



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

Name of the Student : SUNITA OJHA

Roll Number : 126106016

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Thesis Title: Green Synthesis of Metallic Nanoparticles using Leaf Extract of Selected Silkworm Host Plants and Their Applications

Name of Thesis Supervisor(s) : Prof. Utpal Bora

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Nanoparticles are solid particles with 1-100 nm size in any dimension. Among physical and chemical methods of nanoparticle synthesis, green synthesis has several advantages. It is a simple, inexpensive, and environment friendly method. In this thesis, we have synthesized metallic nanoparticles using leaf extract of silkworm host plants and also studied their applications. Silver nanoparticles were synthesized using *Ricinus communis var carmencita* leaf extract. The synthesized silver nanoparticles were characterized by biophysical techniques such as UV-Visible spectrophotometry, TEM, FESEM, XRD, FTIR and TGA. These nanoparticles were found to be biocompatible at lower concentrations. They also exhibited antibacterial activity against both gram positive and gram negative bacteria. Zinc oxide and iron oxide nanoparticles were synthesized using *Heteropanax fragrans* and *Persea bombycina* leaf extract. The size, crystallinity, and stability of these nanoparticles were characterized by biophysical techniques. The synthesized iron oxide nanoparticles were found to be nontoxic to mouse fibroblast cell lines at lower concentrations. The photocatalytic degradation of methylene blue dye using zinc oxide nanoparticles under UV illumination was studied. Methylene blue removal using iron oxide nanoparticles as fenton's reagent was also studied.