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Title: Hydrophobic surface functionalization of lignocellulosic jute fabrics by enzymatic grafting of octadecylamine

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Highlights

1. The feasibility of the laccase-mediated grafting of octadecylamine (OA) onto lignin-rich jute fabrics was investigated for enhancing the surface hydrophobicity.
2. In order to obtain detailed structural information of the grafting products, the residual lignin in the jute fabrics was isolated by liquid extraction and further analyzed in the macromolecular level by MALDI-TOF MS and NMRs ($^1\text{H-NMR}$, $^{13}\text{C-NMR}$ and HSQC-NMR).
3. The surface of jute fabrics was characterized in terms of FT-IR, XPS and SEM, which also indicated the covalent grafting of OA onto the jute surface mediated by laccase.
4. The nitrogen content of jute fabrics was determined by the micro-Kjeldahl method, from which the grafting percentage (Gp) and grafting efficiency (GE) of the enzymatic reaction could be calculated. The obtained Gp and GE values were 0.712% and 10.571%, respectively.
5. The surface hydrophobicity of the jute fabrics was estimated by contact angle and wetting time measurements. The modified jute fabrics via OA-grafting showed an increased wetting time of 18.5 min and a contact angle of 116.72, indicating that the surface hydrophobicity of the jute fabrics increased after the enzymatic grafting modification with hydrophobic OA molecules.

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