4. EXPERIMENTAL SETUP

Hydrodynamically balanced drug delivery systems have been found to be very useful drug delivery system to attain oral controlled release of drugs (Baumgartner *et al.*, 2001) but floating systems suffer from a major disadvantage that they are effective only when the fluid level in the stomach is sufficiently high. However, as the stomach empties and the tablet is at the pylorus, the buoyancy of the dosage form may be impeded. This serious limitation can be overcome by making the floating system eventually adhere to the mucous lining of the stomach wall. Floating and bioadhesive drug delivery system thus, offer the advantages of increased gastric residence, leading to improved bioavailability of drugs with narrow absorption window (Chitnis *et al.*, 1991; Chueh *et al.*, 1995).

A central composite design (with $\alpha = 1$) using three levels each of the two factors viz., CP 934P and HPMC K4M was adopted to optimize the various responsive variable viz., Drug release in 16 hours, time taken to release 60 % drug, total floating time and bioadhesive strength. Direct compression method was adopted to prepare tablets keeping all process variables constant. Tablets were evaluated for their bioadhesion strength, total floating time and i*n vitro* dissolution studies by USP dissolution apparatus. The dissolution data was analyzed by ZOREL software.

Diltiazem Hydrochloride was (DTZ) chosen as the candidate drug because it has an elimination half-life of 3.5 hours and has an absorption zone from the upper intestinal tract. Efficacy of the administered dose of this drug may get diminished due to incomplete drug release from the device above the absorption zone. DTZ requires multiple daily drug dosage in order to maintain adequate plasma concentrations. Therefore, it is a suitable model candidate for gastroretentive formulation (Gambhire *et al.*, 2007)

4.1. Materials Used

4.1.1. List of Chemicals used

S.No.	Name	Supplier
1.	Carbopol	CDH Pvt. Ltd, New Delhi, India
2	Calcium chloride	CDH Pvt. Ltd, New Delhi, India
3	Diltiazem hydrochloride	Modimundi Pharma, Modipuram, Meerut
4	HPMC K4M	CDH Pvt. Ltd, New Delhi, India
5	Hydrochloric Acid	CDH Pvt. Ltd, New Delhi, India

6	Lactose	Loba Chemie Pvt. Ltd, Mumbai, India
7	Magnisium Stearate	Loba Chemie Pvt. Ltd, Mumbai, India
8	Microcrystalline Cellulose	Loba Chemie Pvt. Ltd, Mumbai, India
9	Sodium alginate	CDH Pvt. Ltd, New Delhi, India

4.1.2. List of equipments used

S.No.	Name of equipment	Model
1.	Single punch tablet punching machine	Pharmaceutical machine Works, Thane, India
2.	Tablet hardness tester	Lab India Instruments Pvt. Ltd, Thane, India
3.	pH meter	Lab India Instruments Pvt. Ltd, Thane, India
4.	Dissolution apparatus	DS 8000, Lab India Instruments Pvt. Ltd, Thane, India
5.	UV VIS Spectrophotometer	UV 1800, Shimadzu India
6.	Friabilator	Lab India Instruments Pvt. Ltd, Thane, India
7.	Digital balance	,,
8.	Optical microscope	,,
9.	Standard sieve set (In Vivek College, Bijnor)	,,

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