NanoMaterials Technology

Mass Production of Nano-Hydrid Matrix Particles for Water Insoluble Drug with HGCP Technology Platform

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Abstract
It is found low water solubility influences the in vivo absorption of many drugs or new active compounds under investigation and therapeutic efficacy in recent years. Reducing particle size is effective way to improve water solubility, then in vivo absorption and efficacy. HGCP platform has been widely applied to produce nanosuspension or microsusnpension by micro-mixing of drug solution with antisolvent. The process is simple, rapid and easy to scale up [1-2]. Followed by spray drying process and formula optimization, Nano-Hydrid matrix particles including certain excipients can be obtained. Excipient form powder matrix and nanoparticles are separated from each other by excipient, thus low aggregation and small particles size upon reconstitution in water is guaranteed. Different model drug has been selected to produce Nano-Hydrid matrix particles through HGCP precipitation and spray drying. Based on characterization of Nano-Hydrid matrix particles and powder redispersion, nanoparticles can be observed with slight change in PSD. In vitro dissolution and in vivo plasma profile also validated faster dissolution and better absorption can be achieved. Such strategy has been applied successfully to other oral formulation, as well as inhalation development [3].

References

[1] Chen, J.F., Zhou, M.Y., et al, Int. J. Pharm. 269 (2004), 267-74.
[2] Date, A.A., Patravale, V.B., Curr. Opin. Colloid Interface Sci. 9 (2004), 222-35
[3] Shen, Z.G., Chen, W.H., et al, Int. J. Pharm. 430 (2012), 98– 103

Figures

Figure 1 SEM images of HGCP precipitated slurry and Nano-Hydrid matrix particle

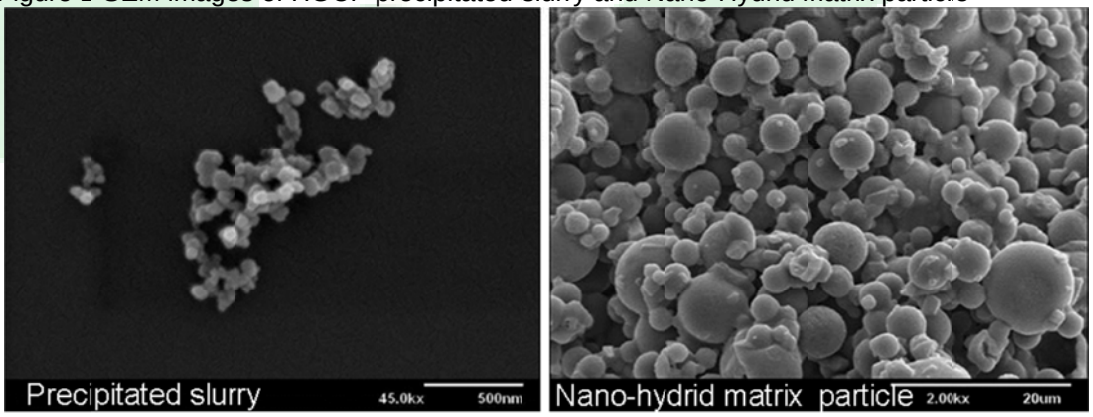
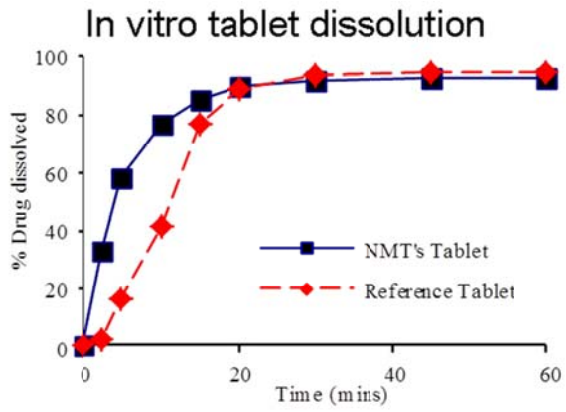
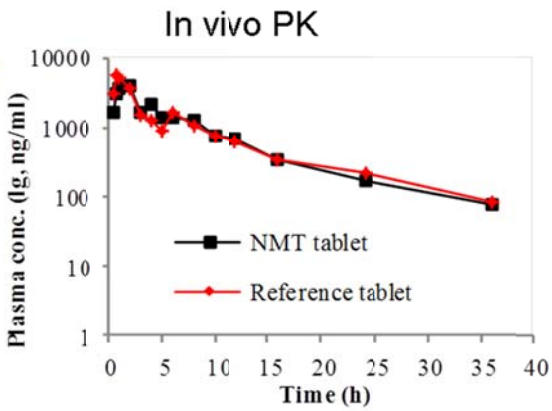


Figure 2 tablet dissolution comparison and in vivo PK profile with marketed reference tablet


In vitro tablet dissolution
% Drug dissolved
Time (mins)
NMT's Tablet
Reference Tablet


In vivo PK
Plasma conc. (lg, ng/ml)
Time (h)
NMT tablet
Reference tablet