Multiobjective Optimization of a Pharmaceutical Formulation Using Regression Method

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Abstract : The formulation of a commercial pharmaceutical product involves several composition factors and response characteristics. When the formulation requires to satisfy multiple response characteristics which are conflicting, an optimal solution requires the need for an efficient multiobjective optimization technique. In this work, a regression is combined with a non-dominated sorting differential evolution (NSDE) involving Naïve & Slow and ε constraint techniques to derive different multiobjective optimization strategies, which are then evaluated by means of a trapidil pharmaceutical formulation. The analysis of the results show the effectiveness of the strategy that combines the regression model and NSDE with the integration of both Naïve & Slow and ε constraint techniques for Pareto optimization of trapidil formulation. With this strategy, the optimal formulation at pH=6.8 is obtained with the decision variables of micro crystalline cellulose, hydroxypropyl methylcellulose and compression pressure. The corresponding response characteristics of rate constant and release order are also noted down. The comparison of these results with the experimental data and with those of other multiple regression model based multiobjective evolutionary optimization strategies signify the better performance for optimal trapidil formulation.

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