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Formulation and evaluation of Gastro-Retentive Floating Matrix Tablets (GRFMTs) of Metformin using *Grewia mollis* gum

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Grewia polysaccharide gum was obtained from the inner stem bark of the edible plant *Grewia mollis* Juss, (Family: Tiliaceae). Granules were prepared by wet granulation technique using the extracted natural gums at varying concentrations (2, 4, 6 and 8% w/w). Sodium bicarbonate (30%) and tartaric acid (5%) were incorporated as the gas generating agents. All granules were evaluated for micromeritic properties. Granules were compressed at an optimized compression pressure of 35 arbitrary units on the load scale using a single punch tableting machine. Tablets were evaluated for hardness, friability, floating lag time, *in vitro* buoyancy test and drug release profiles. Compatibility test of the excipients with the API (metformin) was also done using FTIR. Results revealed that all formulated GRFM granules were free flowing with angle of repose and Carr's index ≤31o and ≤14% respectively. The floating lag time for GRFM tablets formulated with *Grewia mollis* was ≤850 s. The *in vitro* buoyancy test of GRFM tablets formulations using the natural gum alone (i.e., without the incorporation of Eudragit® RL100) were <12 hours while those formulations with the incorporation of Eudragit® RL100 were >12 hours. There was a significant difference in tablet hardness with increase in binder concentration ($p<0.05$). The percentage maximum release ($m\infty$) and time to attain this ($t\infty$) for all GRFMTs were ≥87% and ≥4 hours, respectively. All the formulations fitted well into Higuchi model release kinetics. Release exponent (n) for all the formulations have their exponent values >0.45, hence their release mechanism was by non-Fickian diffusion. GRFM tablets of metformin have been developed for the first time using *Grewia mollis* gum which can sustain drug formulation for up to 10 hours and improve the bioavailability of drugs with narrow absorption window in the upper part of the GIT. Batch GM5 showed a better sustained release profile which can be taken as the optimized formulation.

Biography

Collins Ovenseri Airemwen has received his Doctor of Pharmacy (PharmD) degree from the University of Benin, Benin City, Nigeria and Master of Philosophy degree in Pharmaceutics and Pharmaceutical Technology from the same university. He is currently pursuing his PhD and has published more than 8 papers. His research focuses on controlled drug delivery system.

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