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## Synthesis of cellulose impregnated copper nanoparticles as an efficient heterogeneous catalyst for C-N coupling reactions under mild conditions.

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### Graphical Abstract

The synthesis of the cellulose supported copper nanoparticles and their characterization as well as application is pictorially demonstrated.

### Highlights

- Extraction of cellulose from inner stem of *Hibiscus sabdariffa* by facile method.
- Successful synthesis of Cu NPs in nanocellulose with average size of 7 nm.
- NPs effectively catalyze C-N coupling with excellent yields.
- Catalyst is chemoselective to aliphatic secondary amines, no product with aromatic amines.
- Catalyst easily recovered and recycled for up to several times.

### **Abstract:**

Highly efficient copper nanoparticles supported over nanocellulose have been prepared by a simple chemical reduction method. The cellulose was extracted from the inner stem of *Hibiscus sabdariffa* and used as a polymer matrix for the synthesis of copper nanoparticles. The formation of the nanoparticles was validated through different characterization techniques like X-ray diffraction (XRD), Fourier transform infra-red spectroscopy (FTIR), UV-vis spectroscopy (UV) and Energy dispersive X-Ray Spectroscopy (EDX). Moreover the morphology of the cellulose supported copper nanoparticles was investigated using field emission scanning electron microscope (FESEM) and field emission transmission electron micrograph (FETEM) which revealed the formation of spherical nanoparticles with an average size of 7 nm. The synthesized catalyst was then utilized effectively in the C-N coupling reactions involving open chained as well as cyclic secondary amines and electron deficient vinylic compounds. The catalyst

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