

CARBOHYDRATE MICROARRAYS FOR MEASURING CELL WALL POLYSACCHARIDES IN RELATION TO BIOMASS CONVERSION

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Wheat straw biomass (*Triticum spp.*) has the potential to be a new resource for biofuel production. The enzymatic convertibility of a given type of wheat straw biomass is not only linked to the overall chemical composition, but also to the ratio between leaf and stem. Leaf material has been found more convertible than stem material i.e. leaf material requires a lower amount of enzymes for conversion. The leaf to stem ratio of wheat straw biomass changes with the species, but also with the harvest and collection methods. In the Poaceae family, pectin is primarily found in the leaf. It is therefore a good option for an indicator of the leaf to stem ratio of wheat straw biomass mixtures.

Using pectin specific monoclonal antibodies we have developed a method based on the high throughput Comprehensive Microarray Polymer Profiling (CoMPP) technique. This new method allows us to determine the leaf/stem ratio of wheat straw biomass by measuring the level of pectin. The method can also be applied to other cell wall components such as hemicellulose and arabinogalactan proteins.

The CoMPP technique has been used to detect various plant cell wall polysaccharides present in the wheat straw biomass. It has been shown that the detection levels of pectin by pectin specific monoclonal antibodies have the ability to detect pectin values as low as 0.5% in a mixture of polysaccharides typical of that found in Poaceae species. The polysaccharide mixture contained cellulose, β -D-glucan, or glucuronoarabinoxylan, but tests were also made on mixtures containing both β -D-glucan, and glucuronoarabinoxylan. Pectin was added in various amounts ranging from 0% to 60% of the total mixture in order to establish the detection limits of the anti-pectin antibodies for pectic epitopes in the mixtures. These studies were extended to determine the minimum levels of leaf material present in a *Triticum spp.* harvested from various fields. Initial studies have shown the presence of pectin in mixtures containing only 10% leaf material. A blind testing of leaf/stem ratios of *Triticum spp.* mixtures using the CoMPP method has also been carried out with promising results.