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Antidiabetic activity of green synthesized silver nanoparticles using Madhuca longifolia streptozotocin-induced diabetic rats

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Objectives: In developing countries, medicinal plants has been proven to be used in the treatment of diabetes mellitus. It was well accounted in the literature that Phytofabricated silver nanoparticles of traditional plants were found effective against diabetes mellitus. The aim of the current study is to investigate the antidiabetic activity of green synthesized silver nanoparticles of of *Madhuca longifolia* aqueous extract in streptozotocin-induced diabetic rats.

Methods: We have succesfully biofabricated the silver nanoparticles using aqueous extract of *Madhuca longifolia* under ambient conditions. Green synthesized silver nanoparticles were characterized by using different spectroscpy methods such as UV-spectroscopy, Fourier transform-infrared spectroscopy, X-ray diffraction, transmission electron microscope, Field Emission Scanning Electron Microscope and Energy-dispersive X-ray spectroscopy. Antidiabetic potential of green synthesized silver nanoparticles of *Madhuca longifolia* extract for 28 days was assessed in streptozotocin-induced rats by measuring the fasting blood glucose and the peak of blood glucose level within 2 hours of oral glucose tolerance test (OGTT). Its effects on liver antioxidant status and tissue glycogen contents in muscles were also measured. Statistical analyses were done via one-way analysis of variance (ANOVA) and found to be statistically significant ($P < 0.05$).

Results: Variation in the colour of the plant extarct from orange to dark brown supported the synthesis of silver nanoparticles (CCAgNPs) and evidenced by the UV-visible spectroscopy which showed absorbance peak at 420-450 nm. Following second week, green synthesized silver nanoparticles reduced the level of blood glucose in rats. Furthermore, AgNPs revealed significant enhancement in tissue glycogen contents and plasma insulin.

Conclusions: Eco-friendly synthesized silver nanoparticles of *Madhuca Longifolia* showed potent antihyperglycemic agent by improving insulin sensitivity and may be tested in clinical trials.