Antibacterial activity through chemical combustion and green synthesis of iron nanoparticles

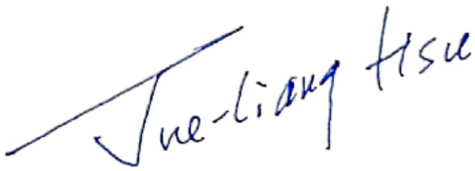
Puji Shandila[1], Jue Liang Hsu[2]

[1]Department of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Pingtung 912, Taiwan

[2]Department of Biological Science and Technology, National Pingtung University of Science and Technology, Pingtung 912, Taiwan

Nanoparticles (NPs) are practically used in every aspect of modern life. Iron nanoparticles were synthesized by chemical combustion and biological method. A sustainable green chemistry approach was established to fabricate magnetic Fe_3O_4 nanoparticles (Fe_3O_4NPs) using the aqueous fruit extract of edible *C. guianensis* (CGFE) Fe-NPs, green tea Fe-NPs (GTFE) and black tea Fe-NPs (BTFE). They were characterized by different techniques including scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Fe-NPs showed possible antibacterial activity against gram-negative and gram-positive microorganisms. Fe-NPs synthesized by chemical combustion exhibit bactericidal action against *Staphylococus aureus, Xanthomonas, Escherichia coli* and *Proteus vulgaris*. Furthermore CGFE demonstrated antibacterial activity against *S. aureus* MTCC 96, *E. coli* MTCC 2939, *S. typhi* MTCC 3917 and *K. penumoniae* MTCC 530. Moreover, BTFE and GTFE were indicated bactericidal effects against Methicillin-resistance *Staphylococcus aureus* and Vancomycin-resistance *Staphylococcus aureus*. This review gives an outline of green synthesized iron nanoparticles (NPs) and features their general applications. These results suggest that the synthesized NPs could be effectively utilized as an alternative antibacterial agent against diseases caused by multiple drug-resistant pathogens.

Keywords: Antibacterial activity, chemical combustion, green synthesis, iron nanoparticles



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