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Technology strategies to control starch retrogradation

Weichang (David) Liu
Tate & Lyle, USA

This session will delve into the key technology strategies that can be used to guide the design and production of novel-starch based ingredients that allow proper control of retrogradation. The term "retrogradation" is widely used in the starch field and refers to the sequence of phenomena that occur after starch is cooked in water, cooled, and then held over time. Starch retrogradation usually decreases the quality of food products, affects the nutritional properties, and shortens the shelf-life. Starch retrogradation is influenced by storage conditions, starch chain structure, and interactions of amylose and amylopectin with other food components. Chemical modification, physical modification and biotechnical modification are the main technology strategies used to control starch retrogradation. Chemical modification changes the molecular structure of starch by introducing functional groups to obstruct starch chain recrystallization and hinder the aggregation of helical structure. Physical modification is implemented by treating starch under certain temperature, moisture and pressure conditions. Starch interaction with food components, such as sugars, salts, proteins, lipids, and non-starch polysaccharides is another important approach to control retrogradation, and the affecting mechanism of different food components varies. Biotechnological modification controls starch bio-synthesis and manipulates chain length distribution and fine structure. Novel starches produced with this method possess unique retrogradation behaviors. Enzymes change the starch chain structure (chain length and branching degree) and affect the starch retrogradation as well. These technology strategies can be used to guide the design and production of novel starch-based ingredients and allows for the proper control of retrogradation in a broad range of food applications.

Biography

Weichang (David) Liu, PhD is a research fellow specializing in texturants, innovation and commercial development at Tate & Lyle. He has more than a decade of experience in Food Science Research and Development. Before joining Tate & Lyle, he worked for Unilever and PepsiCo in China, where he led the Nanotechnology and Technical Science insight teams respectively. He holds a Doctorate degree in Material Science from Tsinghua University (China) and conducted Post-doctoral research in Italy, Germany and Australia.

David.Liu@tateandlyle.com

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