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Aloe vera leaf extract mediated synthesis of curcumin nanoparticles: Implications in the treatment of type-2 diabetes in experimental Wistar rat model

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Background: Curcumin, an active component of turmeric has caught tremendous attention as a potential therapeutics for diabetes because it is a relatively safe and inexpensive drug that reduces glycemia and hyperlipidemia in rodent models of diabetes.

Aim: To study the effect of in-house synthesized curcumin nanoparticles (Cur NPs) in the treatment of type 2 diabetes in experimental Wistar rat model.

Method: The Streptozotocin (STZ)-induced experimental rat model of diabetes were used to evaluate the effect of in-house synthesized curcumin nanoparticles (Cur NPs) on glycemia, body weight, glycosylated hemoglobin (HbA1c), oxidative stress and inflammatory immunological markers.

Results: In this study, we developed *Aloe vera* leaf extract (AVLE) mediated curcumin nano-formulation for highly effective diabetes therapy. Polyphenol (AVLE) mediated bio-functional, Cur NPs showed excellent dispersibility and outstanding stability in physiological environments. The data of biochemical and inflammatory biomarkers revealed the ameliorative effect of Cur NPs on STZ-induced diabetic experimental Wistar rat model. Interestingly, administration of Cur NPs for four weeks was able to prevent body weight loss, reduce the levels of glucose, hemoglobin (Hb), and HbA1C in blood and improve insulin sensitivity.

Conclusions: The data of the present study clearly showed that the therapeutic efficacy of the AVLE synthesized Cur NPs were found better than that of free form of curcumin as well as with the AVLE alone. Cur NPs were also found to be effective in ameliorating the increased levels of fasting blood glucose, urine sugar, and urine volume in STZ-induced diabetic rats. Polyphenol mediated green synthesis of Cur NPs with effective and efficacious anti-diabetic potential may open new prospects for type 2 diabetes therapy.

Biography

Naureen Fatima has completed her studies from the Aligarh Muslim University (AMU), India. She has completed her graduation in 2009 and Post-graduation in 2011. In 2013, she has joined for her PhD at the Department of Biochemistry, Jawaharlal Nehru Medical College, Aligarh Muslim University, under the supervision of Dr. Shagufta Moin, Department of Biochemistry and co-supervision of Professor M Owais, Interdisciplinary Biotechnology Unit, Aligarh Muslim University. She has two research publications, one in Elsevier Journal, *Appetite* in 2013 as a second author and another in *PLOS One* in 2016 as a co-author. She has received the Best Poster Award in the 3rd Annual Meeting of Indian Academy of Biomedical Sciences and Symposium on Modern Trends in Human Diseases in December, 2013 held at the Department of Biochemistry, J.N. Medical College, AMU, India.

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