

Nanocrystals – A Review

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From National Conference on Interdisciplinary Research and Innovations in Biosciences, NATCON -2018. Post Graduate & Research Department of Biochemistry, Mohamed Sathak College of Arts & Science, Sholinganallur, Chennai-600119, India. 24th & 25th January 2018.

American J of Bio-pharm Biochem and Life Sci 2018 January, Vol. 4 (Suppl 1): PP21

ABSTRACT

The word 'Nano' became an integral part in day today life. Almost in all the fields nanotechnology has marked its foot print. Owing to its smaller size, (10^{-9} meter)nanoparticle research is currently an area of intense scientific research. Many miracles are being happened in the nanoworld. They bridge gap between bulk materials and atomic or molecular structures. They are zero-dimensional, possessing nanometric dimensions in all the three dimensions. Development of nano crystals emerged amid various shortcomings of existing delivery techniques for targeted therapy. Nanocrystals are drug crystals with particle size ranging from dozens to a few hundreds of nanometers, while in some cases, pure drug crystals may be physically stabilized by surfactants and/or polymers. Absence of any carrier chemicals offer a maximum drug loading, reduced toxic side effects, increased stability of Nano crystals.It circumvented many instability issues of excipients and surfactants. Drug nanocrystals constitute a versatile formulation of the pure poorly water-soluble drug without any matrix material to enhance the pharmacokinetic and pharmacodynamic properties and to resolve the problems of low solubility and low bioavailability. Nanocrystals are of best choice of a drug design due to its platform stability, high drug loading capacity, ease in scaling-up of crystals and its advantage in the enhancement of saturation, solubility, dissolution velocity and adhesiveness to surface/cell membranes. However, stabilization of nanocrystals remains a major challenge in the development of nanocrystals which includes increase in particle size, agglomeration, crystal transformation and chemical instabilities. The present review illustrates the details about drug nanocrystals its merits and demerits, method of production, special properties and current nanocrystal products.