

PROCESS INTENSIFICATION OF SOLID EXTRACTION OF ENSILED MATERIALS BY MICROWAVE HEATING

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Liquid hot water processing is being used to extract free starches, sugars, and hemicellulose from ensiled biomass. This treatment is typically a batch processes that has a 4 hour residence time and requires large amounts of water. The focus of this research is to investigate process intensification methods, particularly microwave heating, to determine if the time and water required for processing can be reduced.

Preliminary results have shown that microwave heating accelerated process. Batches subjected to 1 hour of microwave heating produce similar extraction yields to batches microwave heated for 4 hours under similar conditions. In addition, microwave heated batches without acidification (pH 7.0-5.0) yield approximately 80% of thermal heating batches of reduced pH (1.0) as done in concurrent research (S. Huynh). Finally, it was shown that a hot water wash produced similar extraction yields to the one hour microwave heated batches at 3:1 ratio of water to silage mass.

Finally, experiments with lower water to biomass ratios of 2:1 and 1:1 were conducted to determine if less water can be used in the process with microwave heating.

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