

Pushing boundaries by creating 100% biodegradable packaging



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Why sustainable packaging needs a new adhesive

Sustainable packaging is no longer just a technical challenge — it's a strategic imperative. Consumers are increasingly aware that packaging waste contributes not only to environmental degradation but also to serious health risks. From microplastics in drinking water to PFAS in food packaging, the materials we use to protect products are now seen as potential threats to human well-being. They're not just asking for better materials — they're demanding that brands reflect their values.

Global leaders such as Nestlé and Mars are committed to sustainable packaging, with a strong pivot toward paper-based and compostable materials. Not only to meet regulations but also to maintain consumer trust. The global pivot toward fibre-based formats has opened new opportunities, but also surfaced new questions: How do you achieve heat-pressure sealability without synthetic hotmelt adhesives? How can every layer of a package be both compliant and biodegradable?

For many companies, these questions are at the heart of the shift from theory to execution in circular packaging. It's no longer enough to offer “paper-based” solutions. Every component — including the adhesive — must support full biodegradability, food safety, and industrial performance.

PerfectaCOL® GM, Avebe's potato starch-based adhesive, offers a breakthrough. It combines high seal strength, oil-and-grease resistance, and biodegradability — without requiring retooling or introducing harmful additives.

Read on to discover today's current trends in sustainability, the challenges the industry faces, and how Royal Avebe can support you with the solution.



“Packaging is the first impression — make it sustainable.”

**“Packaging is
often the
first contact
consumers have
with a product
— and they expect
it to be safe,
sustainable, and
transparent.”**



Consumer demand and regulatory pressure

Today's consumers are not just looking for eco-friendly packaging — they're looking for safe packaging. As awareness grows around the waste and health risks of plastics and PFAS, packaging has become a symbol of trust. Packaging is often the first contact consumers have with a product — and they expect it to be safe, sustainable, but also non-toxic, biodegradable, and aligned with their personal well-being.

This shift in expectations is especially strong among younger generations, who are driving demand for packaging that reflects their values — transparency, responsibility, and health. At the same time, governments are responding with far-reaching regulations, banning single-use plastics, restricting PFAS and promoting compostable, biodegradable alternatives. The convergence of consumer expectations and policy is reshaping the packaging landscape.

Key insights:

- 65% of Gen Z and Millennials say they feel guilty about the environmental and health impact of their purchases — and packaging is a top concern (NielsenIQ 2025, McKinsey 2024).
- 42% of consumers prefer biodegradable or compostable packaging for food products, where contamination makes recycling impractical (Packaging Digest 2025).
- Over 150 million tonnes of plastic are floating in the world's oceans — with the EU contributing over 8 million tonnes annually to plastic waste, much of it from packaging (UNEP 2025, EUROSTAT 2024).
- More than 30 countries have enacted bans on single-use plastics and PFAS, accelerating the shift to safer, biodegradable materials (WHO & UNEP 2024).



Plastics, PFAS, and health concerns

Beyond environmental impact, consumers are increasingly concerned about the health risks associated with plastic packaging. Microplastics have been found in drinking water, food, and even human blood. Meanwhile, PFAS — often used in grease-resistant coatings — are under intense scrutiny for their links to cancer, hormone disruption, and immune system effects.

This growing awareness is fueling demand for non-toxic, biodegradable alternatives that are safe for both people and the planet. Packaging is no longer just a functional layer — it's a health and safety issue.

Why this matters:

- PFAS are known as “forever chemicals” because they don't break down in the environment or the human body (EPA 2025, IARC 2023).
- Microplastics have been detected in 100% of tested human placentas in some studies (WHO 2019).
- Consumers are actively seeking PFAS-free, plastic-free packaging — especially in food-, baby-, and personal care categories (McKinsey 2023).



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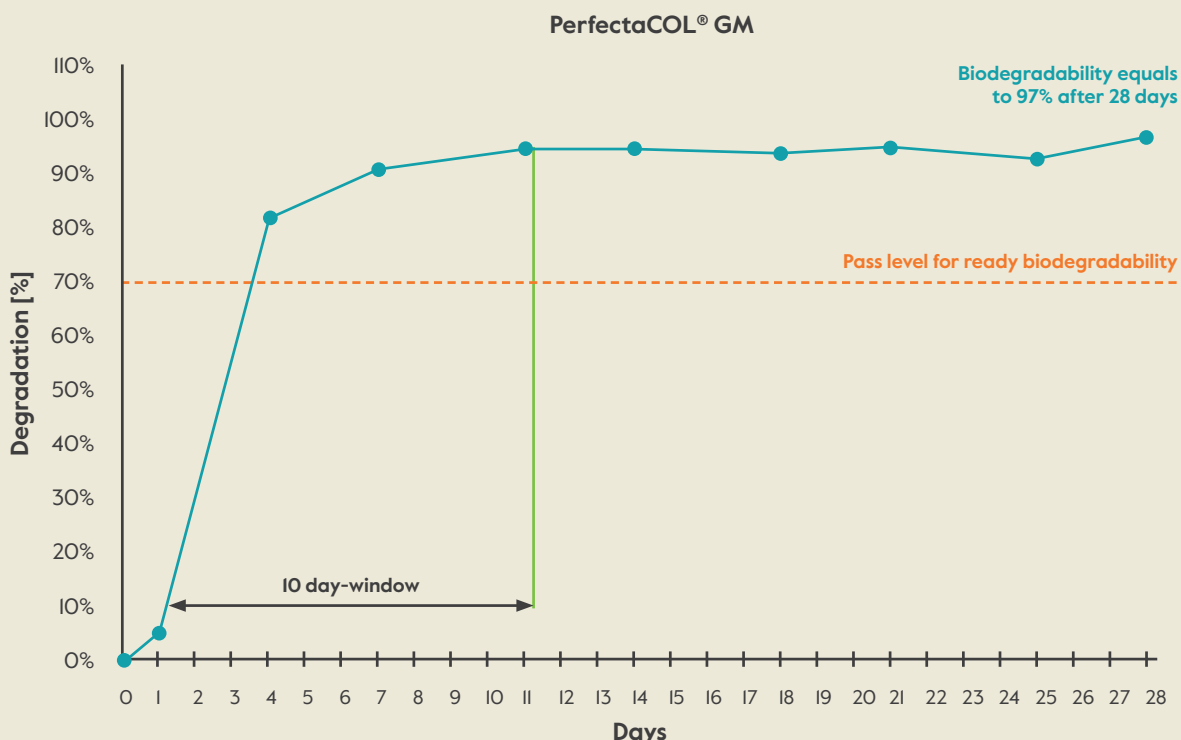


The move to circular and biodegradable packaging

Circularity in this context means designing packaging that returns safely to nature — with biodegradability as a key end-of-life strategy. Unlike recyclable materials, biodegradable packaging breaks down through natural processes, making it ideal for food-contact or single-use applications.

Biodegradability insights:

- Biodegradable packaging is expected to grow at 14.3% CAGR globally through 2030, driven by bans on persistent plastics and demand for natural materials (Markets&Markets 2024, Statista 2025).
- Biodegradable adhesives are increasingly used in flexible paper packaging, replacing synthetic hotmelts that persist in the environment (Beharaj et al. 2019).
- DIN EN 13432 and ASTM D6400 are becoming standard benchmarks for biodegradable packaging certification in Europe and North America (ASTM 2023, ASTM 2022).
- Food packaging is the fastest-growing segment for biodegradable materials due to contamination challenges that make recycling impractical (Shahbandeh 2024).



Rise of fibre-based packaging: market momentum and material demands

Fibre-based packaging is rapidly becoming the cornerstone of sustainable packaging strategies. Its renewable origin, recyclability, biodegradability and compatibility with compostable systems make it a preferred alternative to plastic — especially in food, e-commerce, and personal care sectors.

But fibre alone is not enough. To replace plastic effectively, fibre-based packaging must be paired with high-performance barriers and adhesives that preserve product integrity, resist moisture and grease, and meet safety standards — all while, preferably, remaining biodegradable.

Market momentum:

- The global market for fibre-based packaging is projected to reach \$500 billion by 2030, driven by bans on plastic and rising demand for compostable formats (Markets&Markets 2024).
- Flexible paper packaging is one of the fastest-growing segments, especially for dry foods, snacks, and takeaway containers (Smithers 2025).
- Consumer preference is shifting toward paper-based formats, with over 60% of EU consumers perceiving paper as more sustainable than plastic (Ragonnaud, 2024).

Material challenges:

- Moisture and grease resistance are critical for food applications — requiring biodegradable barriers that don't compromise compostability or biodegradability (PackagingDigest 2025).
- Barrier coatings and adhesives must be free from PFAS and other persistent chemicals to meet regulatory and consumer safety expectations (Ragonnaud, 2024).
- Processing compatibility is key: new materials must integrate into existing packaging lines without costly retooling (PackagingDigest 2025).

Adhesives and barriers matter:

- Adhesives and barriers are the functional backbone of fibre-based packaging — enabling paper to perform more like plastic.
- They ensure sealability, structural integrity, and resistance to moisture and grease, especially in food applications.
- Biodegradable solutions combine industrial performance with environmental integrity.
- These materials are not just components — they are key enablers of the next generation of truly compostable packaging (PackagingDigest 2025).

Market momentum for fibre-based packaging



**\$500 billion
by 2030**

The global market for fibre-based packaging is projected to reach \$500 billion by 2030



**Flexible formats
are booming**

Flexible paper packaging is one of the fastest-growing segments, especially for dry foods, snacks, and takeaway containers

**60% Consumers
prefer paper**

60% of EU consumers perceive paper as more sustainable than plastic

PerfectaCOL[®] GM: The ideal solution for dry food packaging

PerfectaCOL[®] GM is a potato starch-based adhesive designed to meet the demanding needs of dry food packaging. Its versatility being heat-pressure sealable, oil-and-grease barrier, make it the perfect solution for ensuring product integrity and sustainability.

- **Heat-pressure sealability:**

Achieves strong, consistent seals at lower temperatures, reducing energy use by up to 20%.

- **Oil-and-grease resistance:**

Maintains barrier performance even in high-fat applications, eliminating the need for synthetic coatings.

- **Biodegradability:**

Readily biodegradable and free from harmful additives like PFAS, ensuring environmental integrity.

- **Potato starch-based:**

Utilises natural, renewable resources, aligning with consumer demand for eco-friendly packaging.



**“PerfectaCOL[®] GM
delivers what
dry food packaging
needs most
— seal integrity,
grease resistance,
and sustainability
in a single
potato-based
adhesive.**



Case Study I:

Biodegradability in industrial composting

Customer challenge:

A European food packaging converter needed an adhesive that would be fully biodegradable in industrial composting environments, aligning with their zero-waste packaging goals.

Solution:

Avebe's PerfectaCOL® GM, a potato starch-based adhesive 100% biodegradable and certified for industrial compostability.

Impact:

- 97% biodegradation achieved within 28 days under industrial composting conditions.
- Passed DIN EN 13432 compostability standards without requiring synthetic additives.
- Enabled full packaging system (paper + adhesive) to be certified as compostable or biodegradable — a key differentiator in eco-conscious markets.



Case Study 2:

Heat-pressure sealability for snacks packaging

Customer challenge:

A snack food brand required a biodegradable adhesive with strong heat-pressure sealability for flexible paper packaging — without compromising barrier performance.

Solution:

Avebe's PerfectaCOL® GM, engineered for high-performance sealing under industrial conditions.

Impact:

- Achieved strong, consistent seals at lower temperatures (down to 120°C), reducing energy use by up to 20%.
- Maintained oil and grease resistance, critical for snack and dry food applications.
- Compatible with existing sealing equipment, enabling a smooth transition to compostable packaging without retooling.



Case Study 3:

Oil-and-grease resistance in food packaging

Customer challenge:

A premium bakery brand required a biodegradable heat-pressure sealable adhesive and barrier coating that could withstand high oil and grease exposure in its fibre-based pastry packaging — without compromising compostability or visual appeal.

Solution:

Avebe's PerfectaCOL® GM, a potato starch-based dual functionality barrier adhesive, with proven oil-and-grease resistance, was selected for its ability to maintain barrier integrity under demanding conditions and excellent heat-pressure sealability.

Impact:

- Maintained seal strength and barrier performance even in high-fat applications such as croissants and puff pastries.
- Eliminated the need for synthetic coatings or PFAS-based additives, ensuring full compostability or biodegradability of the packaging.



Conclusion

The packaging industry is undergoing a transformation — and compostable, biodegradable solutions are at the heart of it. For adhesive and barrier innovators, this is a once-in-a-generation opportunity. That it's possible to combine performance, processability, and planet-positive impact in one solution.

Royal Avebe, your knowledge partner to make it happen

Innovation by nature has been driving Avebe since 1919. We consider every part of the value chain, and we continue to innovate in a sustainable way. The challenges of the environment, of the culture, and changing consumer behaviour motivates and drives this innovation. Changes do demand adjustment, in either technology or attitudes. Can you obtain a natural and clean label product, from the ingredients to the packaging, while still maintaining the original quality and performance? Can you implement a packaging innovation in your factory and maintain the same level of output?

We understand that transforming packaging to be truly sustainable isn't a small step — it's a systems-level shift. It takes more than good intentions. It takes safe, scalable materials that don't compromise on performance, production speed, or compliance. That's why we developed PerfectaCOL® GM — a biodegradable, PFAS-free adhesive designed to meet the realities of industrial packaging while supporting your transition to compostable formats.

Our approach is collaborative. We work alongside producers, converters, and consultants to design tailor-made solutions that integrate seamlessly into existing lines, meet emerging regulations, and support full product and packaging circularity.

Whether you're aiming to meet climate goals, respond to consumer demand, or lead your market in sustainable innovation — we're ready to support you every step of the way.

Reach out to an Avebe expert today.

**Visit our website avebe.com
for more information.**



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