OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Nanotek & Expo

December 02-04, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

Artificial neural networks: Genetic algorithm based optimization of solid lipid nanoparticles of asenapine maleate

Sanjay Kumar Singh, Parameswara Rao Vuddanda and Sanjay Singh
Indian Institute of Technology (Banaras Hindu University), India

The purpose of this study was to develop and optimize the Solid Lipid Nanoparticles of the Asenapine maleate, an antipsychotic drug using Artificial Neural Networks-Genetic Algorithm (ANN-GA) technique. Naoparticles were prepared by the high shear homogenization/sonication technique. A set of experiments was carried out to evaluate the effect of composition (drug/lipid ratio and surfactant concentration) and process variable (homogenization and sonication time) for the preparation of nanoparticles. The experimental data of 31 trials were designed using central composite design (CCD). Data were divided into two sets: training and test data set. A feed forward back propagation (FFBP) model of ANN was constructed and its input space was optimized using a genetic algorithm (GA) program. The ANN consisted of three levels of neurons: an input layer, a hidden layer and an output layer. The output results were observed in the form of particle size, polydispersity index and entrapment efficiency. The obtained result shows a correlation coefficient (r2) value of 0.97 and a root-mean-square error of 0.21 for the calculated/predicted properties with respect to experimental values, demonstrating the reliability of the proposed model. Therefore, ANN-GA represents a novel tool for optimization of composition, process variables and their predicted outcomes in development of solid lipid nanoparticles.

Biography

Sanjay Kumar Singh is a research fellow at Indian Institute of Technology (Banaras Hindu University), Varanasi. His current area of research is lipid based nanoparticulate drug delivery system. Before joining as doctoral research, he had worked in IPMG-Formulation department with R&D center of Lupin Pharmaceutical Limited (Pune) India. He has three publications with cumulative impact factor 10.8 and has presented/co-authored 7 research/review works in national/international conferences. He has qualified GATE-2008 with 99.78 percentile. He received UGC-JRF for his post graduation research work and awarded Institutional fellowship, from MHRD, Gov. of India for continuing his doctoral research.

sksingh.rs.phe@iitbhu.ac.in