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Formulation and Evaluation of Floating Tablets of Model Drug

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Abstract: *Pre-formulation studies are essential in pharmaceutical development to understand the physical and chemical properties of a drug and its interactions with excipients. This study focuses on the pre-formulation investigations of Nifedipine to develop suitable dosage forms for therapeutic purposes. Standard solutions of Nifedipine were prepared, and calibration curves were generated using UV double beam spectrophotometry. Drug-excipient compatibility was evaluated using FTIR spectroscopy. Floating tablets of Nifedipine were formulated using various polymers via direct compression method. The pre-compression and post-compression parameters of the formulated tablets were evaluated, including bulk density, tapped density, compressibility index, Hausner's ratio, angle of repose, hardness, friability, drug content, and buoyancy studies. In-vitro dissolution studies were conducted using USP-II apparatus. The standard calibration curve of Nifedipine showed a linear relationship between concentration and absorbance. FTIR studies indicated compatibility between the drug and excipients. Evaluation of pre-compression parameters revealed variations among formulations. Post-compression parameters demonstrated uniformity in tablet weight, mechanical strength, and drug content. Buoyancy studies showed variation in floating properties among formulations. Swelling index studies revealed hydration kinetics of tablets. Dissolution studies depicted drug release profiles over time. Kinetic modelling revealed that the optimized formulation followed Higuchi release kinetics, indicating diffusion-controlled drug release. Stability studies of the optimized formulation (F5) showed consistent thickness, hardness, and drug content over a period of three months, indicating formulation stability. This comprehensive study provides insights into the pre-formulation, formulation, and evaluation of floating tablets of Nifedipine, contributing to the development of gastroretentive drug delivery systems.*

Keywords: Pre-formulation, Nifedipine, Excipients, Floating tablets, Dissolution, Compatibility, Kinetic modeling, Stability.