

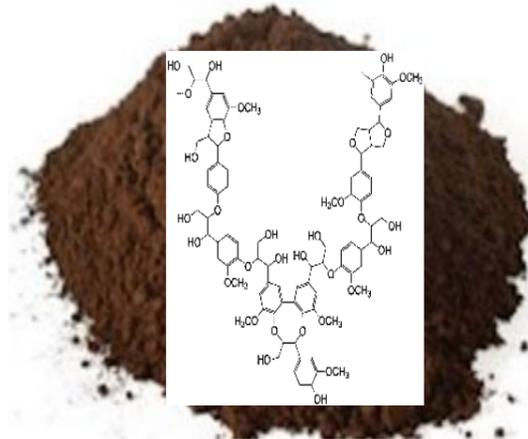
Fractionation

Depolymerisation

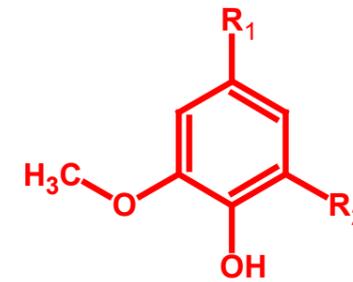
Chemical upgrading and utilisation



Agroforestry and agricultural waste



Lignin



Aromatic functionalized compounds



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VALUE ADDED CHEMICALS FROM LIGNIN



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SHORT DESCRIPTION

With our society facing challenges related to sustainability i.e. resource depletion and waste accumulation, the future success of the chemical and polymer industries relies on the use of renewable feedstocks.

Lignin, one of the main components of non-edible lignocellulosic biomass shows great potential as a renewable feedstock. Lignin's potential lies in its structure. It is the most abundant aromatic biopolymer and is produced in millions of tons as agroforestry and agricultural waste. Therefore, the efficient valorisation of lignin is very important for the viability of bio-refinery processes.

The present innovation describes the conversion of lignin to value added functionalized aromatic monomers using mild oxidizing conditions. The technique preserves the integrity of desirable carbonyl, methoxy and hydroxyl groups, and is useful for making aromatic aldehydes such as vanillin and syringaldehyde in high yields, avoiding normally used highly acidic and strongly alkaline conditions.

TARGET MARKET

- Pulp and paper industry
- Chemical manufacturing industry
- Polymer manufacturing industry

VALUE PROPOSITION/ BENEFITS

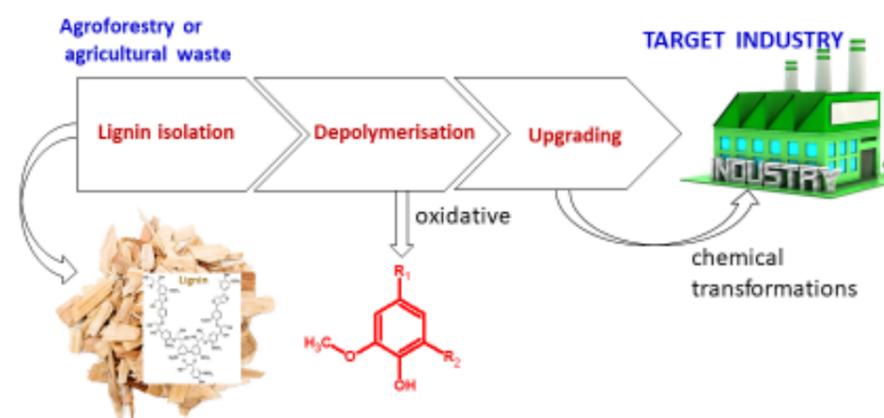
Given the ongoing global drive for sustainable development, the chemical and polymer industries are investigating alternative green and renewable sources for their raw materials. This technology addresses how a waste product from the agricultural and agroforestry industries can be valorised through its conversion to value added functionalized aromatic compounds. The innovation is selective and mild, producing functionalized aromatic compounds that can be used as building blocks in the chemical and polymer industries

COMPETITIVE ADVANTAGE

- The reaction conditions are mild and do not produce highly acidic or basic waste-streams, which can pose as a waste disposal challenges
- Given the mildness and selectivity of the technology, the process is very useful for making aromatic aldehydes such as vanillin and syringaldehyde in high yields

TECHNICAL DESCRIPTION

The present technology relates to a process for the depolymerisation of lignin under mild oxidizing conditions using DMSO and HBr as a catalyst. The reaction can be carried out by using low molar quantities of HBr at high temperatures for over 10 hours. The depolymerized lignin products - is then isolated using vacuum distillation.



PRINCIPAL RESEARCHERS

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Oxidative depolymerisation of lignin into low molar mass compounds that can be used in the chemical industry, as an alternative to chemicals derived from non-renewable feedstocks



INNOVATION STATUS

South African provisional patent, application no: 2019/02602.