Name: Keonhee Kim

Email Address: annakkim@utk.edu

Affiliation: Center for Renewable Carbon, University of Tennessee

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Abstract Title: Reducing inorganics in lignocellulosic biomass utilizing microwave assisted acid extraction.

Abstract (250 words or less): Switchgrass is a potential carbon feedstock for biorefining processes, including thermochemical conversion via fast pyrolysis. However, inorganic (ash) content and composition of switchgrass are detrimental to the conversion process. Specifically, high ash content leads to reactor corrosion, slagging, and fouling, as well as catalyst impairment. The Department of Energy requires an ash content of <1% by dry weight for thermochemical conversion processes. To address this requirement, best management practices during harvesting and advanced pretreatment steps are needed. Various pretreatments have been applied, which involve rain-washing, water leaching, and a variety of acid washes. These treatments were able to remove a significant amount of ash from the biomass; however, water utilizing methods were unable to remove water insoluble inorganics and depended heavily on leaching time, water temperature, particle size, and water to biomass ratio. Moreover, corrosive acid treatments resulted in additional costs for waste neutralization and led to the hydrolysis of cellulose and hemicellulose, which decreases carbon content available for conversion. Here we present a method to lower the ash content of switchgrass by utilizing microwave-assisted extraction. Microwave was used to shorten the extraction times and maximize inorganics removal. We used 5 different washes including acetic acid, citric acid, sulfuric acid, EDTA, and deionized water in an effort to compare inorganic extraction ability. Among the five tested washes, EDTA performed the best at removing all inorganics. Time-, temperature-, and concentration-dependent ash removal will be presented.