

March 29-30, 2018  
Edinburgh, Scotland

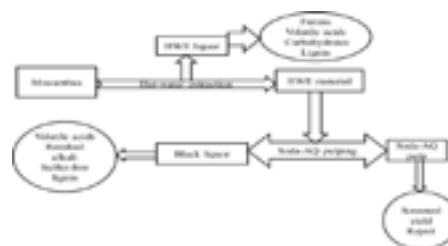
Saleem Ullah et al., Arch Chem Res 2018, Volume 2  
DOI: 10.21767/2572-4657-C1-003

## HOT-WATER EXTRACTION PRIOR TO SODA-AQ PULPING OF MISCANTHUS × GIGANTEUS FROM BIOREFINING PERSPECTIVE

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**A**gricultural residues, such as miscanthus, show a great potential for lignocellulosic biorefineries due to their relatively high polysaccharide content and minor nutritional value for human consumption. In this study miscanthus stalks were investigated from the biorefining perspective to assess their potential use for biorefinery purposes. Hot-water extraction (HWE) of miscanthus stalks was carried out under varying conditions to determine the effect of maximum temperature (140°C and 150°C) and P-factor on miscanthus dry solids mass. Delignification by the conventional soda-anthraquinone (soda-AQ) pulping of one untreated and two hot-water extracted miscanthus stalk samples were also performed. HWE removed effectively hemicelluloses and the dry mass of miscanthus decreased with the increase in temperature and P-factor. The highest yield reduction (10.0 %) was obtained at 150°C with a P-factor of 200. HWE liquors (hydrolysates) were analyzed in terms of pH as well as the amount of volatile acids (formic and acetic acid), furans (furfural and HMF) and dissolved carbohydrates. The pH of HWE liquors decreased with the increase in P-factor and temperature, and especially furan concentrations were higher in those liquors having low pH. The screened pulp yield increased after the HWE stage and the highest yield for the hot-water treated feedstock was obtained at 140°C with a P-factor of 50, corresponding to 53.2 % yield of the charged material. In case of black liquors, volatile acids and residual alkali were determined. In general the results indicated that HWE prior to soda-AQ pulping had some positive effects on delignification.



**Figure 1:** Overall process flow diagram

### Biography

Mr. Saleem Ullah (M.Sc.) is undertaking at the University of Jyväskylä post-graduate studies aiming at a doctor's degree (Doctor of Philosophy) in Chemistry. His research topic is dealing with various biorefinery concepts on the utilization of non-wood feedstocks. His main research interests are chromatographic and spectroscopic analyses of the produced material streams (hydrolysates and pulping liquors containing hemicelluloses, lignin, extractives, and their degradation products), and pulping chemistry. Research keywords: Hot-water extraction, Aliphatic carboxylic acids, Analytical chemistry, Biorefining of non-wood feedstock, Chromatography, Hemicelluloses, Lignin, Pre-treatments, Pulping chemistry, Wood chemistry, etc.

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