**Title**
Characterizing Monosaccharides and Starches in a Co-Culture of Microalgae.

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**Abstract**
Microalgae is a robust source of functional ingredients with positive health effects due to PUFAs, polysaccharides, pigments, essential minerals, vitamins, enzymes and bioactive peptides. This study focused on *Chlorella vulgaris* (Chlorophyta) /*Leptolyngbya* sp. (Cyanobacteria) co-culture microalgae (CCA) carbohydrate characterization, data that is needed for application of these carbohydrates in the future. CCA obtained from the LSU Aquatic Resources Engineering was lyophilized prior to all assays. Total monosaccharide content (TMC) was analyzed using the Phenol Sulfuric method. Total Starch (TS) was quantified using Megazyme™ Total Starch HK Kit. Megazyme™ Amylose/Amylopectin Kit provided CCA starch characteristics. Megazyme™ Resistant Starch provided the amount of resistant and non-resistant starch present in CCA. GC-MS was used to identify monosaccharides present in CCA. TMC was calculated as 20-25% of CCA this coincides with previous studies (Kent et. al 2015; Kumar et. al 2016). TS was determined as 31.32g/100g of algae DWB. Amylose content was 31.92%; amylopectin content was 68.08% determined by subtraction. Resistant starch content was 0.50g/100g of algae DWB; non-resistant starch was 18.93g/100g of algae DWB. D (+) Glucose (1079.67 μg/mg), D (+) Galactose (94.00 μg/mg), and D (+) Mannose (69.84 μg/mg) were identified and quantified by GC-MS proximate quantification with standards. Microalgal products need to become more diversified and economically competitive. The consumer demand for healthy, plant-based, sustainable, high-protein foods is increasing. CCA carbohydrates could be used as a source of plant sourced carbohydrates and starches in foods. They also display rheological attributes when sulfated and could then be used as foaming-agents, stabilizers, and emulsifiers in food.