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Tracking and predicting biomass processing with fluorescent carbohydrate binding modules

Wood biomass is a source of raw materials for established wood-based industries and for the nascent biofuel sector. Efficient processing of wood fiber polymers such as cellulose and hemicellulose requires close monitoring with methods such as FTIR, XPS or chemical analysis. Such methods are time-consuming and require the availability of specialized equipment and expertise. Recently, the carbohydrate recognition domains of glycohydrolases, known as carbohydrate binding modules, were used for studying the development and the biochemistry of plant cell walls. In this study, we engineered a series of color-coded fluorescent carbohydrate binding modules with specificities for four major carbohydrate fiber polymers. This approach named Fluorescent protein-Tagged Carbohydrate-binding modules Method (FTCM) allows for quick, high-throughput analysis of fiber surface carbohydrates signatures and is herein used for 1- monitoring and predicting the impact of various treatments on the properties of biomass pulp and paper produced from such processed fibers and 2- predicting best pretreatment strategy for various biomass residues for biofuel production. We believe that the simplicity of this environmental-friendly approach could change the way industry optimizes biomass fibers processing and deconstruction.

Biography

Marc Beauregard has completed his PhD in 1989 at UQTR (Biophysics) and postdoctoral studies at the Photochemistry Max Planck Institute (RFA) and at University of Liege (Genetic Engineering Laboratory, Belgium). He was Associate Professor with UPEI (Canda) and with Université de Moncton, before being promoted to Full Professor at UQTR in 1998. There he joined the Research Center on Lignocellulosic Materials in 2011 and was recently appointed Chairman of the Chemistry-Biochemistry department. Marc has published more than 75 papers, he has served on editorial board of international journals and has been a member of several grant agencies committees. Throughout his career, he has been very active in R&D with major companies (GlaxoSmithKline, Buckman International) and co-authored 4 patent proposals.

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