

K-State College of Engineering Undergraduate Research Poster Forum  
Sample Abstract

Cement, an essential ingredient of concrete, is the most expensive and energy-intensive product in most concrete. Considering the threat of climate change and global warming, efforts have been put forward to reduce the amount of CO<sub>2</sub> emission from the cement industry by considering alternative methods for producing more environmental friendly cement and concrete. One such way is using supplementary cementitious materials (SCMs) as a partial replacement of cement in concrete. It has been shown that agricultural residues can be potential resources for SCMs production. It is well established that dilute acid pretreatment techniques enhance the reactivity of agricultural residues ash (ARA) in concrete materials. However, the impact of dilute acid pretreatment followed by enzymatic hydrolysis or agricultural residue on the pozzolanic property of the ARA has not been addressed yet. In this study, pozzolanic reactivity of ash produced by burning high lignin residue (HLR) is documented. HLR, a byproduct of bioethanol production from corn stover, is actually dilute acid pretreated and enzymatic hydrolyzed corn stover. Based on heat of hydration, calcium hydroxide consumption, and compressive strength experiments, it was concluded that the ash produced by burning HLR is a very reactive pozzolanic material that can be used as a partial replacement of cement in concrete materials. Thus, HLR which are byproducts of biochemical conversion of AR can be utilized as valuable materials for SCMs production for concrete.

\*All other presentation information that you may have will be entered directly into the registration form and does not need to be included in your abstract.