

ULTRASOUND ASSISTED SOLUBILISATION OF HYDROLYSIS LIGNIN

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Wood biomass consists of three major polymers, which are cellulose, hemicellulose and lignin, of these three polymers the most widely used is cellulose [1]. New technologies have emerged, such as “lignin first” approaches, which aim to valorise all of the biomass [2].

Lignin has the highest potential of these polymers. It is composed of aromatic monomers, which are connected *via* various chemical linkages to form a complex heterogenous biopolymer. Aromatic compounds are widely applied in the chemical industry [3]. The first step towards valorisation of lignin is its dissolution and the most widely used method is alkaline solubilisation [4].

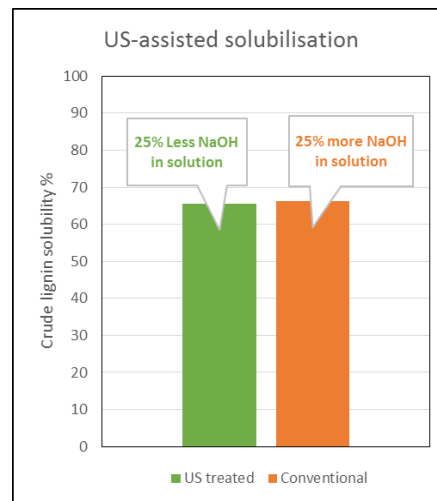


Fig.1 Lowering of NaOH requirement via US-treatment

Here we show a method for increasing solubility of hydrolysis lignin in alkaline conditions *via* ultrasound treatment (Fig. 1). Surprisingly, ultrasound allows the dissolution of larger molecular weight lignins, while its ratio of chemical linkages and OH-groups remain unchanged. This has proven to be effective in the reduction of chemical load in the solubilisation step by 25% and has a further downstream effect on precipitation of lignin, which reduces the required H₂SO₄ by 32%, while the lignin structure and molecular weight remain largely unchanged. Hence, the application of ultrasound makes the production of this type of material more cost effective as well as being industrially applicable.

References

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