

## **(A RMC Success Story) Biobased and Biodegradable Elastomers for Abrasion-Critical Applications**

In 2023, KUORI received the Renewable Materials Conference Innovation Award for its first generation of BLOWA thermoplastic elastomers (TPE), developed from food industry side streams such as olive pits and walnut shells. The award significantly increased visibility and triggered numerous interactions with brands and industrial partners, enabling extensive material testing in real product environments.

These collaborations directly informed the further development of the BLOWA platform. Through iterative compound design and industrial feedback, KUORI substantially improved both mechanical performance and biobased content of the materials while maintaining compatibility with established manufacturing processes such as injection moulding, thermoforming and additive manufacturing. The resulting second generation of BLOWA materials demonstrates improved abrasion resistance, mechanical strength and biobased content, enabling the transition from prototype stage to scaled market entry in applications such as footwear components, small wheels and consumer products.

A central design challenge for abrasion-critical materials is the environmental fate of detached particles. KUORI's materials are engineered for durability during use, while abrasion particles exhibit enhanced biodegradability in soil due to their biogenic filler content and polymer composition.

In parallel to commercializing the BLOWA platform, KUORI continues the search for fully biobased elastomers. The company recently filed a patent for a new material concept ("Material C"), a bio-based polyester system designed for crosslinking into high-performance rubber. Unlike conventional vulcanized rubbers, which are difficult to recycle due to their permanent crosslinked structure, this material is engineered for circularity: the network can be chemically depolymerized back to its monomers, enabling closed-loop recycling. The system is designed to be produced from renewable feedstocks available in Europe, reducing dependency on fossil resources and global supply chains. At the same time, abrasion particles derived from the material show biodegradability in soil environments, addressing one of the major environmental challenges associated with rubber wear. This approach aims to combine the performance of crosslinked elastomers with circular material design and represents the central focus of KUORI's R&D activities in the coming years.