



The Chemical Company

Solutions for Food Packaging



Some things are best packed by nature. For everything else, there's BASF.

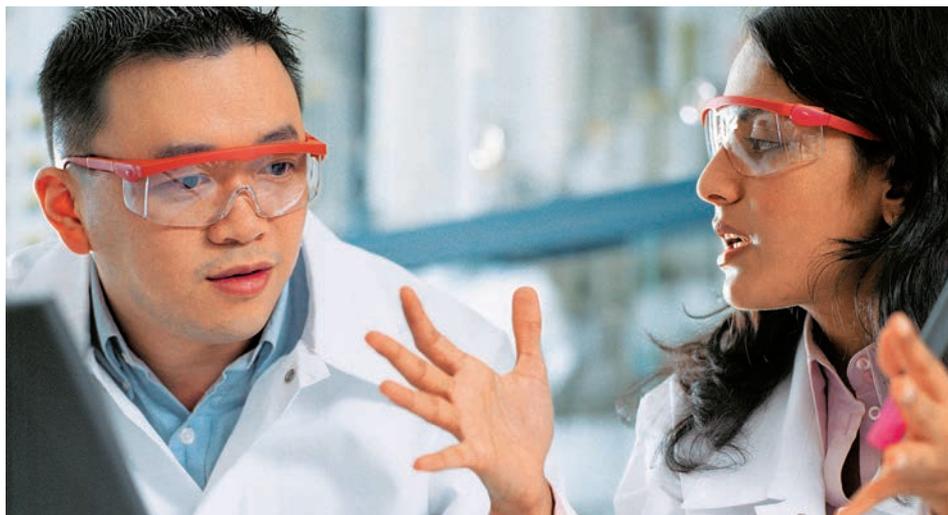
The demands made of packaging are high. Guaranteeing freshness and hygiene is a particular challenge, as foods must often cover great distances when travelling from their place of origin to supermarket shelves. Further time passes before they find their way into a shopping basket, and then again before they ultimately end up on the dining room table.

chemicals, barrier materials, printing ink resins, superabsorbents and foams.

The top five trends driving innovation for the packaging industry today are:

- Sustainability
- Differentiation at point of sale
- Content protection
- Cost reduction
- Convenience

At BASF, we offer a wide range of packaging raw material for the packaging industry.



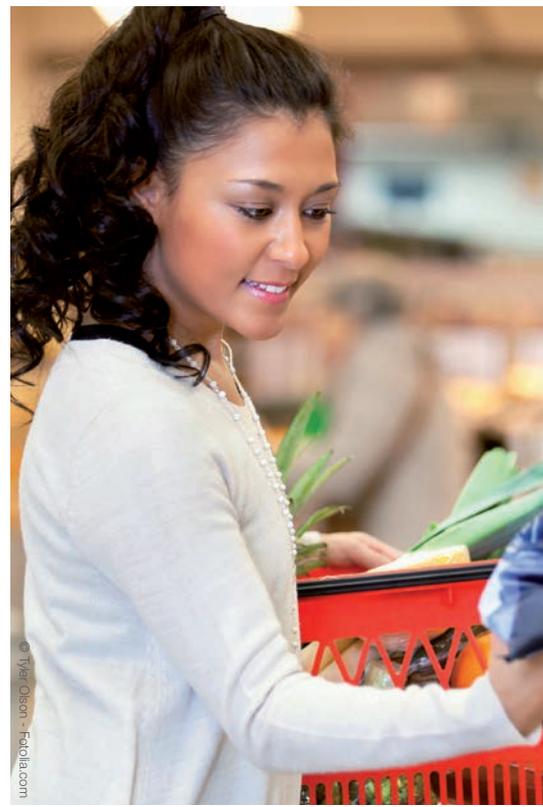
Further considerations such as product safety and materials are paramount for certain applications. Innovation, performance and safety have always been guiding principles for BASF in all its research and development activities with regard to the packaging industry.

BASF offers the packaging industry a wide range of packaging materials and solutions. These include plastics for flexible and rigid packaging, paper chemicals to make and modify paper and cartons, colorants for plastics and printing inks, adhesive raw materials and processing

BASF is the world's leading chemical company: The Chemical Company. Its portfolio ranges from chemicals, plastics and performance products to agricultural products, fine chemicals as well as oil and gas. As a reliable partner BASF creates chemistry to help its customers in virtually all industries to be more successful. With its high-value products and intelligent solutions, BASF plays an important role in finding answers to global challenges such as climate protection, energy efficiency, nutrition and mobility.



Packaging solutions

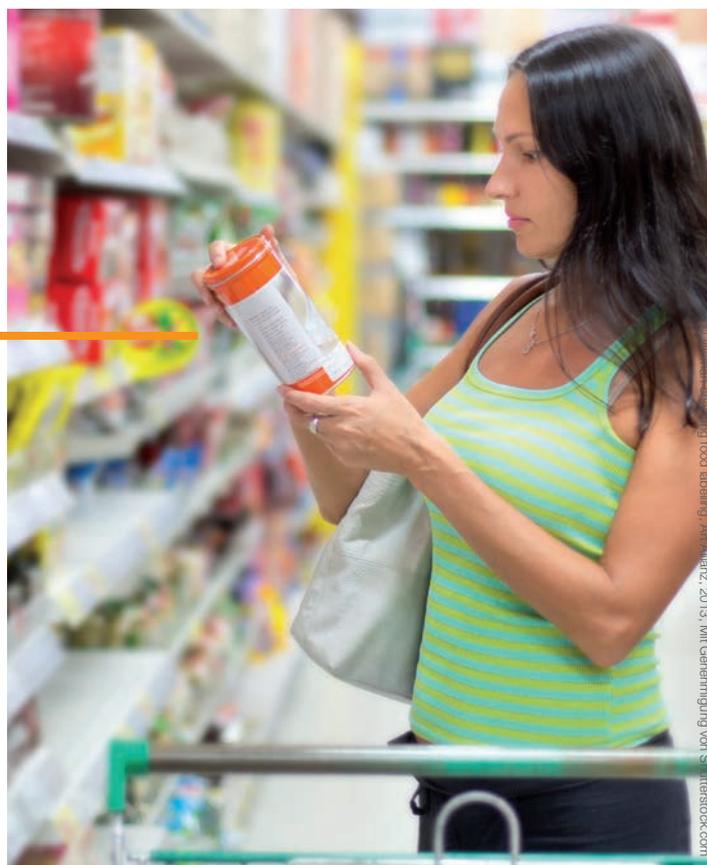


Sustainability

Sustainability is a hot topic in today's changing world. More and more consumers are becoming aware of the need for sustainable solutions. Today BASF is already fulfilling these needs with innovative compostable and bio-based plastics or additives which allow the use of more recycled paper without compromising quality.

Differentiation at Point-of-Sale

More than 60% of buying decisions take place in-store. Packaging that appeal to multisensory such as sight, texture or scent is an effective way to attract consumer attention and enhance product appeal. BASF has plenty to offer in this area, including the largest range of colorants for plastics and printing inks, effect pigments and effect films, materials to alter tactile properties, increase or reduce transparency, provide a shiny or matte appearance, and many other options to make your product stand out from all the others.



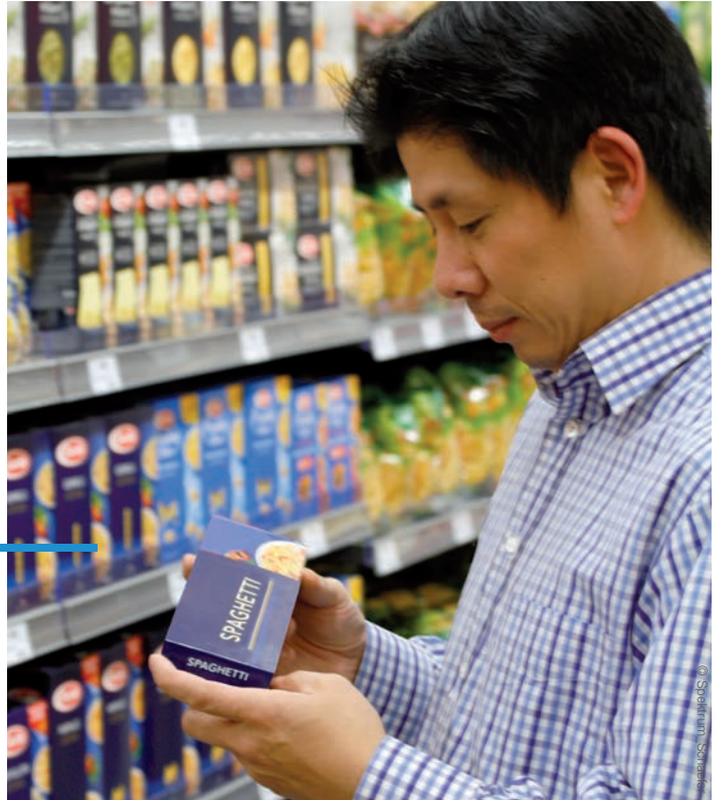


Content Protection

Improved barrier properties and sealing technologies help to extend a product's shelf life. Contents in the packaging can be further protected via modified atmosphere, antimicrobial or mechanical protection. BASF supplies aroma, gas, light, UV, water and many other barrier products.

Cost Reduction

The packaging industry is highly cost-driven and constantly seeks to reduce outlay either by raw material reduction in thin-wall packaging, or by cutting processing time. BASF offers a wide range of products to help you reduce costs.

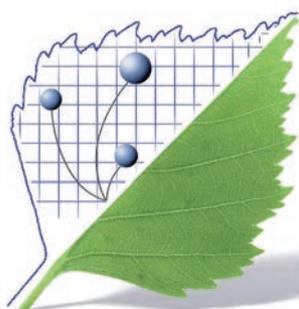


Convenience

The growing demand for convenience foods is driven by major changes in society and individual lifestyle choices. Solutions available from BASF make freezer-to-microwave packaging a reality. BASF also has the solutions to meet your reclosability, intelligent packaging and active packaging needs.

Measuring sustainability

Sustainable development is much more than a vision at BASF, it is an important part of its strategy. Eco-Efficiency Analysis is the most important instrument of BASF for the evaluation of sustainability of products and processes. The method supports customers' decision-making processes to find out which product delivers a defined function with a higher eco-efficiency, compared to other solutions. BASF has also developed SEEBALANCE®, a refined method that factors in all three dimensions of sustainability: economy, environment and society.



EFFICIENCY IN ECOLOGY AND ECONOMY

Eco-Efficiency Analysis

- First developed by BASF in 1996, this tool helps BASF, its customers and its customers' customers to choose the products and processes that better satisfy sustainability requirements both from an ecological and economic perspective.
- Eco-Efficiency Analysis is a comparative method that can also be used to identify new, improved ways to reduce environmental impact and cost.
- Eco-Efficiency Analysis is a holistic approach that embraces each product's entire life cycle from raw material extraction, to production, to end of life.
- Eco-Efficiency Analysis is validated by TÜV (German Technical Inspection

and Certification Organization) and NSF (National Sanitation Foundation) .

- BASF has conducted more than 450 analyses on products and processes by this method to date, in many cases on behalf of customers



SEEBALANCE®

SEEBALANCE® is an innovative tool that measures the social impact of products or processes in addition to their environmental and economic impact.

The aim of the sustainability evaluation tools is to quantify performance in each of the three dimensions and integrate them in a single tool displaying the final result in an easy understandable way.

Practical applications of the Eco-Efficiency Analysis

BASF's Eco-Efficiency Analysis has already been used to analyze packaging products and materials. Analyses performed so far include:

- Carbonated mineral water packaging
- Milk packaging
- Non-phthalate Plasticizer Hexamoll® DINCH®
- Sausage packaging
- Shopping bags made with compostable materials
- Water-based ink containing Joncryl® FLX 5000 for PE film applications
- Yoghurt packaging

More information is available at www.basf.com/sustainability

Driving sustainable solutions is one of BASF's four strategic principles.





Sustainability

Products allowing you to respond to society's needs and expectations with regard to various forms of sustainable packaging include:

ecovio®

With ecovio®, BASF offers a certified compostable polymer which at the same time has a variable biobased content. The main areas of use for ecovio® are compostable packaging solutions such as bags, paper-coating, shrink films, and foam packaging. ecovio® is highly transformable, meaning a wide range of end use applications are possible. This makes organic waste diversion easier for stadiums and large venues, where a variety of compostable food service packaging is required.

Features:

- Certified compostable worldwide
- Complies with food safety requirements
- Finished compound
- Good barrier properties against fat, mineral oil and aroma
- High melt strength
- Moisture and tear-resistant
- Printable and weldable
- Processable on conventional blown film plants for polyethylene
- Variable biobased content

Epotal® Eco

BASF's Epotal® Eco represents a new generation of adhesives for the packaging industry. Epotal® Eco is the first waterbased adhesive for multilayer films that fulfills the requirements of the European standard DIN EN 13432 for compostable packaging.

Features:

- Applicable on for all standard compostable films
- Compostable adhesive
- Enables immediate slitting of laminates after coating
- Meets food contact requirements



Certified compostable and flexible shrink film.

Food contact approved pigments for plastics

A unique color palette of pigments with food contact approval for plastic application enables flexible design of food packaging. These pigments are of highest purity, comply with different international norms and regulations, and offer high chroma for improved visual appeal.

Hexamoll® DINCH®

Hexamoll® DINCH® is the safe plasticizer for applications with close human contact. It is the best-researched non-phthalate, non-aromatic plasticizer and has an excellent toxicological profile. Hexamoll® DINCH® was ranked first in an eco-efficiency analysis comparing five different plasticizers.

Applications:

- Formulation of inks, adhesives and coverings of containers for food packaging
- Formulation of plastisols for lid sealings in metal caps and closures
- Production of cling film for fresh foods for domestic and retail use



Hexamoll® DINCH® is perfect for use in cling film to wrap fresh food.

Joncryl®

With the Joncryl® product line, BASF offers a broad range of high-value, high-performance water-based polymers for the printing ink, overprint varnish and functional packaging coatings market. Our goal at BASF is to design products that help the industry comply with European legislation while maintaining a high level of product performance. The Joncryl product line makes converting from solvent-based to water-based systems a high-quality, cost-saving and eco-efficient option for the flexible packaging market.

Joncryl® FLX Line features:

- Cost-effective and eco-efficient substitute for solvent-based inks
- Water-based technology platform for surface and reverse film printing inks

Joncryl® HSL line features:

- Water-based polymers that offers an alternative to PVC-based technology for heat seal lacquers for eg. yogurt liddings, pharmaceutical blister packaging

Pigments for compostable packaging printing

A range of pigments designed and certified for compostable packaging printing. These pigments are suitable for aqueous, solvent-based and UV curing ink systems and comply with standards such as DIN EN 13432 in terms of heavy metal and eco-toxicity.

Features:

- Certified by DINCertco and Vincotte (OK Compost) according to DIN EN 13432 in terms of heavy metals and eco-toxicity.
- High fastness to light and weathering
- High chroma
- Ideal for compostable bags, paper bags, food packaging and labels
- Suitable for aqueous, solvent-based and UV curing ink systems

Ultramid®

One key driver to sustainability is the use of less resources. By using Ultramid® grades in film packaging the consumption of material can be reduced significantly, as Ultramid® allows for much thinner films due to its outstanding mechanical performance.

Ultramid® has excellent barrier against oxygen and other gases, as it helps to preserve the food much better which means longer shelf life and less food waste.



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Differentiation at Point of Sale

Products and solutions to enhance your customer appeal:

For anti-dust and transparency

Irgastat® P18 FCA features:

- Anti-dust protection – the use of a permanent anti-static agent reduces the electrostatic charge on film surfaces, avoiding dust deposit and preserving the original appearance of the package. The product is approved and used for bulk and industrial food and non-food contact packaging.

Irgaclear® XT 386 features:

Transparency of plastic packaging - special additive for polypropylene, for improved transparency when content visibility is an important feature of the packaging.

Pigments for plastics

For coloration of plastic packaging applications, BASF offers a comprehensive range of colorants including organic and inorganic pigments, dyes, pigment preparations and effect pigments. Whether cost efficiency or superior value-in-use being the key focus, this broad portfolio of colorants helps match specific customer requirements.

Pigments for printing inks

BASF offers a broad range of organic and inorganic pigments, dyes and pigment preparations for solvent, water and UV inks. In addition to our organic colorants, we offer a range of effect pigments that includes vacuum metallized aluminum pigments for special effects on printed goods.



Content Protection

Products to help protect your goods:

Joncryl® functional coatings products

The Joncryl® product line consists of water-based binders that add functionality to a variety of packaging applications. The main functional coatings market segments served with Joncryl® products are primers and overprint varnishes for metallization markets, heat-seal lacquers including primers for film & foil, and barrier coatings for paper and board substrates.

Features:

- Heat-seal lacquers
- Improved recycling through replacement of polyethylene coating
- Non-fluorinated grease-barrier coatings
- Pre-print primers and protective lacquers
- Technical paper enhancement
- The cost effective water-based substitute for solvent-based systems

Tinuvin® UV absorbers

Tinuvin® UV absorbers protect the valuable content of plastic packaging from harmful ultra-violet radiation.

Ultramid®

BASF's Ultramid® grades are polyamides which, integrated in multilayer film structures, provide superb mechanical protection and keep the flavor inside the packaging. Vacuum packaging is one of Ultramid's main applications today.

Ultramid® films' good thermoformability guarantees particularly well-shaped vacuum packaging with good contact clarity and outstanding appearance.

Features:

- Functional barrier against mineral oil migration
- Heat resistance
- High transparency
- Puncture resistance
- Outstanding mechanical performance (strength – stiffness – toughness – ratio)
- Oxygen and carbon dioxide barrier



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Cost Reduction

Products to help reduce your packaging costs:

Epotal® FLX

BASF's water-based dispersions are fully reacted systems for the manufacture of adhesives for film-to-film lamination. Multi-layer films can be processed immediately. Slitting and dispatching of the laminates can take place at the same day, enabling significantly reduced lead times and costs. Main advantages of water-based adhesives:

- Broad application range
- Food contact approval
- Immediate slitting
- No telescoping required

Ultramid®

Ultramid® can significantly help to reduce production costs. Due to its outstanding mechanical performance, the thickness of the packaging can be reduced to a minimum. This helps to save a significant amount of resources.

In addition, special Ultramid® B SL-grades are available with improved processability to allow high line speed production.

Features:

- Higher blow up and less wrinkling in blown film processing
- Improved transparency and gloss
- Increased formability in thermoforming process
- Less film breaks and higher output in biaxially oriented polyamide (BOPA)
- Lower sensibility regarding cooling rate



Ultramid® is highly appreciated in multilayer films for the packaging of food.



Convenience

Products and solutions to help you meet growing customer demand for convenient packaging solutions that make life easier for the consumer:

ecovio®

Kitchen and food waste can be collected hygienically and simply in ecovio® bags, then turned, together with the bag, into compost. Undesirable odor and pest infestation are prevented. Thanks to its good wet strength, liquid from teabags or the remains of fruit do not leak through, so there is no more laborious scrubbing of the organic waste bin.



Compostable organic waste bags are already in use today.

Pigments suitable for printing on microwave-able packaging

Apart from the usual convenience of using the same packaging for freezer storing and microwave heating at home, packaging can also be made suitable for the pasteurization or sterilization processes during the food production process. BASF offers a selection of pigments with fastness to avoid migrating or bleeding under conditions such as 130° Celsius for 30 to 45 minutes.

Features:

- Applicable for packaging used in deep freezing, microwave-able, flexible packaging, pouches
- Consistent performance with a wide range of temperatures
- Strong color fastness

	Effect	Product
Sustainability	Protection of polymer against degradation	Chimassorb®, Tinuvin®, Uvinul®
	Pigments for compostable packaging printing (DIN EN 13432)	Cromophtal®, Heliogen®, Irgalite®, Paliotol®
	Compostable and biobased polymer	ecovio®
	Compostable adhesive	Epotal® Eco
	Plasticizer for applications with close human contact	Hexamoll® DINCH®
	Conversion from solvent to water-based systems	Joncryl® FLX and Joncryl® HSL line
	Less material consumption	Ultramid®
Differentiation at Point of Sale	Printing with special effects	BlackOlive™, Firemist®, Glacier™, Graphitan®, Lumina®, Magnapearl®, Mearlin®, Metasheen®, Paliocrom®
	Organic colorants for printing films and labels	Cromophtal®, Cinquasia®, Fanal®, Heliogen®, Irgalite®, Irgazin®, Microlith®, Orasol®, Paliotol®
	Mass coloration of plastics	Cromophtal®, Heliogen®, Irgalite®, Irgazin®, Magnapearl®, Paliotol®, Paliogen®, Sicopal®, Sicotan®, Sicotrans®
	Transparency of plastic packaging	Irgaclear® XT 386
	Anti-dust protection	Irgastat® P18 FCA
Content Protection	Functional coatings	Joncryl®
	Super-absorbent	Luquasorb® FP800
	UV light protection	Tinuvin®, Chimassorb®, Uvinul®
	Gas barrier / Protection from mechanical impacts	Ultramid®
Cost Reduction	Reduced lead times in film-to-film lamination processes	Epotal® FLX
	UV print	Irgacure®, Lucirin®, Laromer®
	Polymer durability	Irganox® and Irgafos®
	Process efficiency	Microlen® and Eupolen® pigment preparations
	Process efficiency	Ultramid® B SL-grades
Convenience	Hygienic and easy collection of kitchen waste	ecovio®
	Freezer-to-microwave	Pigments suitable for printing on micro wave-able packaging

Application / Description

UV stabilizers for plastic materials, adhesives and inks protect plastic substrates from rapid aging, thereby improving performance and durability.

Range of pigments designed for compostable package printing. All pigments received the "OK Compost" certification by Vinçotte and were also approved by DINCertco in accordance with DIN EN 13432.

ecovio® is a certified compostable polymer with a variable biobased content. It is used to produce compostable shopping bags, paper coating, shrink film and food packaging.

Epotal® ECO is a water-based dispersion that complies with DIN EN 13432, the European standard for compostable packaging. It is suitable for use with all standard compostable films.

Non-phthalate plasticizer with excellent toxicological profile and approval for contact with food and drinking water in many countries.

Water-based technology for printing inks for flexible packaging and heat seal lacquers for dairy and pharma applications.

Due to its excellent mechanical performance, Ultramid® grades allow the production of very thin film which reduces the consumption of resources significantly.

Used alone or mixed with transparent pigments or dyes, BASF effect pigments create striking visual effects.

Color has always been used to attract attention, differentiate, create sensations, and increase brand visibility and shelf impact. BASF colorants permit the formulation of printing inks for gravure, flexo, and offset, meeting the strictest criteria for safety and compliance with current regulations.

Wide variety of colorants for plastic packaging compliant with the application demand and offering enhanced visual appeal.

Special additive for polypropylene, for improved transparency when content visibility is an important feature of the packaging.

The use of a permanent anti-static agent reduces the electrostatic charge on film surfaces, avoiding dust deposit and preserving the original appearance of the package. The product is approved and used for bulk and industrial food and non-food contact packaging.

Water-based acrylic resins that act as barriers against water, water vapour and grease and enhance mechanical resistance. Used to formulate lacquers and primers both for cellulose substrates and plastics.

Super-absorbent polymer that absorbs and holds excess liquids from fresh foods in trays, ensuring better and longer food preservation and maintenance of its organoleptic properties.

UV filters extend the shelf-life of the contents by protecting against UV radiation.

Range of polyamides for combination in multilayer food packaging solutions with excellent mechanical properties. The impermeable barrier prevents oxygen penetration from outside and in that way extends the shelf-life of oxygen-sensitive products.

Water-based dispersions for the manufacture of adhesives for film-to-film lamination. Facilitate immediate slitting of laminates after coating and in that way reduce lead times significantly.

Photoinitiators and resins for formulation of UV-print inks and paints in settings where polymerization speed is the most important aspect of the printing process.

Thermal and process stabilizers protect the polymer during processing.

Non-dusting and free flowing, fully dispersed pigment preparations help improve processing efficiency.

Range of polyamides for combined use in multilayer food packaging solutions. In addition to conventional gas-barrier properties, Ultramid® B SL grades provide process benefits by reducing film breaks and improving production efficiency.

Organic waste bags made of compostable and mostly biobased polymer ecovio® are an easy and convenient solution for the collection of kitchen waste.

Selection of pigments with fastness to avoid migration or bleeding under conditions such as 130° C for 30 to 40 minutes.

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