

Selective Hydrogenation of 4-Cyanoquinoline into Anti-inflammatory Derivatives Using Palladium Incorporated with Charcoal Obtained from Agricultural Residues †

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Abstract: 4-Cyanoquinoline is a natural product belonging to the class of alkaloid. The selective hydrogenation of the nitrile group and N-heteroarenes group is quite challenging. This study has developed a sustainable method for hydrogenating 4-cyanoquinoline under mild conditions over a palladium-doped carbon-supported catalyst (5wt% Pd/AC). Agricultural waste has been used for the production of activated carbon. SEM, TEM, and XRD have been employed to characterize the catalyst. The prepared catalyst showed high activity towards the hydrogenation of 4-cyanoquinoline at 50°C and 20 psi with 99% selectivity, providing the corresponding Quinoline-4-amide (QCM) with 98% yield, which possesses a potent anti-inflammation activity. The hydrogenation reaction using the same catalyst, when carried out at 80°C, gives 1,2,3,4-QCM as a major product with 98% selectivity. Further, the Pd/AC catalyst could be reused up to five times without significant loss in activity, the economic viability of the synthesized catalyst. The utilization of agricultural waste further makes this process cost-effective and environmentally benign.

Keywords: waste-derived heterogeneous catalyst; 4-cyanoquinoline; selective reduction; anti-inflammation.

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Conflicts of Interest

The authors declare no conflict of interest.