

Green Synthesis of Phyllanthus Niruri Nanoparticles for the Treatment of Sickle Cell Anemia

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Abstract: *Nanotechnology is currently the most active research area in modern materials science. While numerous chemical and physical methods exist for the synthesis of nanomaterials, the green synthesis approach is increasingly prominent. Plant-mediated synthesis of nanoparticles is a green chemical technique that integrates nanotechnology with botany. This novel method of synthesis ideally occurs at ambient temperatures, neutral pH, and is cost-effective and environmentally friendly. Given this goal, various routes have been explored for synthesizing nanomaterials.*

The present study aims to formulate and evaluate herbal nanoparticles derived from Phyllanthus niruri for the natural treatment of sickle cell anemia. Sickle cell anemia is characterized by the presence of sickle-shaped erythrocytes caused by abnormal hemoglobin production. This condition leads to clogging of capillaries and obstructs blood flow in the vessels, resulting in severe complications such as ischemia, hypoxia, and organ failure. While some drugs, such as hydroxyurea, are available for treating sickle cell anemia, they are often associated with severe adverse effects, limiting their frequent use. Therefore, this study focuses on designing herbal nanoparticles as an alternative treatment for sickle cell anemia. The plant material for this study was sourced from an authorized market, dried, and powdered for further processing.

Keywords: nanomaterials