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## Bio-sourced phenolic foams based on tannins and lignin

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### PURPOSE OF THE ABSTRACT

Phenolic resins are thermosetting polymers obtained by a polymerization reaction of phenol with formaldehyde. They are materials of significant importance in the industry. They are used in several applications such as adhesives, insulation foams in building and construction, etc. Seen that the component of this resins are derived from petrochemicals, which are non-renewable and therefore ultimately limited in supply, the use of material with a low-carbon footprint is an important issue. Among all the phenolic compounds, lignin and tannins are the most available, they present an environmentally friendly alternative to phenol and formaldehyde and they can be considered as by-products of wood and paper industries that are interesting to valorize.

In our research work, we have developed free-formaldehyde resins using tannins and lignin to replace phenol. Lignin is a pulp industry by-product and currently less than 2% of lignin is used as specialty products, while most of it is used as low value fuel. Tannins frequently present in the bark of plants and can be extractable from wood sawdust. The bio-sourced resins allow us to prepare new foams with an amount greater than 80%. The obtained foams have excellent sound and thermal insulation properties as well as good resistance to heat compared to polyurethane and polystyrene foams. In addition, these foams have proven their high performance in the treatment of water contaminated with heavy metals (Cu, Cd, Zn and Pb) which are extremely toxic at certain doses.

## FIGURES

FIGURE 1

FIGURE 2

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KEYWORDS

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BIBLIOGRAPHY