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Anti-diabetic and hypo-lipidemic activity of green synthesized silver nanoparticles and *G. sylvestre* extract on streptozotocin induced diabetic rats: An *in vivo* approach

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In recent times, nanomaterials being used in anti-diabetic studies for their exclusive properties such as small size, more surface area, biocompatibility and enhanced solubility. In view of this, present study aimed to evaluate the anti-hyperglycemic potential of Green Synthesized Silver Nanoparticles (GSSNPs) and *Gymnema sylvestre* extract. The crystalline nature of the GSSNPs was confirmed by X-ray diffraction; the characteristic peaks observed at $2\theta=38.23^\circ$, 44.33° , 64.56° and 77.45° were corresponded to (111), (200), (220) and (311). The Scanning Electron Microscopy (SEM) and High Resolution Transmission Electron Microscopy (HRTEM) analysis divulges that the GSSNPs were spherical in shape. Energy Dispersive X-ray Analysis (EDAX) spectrum exhibit peaks for the presence of silver, carbon and oxygen atoms in the range of 1.0-3.1 keV. FT-IR reveals the binding properties of active bio-constituents responsible for capping and stabilizing GSSNPs. After successful synthesis and characterization, the GSSNPs were tested for toxicity using Acute Oral Toxicity analysis (AOT) by OECD-423 guidelines. Diabetes was induced by injecting streptozotocin (STZ) intraperitoneally (40 mg/kg, i.p.). The results showed increased blood glucose, cholesterol, triglycerides, LDL, VLDL, huge loss in body weight, downturn in plasma insulin. The *Gymnema sylvestre* extract (200 mg/kg, 400 mg/kg), GSSNPs (100 mg/kg, 200 mg/kg) and Metformin 250 mg/kg were administered to the diabetic rats. GSSNPs at dose level of 200 mg/kg (b.wt p.o.) showed significant inhibition of ($p<0.001$) blood glucose levels and lipid profile as compared with *Gymnema sylvestre* extract treated group. These detections revealed that GSSNPs possess potent anti-hyperglycemic and anti-hyperlipidemic activity and thus preferable over crude extract.

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