Harsh Vardhan et al., Pharm Anal Acta 2016, 7:1 (Suppl)
http://dx.doi.org/10.4172/2153-2435.C1.028

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8th International Conference and Exhibition on

Pharmaceutics & Novel Drug Delivery Systems

March 07-09, 2016 Madrid, Spain

Quality-by-design approach for formulation development of drug nanoparticles

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Quality by Design (QbD) principles was explored to study and screen the optimal parameters for a drug loaded polymeric nanoparticle. Formulations were prepared using modified emulsification solvent evaporation technique by adopting Plackett-Burman design as factor screening and Box-Behnken design for response optimization plot. The relationship between design factors and experimental data was evaluated using Minitab 17. Desired properties for three of the responses particle size, zeta potential and drug encapsulation efficiency were defined and evaluated. It was observed that the concentration of polymer significantly affects the drug encapsulation efficiency and this resulted in considerable variation in the particle size. Surfactant did not have a significant effect on drug encapsulation efficiency. However, surfactant concentration did affect the zeta potential with higher surfactant concentrations resulting in higher zeta potential. The present combination of polymer for Polyhydroxybutyrate-co-hydroxyvalerate (PHBV) nanoparticle demonstrates an effective way to prolong the drug release with initial burst.

Biography

Harsh Vardhan has completed his BPharm from J S S College of Pharmacy, Mysore and MPharm from Lovely Professional University, Jalandhar. He is now pursuing PhD from Department of Pharmaceutics, IIT (BHU), Varanasi. He also worked as a QA Officer in Aristo Pharmaceuticals Pvt. Ltd., and as Jr. Officer in ARD Department of Acme Formulations Pvt. Ltd., Baddi (Himachal Pradesh).

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