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Abstract

A Pharmaceutical formulation is composed of several formulation factors and process variables. Quantitative model based pharmaceutical formulation involves establishing mathematical relations between the formulation variables and the resulting responses, and optimizing the formulation conditions. In a formulation system involving several objectives, the desirable formulation conditions for one property may not always be desirable for other characteristics, thus leading to the problem of conflicting objectives. Therefore, efficient modeling and optimization techniques are needed to devise an optimal formulation system. In this work, a novel method based on radial basis function network (RBFN) is proposed for modeling and optimization of pharmaceutical formulations involving several objectives. This method has the advantage that it automatically configures the RBFN using a hierarchically self organizing learning algorithm while establishing the network parameters. This method is evaluated by using a trapidil formulation system as a test bed and compared with that of a response surface method (RSM) based on multiple regression. The simulation results demonstrate the better performance of the proposed RBFN method for modeling and optimization of pharmaceutical formulations over the regression based RSM technique.

Keywords: Radial basis function network ▪ multiple regression ▪ multiobjective optimization ▪ pharmaceutical formulation