

Biosynthesis of CaO nanoparticles using *Trigona* sp. Honey: physicochemical characterization, antifungal activity, and cytotoxicity properties

ABSTRACT

In this study, calcium oxide (CaO) nanoparticles (Nps) were obtained by biosynthesis through the deposition and precipitation of calcium carbonate (CaCO₃) in *Trigona* sp. honey. The FESEM images showed a spherical morphology with an average Nps size below 100 nm, whereas the AFM images demonstrated its average height of 2.3 nm. The XRD pattern analysis resulted in sharper peaks indicative of CaO Nps that were well-crystallised. Further calculation of the average particle size by using the Debye-Scherrer equation yielded the value of 51.64 nm, whereas the FTIR spectrum showed the intensive peaks of the hydroxyl and carboxylic groups, amines, and amides. Accordingly, these biosynthesised CaO Nps generated at 15 % concentration displayed maximum inhibition against the anthracnose disease. They were found to be nontoxic when analysed through a cytotoxicity test against the MRC 5 cells and VERO cells.

Keyword: CaO; *Trigona* sp. honey; Nanoparticles; Biosynthesis; Cytotoxicity; Antifungal