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CASE STUDY
Paper & Packaging

Sustainable solutions from Kuraray

Innovative packaging for dry pet food

KURARAY POVAL™ | EXCEVAL™ | PLANTIC™ | EVAL™ | MonoSol

Sustainability: the most urgent trend in packaging

Various trends and requirements are currently transforming the packaging market: renewable raw materials, reducing the amount of packaging material, cutting CO_2 emissions, monolayer products, recyclability, repulpability or biodegradability – to name a few.

Consumers and brand owners driving the trend

Greater sustainability and circularity are an urgent issue for the whole of society and are being driven forward by legislators and consumers as well as brand owners and industry. The objective is to find circular packaging solutions. This also applies to plastics. Several major players in the food sector, from Danone and Mondelez to Nestlé and Unilever, have already published voluntary commitments or pledges.

Revision of the PPWD in the EU

The trend towards sustainability also has a political dimension. An example from the European Union: in conjunction with the "European Green Deal" to reduce CO_2, the "Packaging and Packaging Waste Directive" (PPWD) is intended to ensure a high level of environmental protection. The latest amendment to the directive contains, among other things, updated measures to promote reuse, recycling and other forms of recovery of packaging waste as an alternative to disposal. The EU Commission intends to publish a proposal on further tightening of the PPWD before the end of 2022.

International complexity

Sustainability is a global megatrend in the packaging industry. However, there are significant differences in national and regional legislation and regulatory requirements. Internationally, in some instances, the disparity between packaging and recycling regulations is as big as the difference in the available recycling infrastructure. Nevertheless, the overriding global trend is the same: reducing and recycling packaging are on the agenda everywhere and legislation is becoming more stringent. For brand owners and manufacturers, the extremely heterogeneous regulatory landscape is a major challenge. A conventional packaging concept that can still be used in some countries may no longer be acceptable in other states and regions. However, they all agree that the objective is to protect food and avoid waste.

Combining functionality and sustainability

It is vital to ensure that new, more sustainable packaging solutions continue to meet the full range of functional requirements for food packaging. All the Kuraray innovations outlined below combine these two objectives: as well as focusing on sustainability, they provide reliable protection for food. These packaging ideas based on Kuraray's products point the way to circular packaging. Every packaging problem is specific. Therefore, Kuraray's experts are committed to helping their customers and the entire supply chain find packaging solutions that meet their specific needs and ensure compliance with specific regulatory requirements.

Innovative packaging for dry pet food

The pet food market is growing in industrialized countries – along with the number of pets. Extensive contact restrictions during the COVID-19 pandemic contributed to the sharp rise in the number of pets – and therefore demand for pet food. In fact, the number of packaging units sold is growing faster for dog and cat food than for any other type of FMCG: the compound annual growth rate (CAGR) was around 25% between 2015 and 2020. As for human food, consumers perceive paper-based packaging as more sustainable.

The paper-based packaging used for pet food up to now is not perfect. The problem lies in the fluoropolymers that provide the necessary barrier to the fat content of pet food. For example, cat food generally has a 10% fat content while the fat content of dog food is typically up to 20%.

Halogenated polymers such as fluoropolymers are controversial because of their potentially harmful effect on the human - and animal - organism. Moreover, pet food packaging containing fluoropolymers is extremely difficult to recycle. New, more sustainable alternatives to the common packaging types used at present need to ensure a similar barrier to aroma, odour, and grease.

The four paper-based packaging innovations presented below meet these requirements because they use the barrier properties of future-oriented products from Kuraray. Some of these innovations are already in commercial use. These new packaging concepts are ideal replacements for paper- and cardboard-based packaging where greaseproof properties are based on fluoropolymers. They combine superior sustainability with the necessary functionality.

1. EXCEVAL™-coated paper bags

Example of a conceptual structure for such packaging:

Paper / moisture barrier coating / EXCEVAL™ coating / heat-sealable coating

This type of packaging is already in commercial use in the food sector. A thin, water-soluble EXCEVAL™ coating acts as an oxygen and aroma barrier. The EXCEVAL™ is applied by conventional coating equipment, for example, rotogravure coaters or rod coaters. Dispersions, e.g. polyolefin or other polymer dispersions, are used as a heat-sealable coating on the inside of the packaging. These paper structures can be repulped without problem in standard paper mills as EXCEVAL™ is soluble in water – unlike conventional fluoropolymers. This type of packaging is based on a technology approach that has been established in the paper industry for many years.

EXCEVAL™:
Excellent resistance to water, oil and grease

EXCEVAL™ is Kuraray's halogen-free, hydrophobically modified polyvinyl alcohol (PVOH). It has been specifically developed to improve the water resistance of PVOH. An Exceval™ coating provides an excellent barrier to oxygen, nitrogen and carbon dioxide gas, even at elevated relative humidity. Using EXCEVAL™, packaging manufacturers can improve the functionality of their paper by giving their packaging excellent oxygen barrier properties and very good resistance to oil and grease.

Sustainability benefits of EXCEVAL™

EXCEVAL™ is water-soluble and repulpable and can be recycled in the paper stream of standard paper mills.
In addition, EXCEVAL™ is inherently biodegradable.

2. Paper-based pouches with EVAL™

Example of a conceptual structure for such packaging:

Paper / polyethylene / EVAL™ EVOH / polyethylene

Kuraray's ethylene vinyl alcohol (EVOH) copolymers are marketed as EVAL™. A pouch containing a thin layer of EVAL™ provides the oxygen and aroma barrier required for dry pet food. The polyethylene (PE) layer acts as a moisture barrier and sealing layer. The paper-based pouch is prepared by coextrusion coating EVOH and PE onto paper. This packaging concept prevents oxidation of fat and preserves the vitamin C in pet food. Furthermore, it uses the smallest possible amount of plastic and optimizes the repulpability of paper fibres.

EVAL™ EVOH: Functional barrier in a very thin layer

Kuraray's EVAL™ ethylene vinyl alcohol copolymer (EVOH) helps the food and healthcare sectors develop packaging that protects product quality for a prolonged period. Recyclable multilayer structures with EVAL™ EVOH meet the most stringent hygiene conditions and food contact standards and regulations. In packaging applications, a layer of EVAL™ EVOH just one millimetre thick creates a functional barrier equivalent to a ten metre thick wall of polyethylene.

Sustainability benefits of EVAL™

A thin EVAL™ EVOH layer allows the production of particularly lightweight, resource-saving packaging and therefore helps to reduce waste. Moreover, EVAL Europe N.V.'s EVOH production site in Belgium has ISCC PLUS certification. Certification is based on the mass-balance approach and documents the fact that the ethylene monomer in Kuraray's "biocircular EVOH" is produced from renewable resources.

3. Repulpable paper packaging with PLANTIC™ biopolymer

Example of a conceptual structure for such packaging:

Paper / PLANTIC™ film / sealing layer made of e.g. PE, PBS or PBAT

This paper packaging for food is already used commercially. PLANTIC™ film laminated onto the inner side of paper packaging creates a barrier to aroma and oxygen. An inner sealing layer – for example, renewable or biodegradable polyethylene(PE), polybutylene succinate (PBS) or polybutylene adipate terephthalate (PBAT) – also acts as a moisture barrier. The production technologies used for this type of packaging are extrusion coating, lamination and extrusion lamination. Since PLANTIC™ is soluble in water, the inner sealing layer and adhesive can easily be separated from the paper in the repulping process. Moreover, thanks to the water solubility of PLANTIC™, the repulping yield is higher than e.g. with a conventional PE layer. Consequently, the paper fibre can be repulped without difficulty. Consumers generally consider paper packaging to be sustainable and particularly high quality and are likely to prefer this type of packaging to all-plastic packaging, even if it is recyclable or compostable.

PLANTIC™:
The biopolymer that keeps oxygen out and preserves aroma

PLANTIC™ is a high-performance film manufactured by Kuraray using more than 80% renewable raw materials. It is produced from thermoplastic starch and is biodegradable and compostable (home and industrial composting). Due to its high gas barrier properties, this biopolymer from Kuraray can be used in packaging that preserves aromas and effectively keeps out oxygen. PLANTIC™ is therefore ideal for both MAP packaging for food with a short shelf life and packaging solutions for dry goods such as coffee, tea and animal feed.

Sustainability benefits of PLANTIC™

PLANTIC™ is made from plant-based starch and has a water content of around 12%. This biopolymer is dispersible in water, which makes it possible to separate multilayers and allows simple repulping of paper packaging. PLANTIC™ is certified for both industrial and home composting and can be used in the manufacture of completely compostable multilayer packaging.

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Established in 1991, Kuraray Europe GmbH is based in Hattersheim, near Frankfurt am Main, Germany. In 2021 the company generated annual sales of EUR 1.1 billion. It has more than 820 employees in Germany at its sites in Hattersheim, Frankfurt and Troisdorf. Kuraray is a global speciality chemicals company and one of the largest suppliers of polymers and synthetic microfibres for many sectors of industry. Examples are KURARAY POVAL™, MOWITAL®, TROSIFOL® and CLEARFIL™. Kuraray Europe also has around 215 employees at six other European sites. They are also working on the development and application of innovative high-performance materials for a wide range of sectors, including the automotive, paper, glass, and packaging industries, as well as for architects and dentists.

Kuraray Europe is a wholly owned subsidiary of the publicly listed Kuraray Group, which is based in Tokyo, Japan, and has more than 11,200 employees worldwide and sales of EUR 4.8 billion. Kuraray's current slogan is: "Possible starts here."

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