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Microwave Generated Nanocomposites for Solubility Enhancement of Atorvastatin Calcium: *In Vitro- In Vivo* Characterization

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Abstract: Atorvastatin calcium is anti-hyperlipidemic agent has low aqueous solubility resulting in low oral bioavailability thus presents a challenge in formulating a suitable dosage form to improve the aqueous solubility. Nanocomposites are novel technology for enhancing the solubility of Atorvastatin calcium. Nanocomposites formulation of Atorvastatin was prepared by microwave induced diffusion method (MIND). The natural polymers like gum acacia, modified gum karaya and synthetic polymer like PVP K-30 were used as carrier in the formulation. Six different formulations were prepared with varying ratios of drug and carriers and corresponding physical mixtures were also prepared. The selections of natural carriers were based on their surfactant and wetting properties. The optimum drug-to-carrier ratio was found to be 1:4 AA_N which enhanced solubility nearly 14 fold as compared to pure drug. *In vitro* drug release exhibited cumulative release of 84.72% as compaired to 48.47% for the pure drug. The optimized nanocomposites were characterized by Fourier transform infrared spectroscopy, Differential scanning calorimetry, X-ray diffraction, Scanning electron microscopy, and Transmission electron microscopy. In a Triton-induced hyperlipidemia model, a 2-fold increase in the lipid lowering potential was obtained with the reformulated drug as compared to pure drug. These results suggest that nanocompositesusing natural carrier is a promising approach for oral delivery of Atorvastatin calcium.
Keywords: Nanocomposites, Atorvastatin calcium, Microwave induced diffusion method , Natural and Synthetic carriers.

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