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# Continuous casting: A soft processing approach to fabricate polysaccharides-based bioplastics

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The last decades have been marked by an intensive research on polysaccharide processing as an effort to fabricate environmentally benign packaging materials at large scale. Most focuses have been on melt processing techniques due to the already established knowledge of petroleum-based plastic processing. However, the melt processing of polysaccharides has shown to be challenging due to the thermomechanical instability of these biopolymers. Here we introduce the continuous casting as a soft, rapid, and large-scale compatible approach to fabricate bioplastics from polysaccharides. This covers the implementation of the continuous casting process for cellulose derivatives such as hydroxypropyl-methyl-cellulose and carboxymethyl-cellulose, and starch with variable amylose/amylopectin ratio. Other successfully tested polysaccharides were chitosan, pectin carrageenan, and alginate. Bioplastic sheets as thin as 10 μm are possible to be efficiently formed in minute fractions when any Newtonian aqueous polysaccharide solution is used. However, we disclose how the continuous casting can be adjustable to non-Newtonian polysaccharide fluids. Polysaccharide-based bioplastics fabricated by continous casting fit a broad range of mechanical properties for application in numerous food packaging sectors. The future outlooks of this soft processing for nanotechnology is also covered.

## Biography

Francys K V Moreira is an Engineer with proficiency in natural polymers. He has devoted his scientific career to polysaccharides, mastering their physical chemistry and processing. He currently serves as a postdoc at the National Nanotechnology Laboratory for Agribusiness (LNNA) of Embrapa Instrumentation, a Brazilian federal research organization. His research interests include biopolymers in general, nanotechnology, organic/inorganic hybrids and bionanocomposites, sensor and multifunctional materials for intelligent/active packaging.

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