

Innovative lignin based biosorbents for water purification

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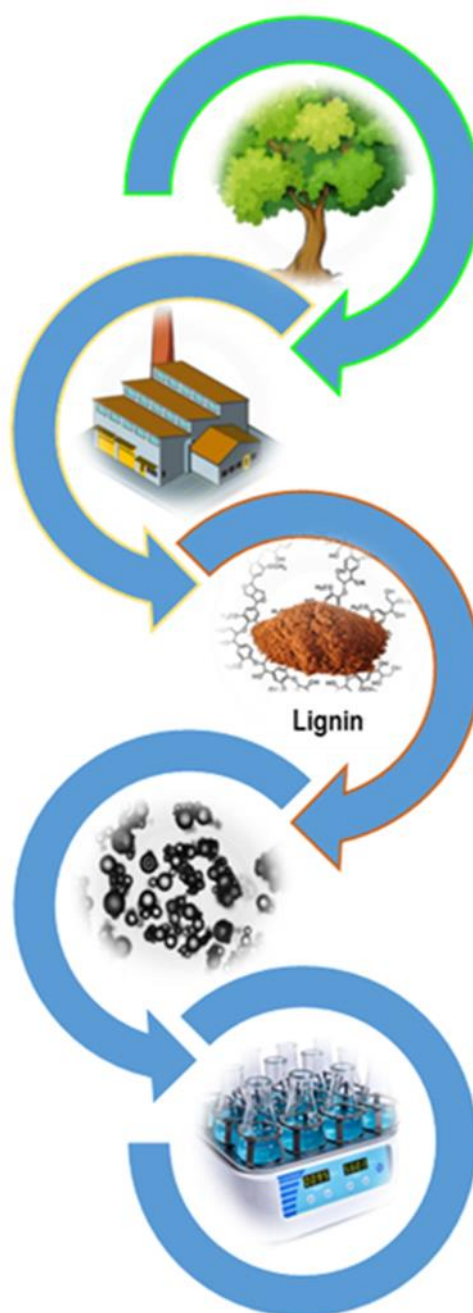
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Abstract:

Lignin is one of the main components of lignocellulosic biomass, along with cellulose and hemicellulose. This biopolymer is a high-volume waste product of the pulp and paper industry and is, therefore, low-cost, widely available, and additionally fully biodegradable.

Due to the possible chemical modification of lignin's structure, it shows great potential in synthesizing materials for sorption applications. The practical use of lignin that has not undergone suitable chemical modification is limited, due to its low adsorption capacity and low selectivity towards the pollutants to be removed. Hence, its modification and use in combination with cross-linked polymers is the key to improving sorption properties. The enormous potential of lignin, due to its structure, as well as the renewable nature and availability of this biopolymer, fit perfectly into the current pro-environmental policy and are associated with its wide application spectrum.

The invention aimed to develop a product in the form of original efficient polymeric sorbents with natural lignin and to evaluate their sorption potential for the removal of coloured organic pollutants from water and wastewater. Due to the introduction of lignin as a waste product from paper production, the obtained polymeric adsorbents with new features and properties will allow to obtain materials with greater biodegradability and thus less



burdensome for the environment compared to commercially available materials.

The main advantages of using lignin based biosorbents over conventional methods for water treatment are:

- ✓ low cost,
- ✓ high efficiency,
- ✓ sludge minimization,
- ✓ biosorbent regeneration,
- ✓ easy of operations, etc.



The presented biosorbent was obtained according to an innovative and original method, which was claimed by a patent application to the Polish Patent Office (No. P.443 049).

Keywords: lignin biosorbent, epoxy resin, water purification, innovative method of dyes removal