Biowastes as sustainable source for nanoparticle synthesis and their pesticide properties: A review

ABSTRACT

Over the last decade, nanoparticles derived from biowaste have been widely investigated as one of the greener approaches to preparing pesticides as its application offer the usage of environmentally friendly and earth-abundance resources, cost effectiveness due to low energy consumption, biocompatibility, as well as flexibility in preparation of biomolecules as a medium or bio-reducing agents for pesticide production. Integrating biowastes in nanomaterials-based pesticide preparation marks a new age of innovation in nanomaterial technology to overcome the contemporary problems currently plaguing the agriculture sector with the possibility of mitigating environmental pollution. In this review, the synthesis of nanomaterials derived from biowastes as agrochemicals and their advantages are presented. It is expected that this review would serve as a guide for selected industry and scientific communities working with nanomaterials in the form of agrochemicals to enhance crop protection. It is anticipated that the next generation agrochemicals will mark the use of ecofriendly sustainable materials to which nanomaterials-based pesticides derived from the biowastes will play a major part ensuring food security thus achieving the Zero Hunger goal in the Sustainable Development Goals.