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(57) Abstract :
The present invention discloses a cost-effective and sustainable method for producing vanillin from lignin obtained from agricultural residues. Lignocellulosic waste materials such as rice straw and wheat husk are pre-treated to isolate lignin, which serves as a renewable aromatic feedstock. The isolated lignin is subjected to controlled biological and/or chemo-enzymatic depolymerization to generate low-molecular-weight aromatic intermediates, which are subsequently oxidized to form vanillin. The produced vanillin is recovered and purified using conventional separation techniques to obtain high-purity product suitable for industrial applications. The disclosed process minimizes reliance on petrochemical resources, reduces environmental pollution associated with agricultural waste disposal, and supports circular bioeconomy principles. The method is scalable, environmentally benign, and economically viable, offering a sustainable alternative to conventional vanillin production routes.

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