INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	Ph.D.

Thesis Title: Studies on the Green Synthesis of Silver Nanoparticles and their Utilization on the Development of Polymer Nanocomposites for Water Disinfection and Wound Healing Applications

Name of Thesis Supervisor(s)	:	**Prof. Subhendu Sekhar Bag** (Supervisor) **& Prof. Animes Kumar Golder** (Co-supervisor)
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SHORT ABSTRACT

The thesis contains embodiment of research aimed towards (a) Synthesis, optimization and characterization of silver nanoparticles (AgNPs) via the green route using 'Bhimkol' (*Musa balbisiana Colla*) peel extracts; (b) Study of the phytochemical properties of Bhimkol *(Musa balbisiana Colla)* peels and the antibacterial activities of both bhimkol peel extract and green synthesized AgNPs; (c) Synthesis and characterization of Silver Nanoparticle via green route using *Sechium edule* aqueous extract, study of their antimicrobial as well as catalytic activity; (d) Characterization and development of polystyrene nanocomposites (PS-AgNPs) from waste thermocol and green synthesized AgNPs for water disinfection application and (e) Characterization and development of PVA/Gelatin/AgNPs based polymer nanocomposite hydrogel for wound dressing application.

The thesis opens up the opportunity to search for other waste materials of indigenous availability and utilize them as bioreductant for the large scale synthesis of nanomaterials of wide applications. The focus of the thesis is, though, limited to AgNPs, based on the phytochemical constituents of the studied banana peels or Chayote squash, we believe that other metallic nanoparticles can also be synthesized. Turning waste into value-added product, as is shown in Chapter 3, could also be further explored for practical application toward large scale production of tanks for storing water without bacterial growth/infection. The final chapter devoted to showcase the preparation of triad polymeric nanocomposite hydrogel for wound healing applications. Such materials would find immediate application for the production of wound healing bandages, which might be efficient and cost-effective. Finally, with the available facilities and limitations, the works presented in the thesis would find an opportunity for further exploration towards designing strategies, chemistry, and engineering models to develop efficient materials of clinical importance.