

Designing and Fabrication of heterojunctions of thiosemicarbazones and nanoparticles in search of their medicinal activity

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Introduction: Thiosemicarbazone (TSC) derivatives and their complexes have emerged as versatile medicinal agents. Now the focus is shifted on targeted drug-delivery and here the application of nanotechnology is being explored. Nanoparticle (NP) technologies are being explored owing to their tremendous medicinal applications. They are also been explored to overcome the water insolubility of medicinal agents and ability to target specific targets.

Methods: This article aims at exploring the fabrication strategies and applications of functionalized TSCs conjugated with NPs for improved therapeutic potential. The studies were taken from recent literature, indexed in leading databases.

Results: Literature survey reveals the fabrication of TSCs with chitosan coated superparamagnetic magnetite NPs which showed significant anti proliferative activity against a number of cell lines. Similarly cobalt oxide nanoparticles conjugated with TSCs have been tested against hepatic cancer cell line HepG2. Other than anticancer activity, the functionalized nanoparticles have also been employed against drug-resistant pathogens. To improve the oral bioavailability and pharmacological activity nanoparticle-based block polymers have been proposed to encapsulate the TSC moiety. The morphological evaluation was performed with transmission and cryo-transmission electron microscopy. The *in vitro* activity of the fabricated NPs was tested against *Leishmania amazonensis*. Significant concentration-dependent inhibitory activity against intracellular amastigotes was observed, and low cytotoxic activity was demonstrated against macrophages.

Conclusion: The article may shed light on the structure-bioactivity relationship of novel nanocomposites derived from TSCs and NPs and their specific mechanisms of action.

Keywords: Fabrication, Thiosemicarbazone, Nanocomposite, Therapeutic