Indian Journal of Experimental Biology
Vol. 62, July 2024, pp. 530-539
DOI: 10.56042/ijeb.v62i07.12074

Green synthesis of calcium carbonate nano scale particles using *Benincasa hispida* (Thunb.) Cogn. pulp and their qualities

Treesa Sani[1], Sruthi VP[1], Jomol NJ[1], Nibu Varghese[2] & Soumya RS[1]*

[1]Pushpagiri Research Centre, Department of Biochemistry, Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla, Kerala, India

[2]School of Bioscience, Mar Athanasios College For Advanced Studies (MACFAST), Thiruvalla, Kerala, India

Received 31 January 2024; revised: 17 March 2024

Green synthesized calcium carbonate nanoscale particles ($CaCO_3$ NPs), mainly from plant sources, have attracted much interest due to their intrinsic properties like eco-friendliness, rapidity, and cost-effectiveness. In this study, we used *Benincasa hispida* (Thunb.) Cogn. pulp was used for $CaCO_3$ NPs synthesis, and these were characterized using particle size analysis, FTIR (Fourier Transform Infrared), XRD (X-Ray Diffraction), FE-SEM (Field Emission Scanning Electron Microscopy) and EDX (Energy Dispersive X-ray). The synthesized $CaCO_3$ NPs showed good antioxidant, anti-inflammatory, and photocatalytic activity towards azodyes, i.e., TB (trypan blue) and CR (congo red). The particle size analysis showed that the $CaCO_3$ NPs have sizes from 40nm to 100µm. The FE-SEM analysis showed that the particles exist as rice-like crystals. EDX data quantified the elemental compositions of $CaCO_3$ NPs. The FTIR spectrum showed that similar functional groups of $CaCO_3$ (calcium carbonate) were present in $CaCO_3$ NPs, and XRD confirmed that these are crystalline. The in vitro antioxidant and anti-inflammatory assays were done to identify the corresponding potential of $CaCO_3$ NPs. It also displayed dye degradation potential to TB and CR. Thus, the study demonstrated that the green synthesized $CaCO_3$ NPs can be used as a potent antioxidant, anti-inflammatory, and photocatalytic agent.

Keywords: Antioxidant, Anti-inflammatory, Ash Gourd, Azodyes, Winter Melon, Wax Gourd