━━━ **Research** Article ━━━

APPLICATION OF DESIGN OF EXPERIMENTS TO OPTIMIZE GASTRO RETENTIVE DRUG DELIVERY SYSTEMS FOR CIPROFLOXACIN HCL AND METRONIDAZOLE

Rohit Lowalekar*, Lalit Singh Chauhan

Department of Pharmacy, Mohan Lal Sukhadia University, Udaipur

Bhupal Nobels Institute of Pharmaceutical Sciences, Udaipur, Rajasthan

ABSTRACT

Ciprofloxacin HCl and metronidazole both have a short half-life and narrow absorption window. Moreover, metronidazole is ineffective on aerobic bacteria. Thus a combination of both can be effective on a broad spectrum of bacteria. The objective of this research was to develop gastroretentive floating tablets of Ciprofloxacin Hcl and metronidazole using 2^3 full factorial design with 3 factors at two levels. The factors responsible for design space were selected based on the primary screening of the formulation for different polymer matrix and floating agent guar gum. The statistically significant study resulted in eight experiments wherein the formulations were evaluated for hardness, floating time, friability, % drug content, in-vitro drug release and mean gastric retention period. Statistical analysis was done using Minitab 17.3.1 software along with data model fitting. One-way Analysis of variance (ANOVA) was carried out to determine the p-value, F-value, R^2 and the standard deviation (S) of the various factors over various responses individually at a confidence limit of 95%. Surface plots were plotted between a single pair of variables and the required response to be measured to relate to the two continuous variables. Statistical analysis data revealed that tablets from formulation batch F2 was more promising system exhibiting excellent floating properties and drug release pattern. The study and the statistical parameters depicted that there is no difference between group means on the entire study factors. Stability studies revealed that all formulations were physically and chemically stable.

KEYWORDS: *Ciprofloxacin HCL, Metronidazole, Factorial design, In-vitro drug release, ANOVA.*