



Featured Letter

Synthesis of coconut shell nanoparticles via a top down approach: Assessment of milling duration on the particle sizes and morphologies of coconut shell nanoparticles



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ABSTRACT

Coconut shell nanoparticles (CSNPs) were synthesised from coconut shell powders using a top down approach. Effects of milling time on the particle morphologies and sizes of CSNPs were studied. CS powders were milled for a maximum of 70 h using ceramic balls and a planetary mill. Milled samples taken at 16, 46 and 70 h were analysed using scanning electron microscope with attached energy dispersive X-ray spectrometer, X-ray diffractometer and UV–vis spectrophotometer. SEM micrographs revealed a difference in morphologies and appearances of the CSNPs. Particle size determination depicted a decrease in CSNPs' sizes with an increment in milling duration. The CSNP size determination from SEM aided with software and XRD aided with Scherrer's equation agrees with each other. This implies that the SEM observed CSNP sizes are in line with XRD crystalline sizes. The decrease in particles' Co K α X-ray absorbance with increment in milling duration is an indication of reduction in CSNPs' opaqueness. This agrees with fading of brownish colour of CS powders as the milling duration increased. The smaller the wavelength at which maximum absorbance of the Co K α X-ray occurred the smaller the CSNPs' sizes. Hence, an increase in surface area as the CSNPs' sizes decreased during milling led to particle agglomeration and formation of new compounds.