

7th International Conference and Exhibition on

BIOPOLYMERS AND BIOPLASTICS

October 19-20, 2017 San Francisco, USA

Carbohydrate biopolymers associated with the South African sugar industry**Heidi du Clou and Stephen N. Walford**

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Statement of the Problem: Polysaccharides are carbohydrate biopolymers that are derived from numerous sources; including plants and microorganisms. They are present in sugarcane and in sugarcane processing streams. Sugarcane polysaccharides include starch, dextran, indigenous sugarcane polysaccharide, Robert's glucan, galactomannan, levans and sarkaran. Collectively, sugar technologists refer to mixtures of polysaccharides found in processing streams as "gums". Gums are regarded negatively in the sugar industry. Not only do they represent a direct loss of recoverable sucrose (sugar) due to the action of the microbes that produced them, but they also possess physical properties that affect processing. For example, cane starch, dextran and sarkaran have been linked to increased viscosities and related sucrose losses in sugar processing streams. The causes, chemical make-up and effects of cane starch and dextran are well documented. However, other gum polysaccharides are not as well understood. This research looks to establish the methods to isolate, elucidate and characterise the major constituents of gums in the South African sugar industry. Methodology & Theoretical Orientation: Gums from various sugar processing streams from across South Africa were isolated and characterised by methods that were established using gel filtration chromatography, gas chromatography mass spectroscopy, nuclear magnetic resonance spectroscopy, rheology and enzymatic hydrolysis followed by high performance liquid chromatography. Findings: Polysaccharides that constitute gums in the South African sugarcane industry are not limited to starch and dextran, but rather a complex and variable mixture of biopolymers. Conclusion & Significance: The techniques developed and knowledge gained better equips the sugar industry to analyse gums and opens opportunities for the industry to exploit the unique physico-chemical properties of these biopolymers.

Biography

Heidi du Clou has her expertise in analytical chemistry, chemical method development and biopolymer structure elucidation. She is passionate about biopolymers, mass spectroscopy and rheology. Heidi has been involved in the sugarcane industry since 2009. Her research for this industry has led to the development of several methods that enable the analysis of biopolymers within complex sugar matrices, and the compilation of a carbohydrate mass spectral library specific to the polysaccharides found in the industry. Her passion for rheology has led to an improved understanding of sugarcane-derived biopolymer solution behaviour, which has initiated a multitude of new research possibilities for the sugarcane processing industry.

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