

uperabsorbent hydrogels — capable of absorbing liquids and swelling up to several hundred times their initial mass — can be used within topical personal care products, in the cores of absorbent hygiene products such as disposable diapers, and in soils and growing media to improve water retention for agriculture applications.

Superabsorbent materials are traditionally made of synthetic copolymer hydrogels, which have limited biodegradability. Their environmental impact is substantial: For example, in the U.S. alone, around 28 billion

every year. Global environmental regulations and mandates and growing consumer interest in natural and eco-friendly products are driving strong demand for biobased and biodegradable alternatives to synthetic materials.

One biodegradable alternative to synthetic superabsorbents is based on polysaccharide chemistries (*e.g.*, starch or cellulose). However, polysaccharide-based absorbents have a lower absorbency under load (AUL) than traditional superabsorbents.

be absorbed under a static pressure, is a key performance metric for hygiene applications.

Through funding from the National Science Foundation (NSF), Ecovia Renewables, Inc. (a spinout company from the Univ. of Michigan),

has developed a novel, cost-effective fermentation-based bioprocess for producing biodegradable superabsorbents. The bioprocess generates crosslinked polyamino acids from low-cost raw materials such as glycerol or glucose. The process has a stoichiometric theoretical yield of 0.7–0.72 g product per g substrate, depending on feed-stock selection.

Ecovia's bioprocess involves a fermentation step that polymerizes amino acids *in situ* via a non-ribosomal enzymatic reaction, followed by