

ABSTRACT

PRESENTER: Dr. Natnael Behabtu

COMPANY: DuPont

JOB TITLE: Technology Manager

Podium Title: *Enzymatic polymerization: a new class of natural polymers for the personal care formulations*

Background information (Short introduction)

Polysaccharides are ubiquitous in nature. Cellulose and starch are the most abundant polymers found in nature, with many other polysaccharides also used as specialty food additives. Nature makes exquisite use of these rich designs to deliver specific functionality.

Objective

As exciting as extracted polysaccharides are, many challenges are left when it comes to their processing and use. A century of synthetic polymers synthesis has established precise and consistent micro and macromolecular material composition as the *conditio-sine-qua-non* for modern precise formulation needs.

Methodology

Thus, the ability to bring modern polymer science thinking to polysaccharides through enzymatic polymerization can deliver both naturally occurring polysaccharides and novel natural-synthetic structures made through a bottom-up assembly of natural monomers in a controlled and high purity fashion.

Results

Moreover, the know-how has now advanced to a point where less abundant, non-commercially known polysaccharides such as alpha 1,3 linked glucan homopolymers can be routinely manufactured with high purity, precision and consistency to enable the most stringent formulation needs. Even more intriguing is the ability of enzymatically polymerized polysaccharide to yield defined, hierarchical colloidal microstructure with unique particle morphology.

Conclusion

Enzymatic polymerization is thus a new wave in natural polymers design that brings both the benefit and purity and performance of synthetic polymers together with the sustainability of natural polymers.

Why is this important to the industry?

This is a new, more sustainable approach to a broad class of polymers and colloidal ingredients



Natnael received his PhD in Chemical Engineer at Rice University in 2012. His work encompassed carbon-based high-performance materials, their complex fluids and nano-scale materials behavior. Since 2012, he works at DuPont working in a diverse set of technology areas, from colloidal science applied in food and cosmetics to textile fibers and biodegradable packaging. He is currently a technology manger in the DuPont Nutrition and Bioscience division leading new biomaterial development effort in the enzymatic polymerized polysaccharides space. His current work focuses on the pressing sustainability needs and their societal impact - a generation-defining challenge - with a holistic approach, that goes beyond the mere technology solutions.”