprint compared with similar pan liners on the market.” Says Paul van den Heuvel, Product Development Manager Arnitel at DSM. He adds: “This development illustrates DSM’s positive approach to partnering across the supply chain, and the benefits that can result from an open-mind R&D strategy.”

DSM launched Arnitel® Eco in 2010. The rapeseed it uses is grown in areas where there is no competition with food crops. Arnitel Eco was awarded Cradle to Cradle® certification by the internationally renowned sustainable design firm, McDonough Braungart Design Chemistry (MBDC), and also the Frost & Sullivan Europe Green Excellence in Product Innovation Award.

An ongoing dialogue

DSM maintains an ongoing dialog with its downstream partners in the food packaging chain. An important part of that dialog is a dedicated website: www.dsm.com/packaging-graphic-art, which focuses on food, as well as medical and industrial applications. It highlights the latest trends and solutions and acts as a

knowledge platform for everyone in the value chain, from film formulators and food processing companies to brand owners, manufacturers and retailers. This ongoing relationship with the packaging community is helping to deliver many original and valuable innovations, some of which are featured on the website.

Van den Heuvel: “A key industry driver is sustainability. In packaging, the focus is on reducing carbon footprint, preserving fossil fuels and reducing food and material waste through smarter solutions. DSM offers a range of performance materials that are more environmentally friendly, flexible, and easier to process, and safer to transport – while also bringing additional benefits to consumers.”

With food prices continuing to rise, there is now an even greater imperative to optimize all aspects of the processing operation; an objective that innovative flexible film packaging is ideally positioned to fulfill. And while individual companies cannot hope to resolve all of the issues associated with food waste on their own, DSM has both the technology and the expertise to act as an industry-wide catalyst that generates ongoing improvements to address avoidable waste.

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