589d Water Extraction of Steam Exploded Xylo-Oligosaccharides for Xylitol Production

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There is a growing interest in the applications of xylan and xylose for the production of oxygen barrier films, xylitol, ethanol, and other products. The major challenge is producing xylan and xylose in high yields and high purity levels for suitable applications. We investigated the steam explosion pretreatment of agricultural residues such as corn cobs and oat hulls at various severity parameters. The steam exploded materials were extracted with water to various concentrations of xylan and xylo-oligosaccharides. The steam exploded corn cob was readily extracted with water to produce highly concentrated low molecular weight fractions of xylo-oligosaccharides that were then hydrolyzed to xylose with very dilute sulfuric acid. The hydrolysate was readily fermented to xylitol using Candida tropicalis. Although the steam exploded oat hull was also readily extracted with water, it contained very high molecular weight xylan fractions. The high molecular weight xylan fractions were further fractionated using membranes with molecular weight cut-off of 3000. Because of the extremely high molecular weight of these xylans, they were used for film applications rather than fermentation into xylitol. In both cases, the severity of pretreatment was critical to the molecular weight distribution of the water-soluble material.