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# The potential black liquor has to improve the sustainability of Kraft process if used as feedstock for Kraft biorefinery

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Among different chemical pulping processes, conventional Kraft pulping process is commonly practised. In this chemical pulping process, woodchips are converted into pulp and black liquor in presence of sodium hydroxide (NaOH) and sodium sulphide (N2S). This black liquor is subjected to combustion in the recovery boiler to produce steam, used for power generation and smelt recycled to extract cooking chemical (white liquor). However, Birch wood was used for this experiment. After cooking the wood sample, the pulp was separated from the black liquor using a filter paper. Furthermore, the product was washed and dried at 105°C. The by- product obtained from cooking each particle size (0-2, 2-4 and 4-8mm); at these cooking times (30, 60 and 90mins) resulted to different strong Kraft spent liquor (SKSL) samples. A liquid-liquid extraction (LLE) was carried out on the SKSL's using Hexane as the separation solvent. The results obtained from analysing the extract using a GC/MS and a thermogravimetric analysis (TGA), indicate that particle size 0- 2mm contain higher percentage of extractable bio-crude that can be converted to value-added products In summary, the result obtained from the TGA and GC/MS analysis has shown that black liquor has the potential to improve the sustainability and economic viability of Kraft pulping mills when used as a feedstock in Kraft bio-refinery to produce value- added product.

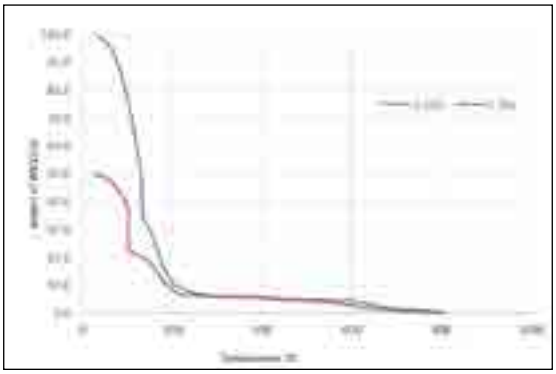

Figure.1 shows a clear difference in weight between the amounts of organic compounds present in the SKSL before (2.30b) and after (2.30a) liquid-liquid extraction for particle size 0-2mm cooked in 30 min. The graphs also demonstrate that amount of bio-crude extracted after LLE.

## Biography

Franklin Kalu has his first degree in Bio-resource Engineering, and holds a Masters degree in Renewable Energy Engineering. Recently he is a PhD student at Heriot Watt University. His research interests are focusing on how the integration of a biorefinery concept can make large industries sustainable. Currently he is working on how changes in input parameter (woodchip length) affect energy consumption and greenhouse gas emission. Furthermore, he is analysing the impact of converting by-products from Kraft pulping mills into value-added products.

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**Notes:**