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Green synthesis of metal nanoparticles using Garcinia extracts: a review

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Abstract

The demand for nanoparticles has been increasing rapidly in recent years due to their unique properties of interest for a wide range of applications. Several physical, chemical, or microorganisms-based methods can be employed in the synthesis of nanoparticles. However, classical processes are time-consuming, complicated, and raise environmental concerns due to the use ofhigh energy and toxic chemicals. Synthesis using plant extract outweighs some classical methods because it is rapid, simple, and eco-friendly. Therefore, plant extract appears promising to produce nanoparticles. Here we review the use of extracts from various species and plant parts of Garcinia for the green synthesis of metal nanoparticles. Garcinia gummi-gutta is a tropical species of Garcinia native to Indonesia. Common names include Garcinia cambogia, as well as brindleberry, Malabar tamarind, Goraka, and kudam puli. The fruit looks like a small pumpkin and is green to pale yellow. We present the major metabolites responsible for metal ions reduction and nanoparticles stabilisation, the synthesis mechanism, the types of metal nanoparticles formed, and their potential applications. Advantages and challenges of Garcinia extract utilisation are also discussed. © 2021, The Author(s), under exclusive licence to Springer Nature Switzerland AG.

Author keywords

Extract ; Garcinia ; Nanomaterials; Nanoparticles ; Systematic review

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