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Zero-order release and bioavailability enhancement of poorly water soluble Vinpocetine from self-nanoemulsifying osmotic pump tablet

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Abstract:

Solid self-nanoemulsifying (S-SNEDDS) asymmetrically coated osmotic tablets of the poorly water-soluble drug Vinpocetine (VNP) were designed. The aim was to control the release of VNP by the osmotic technology taking advantage of the solubility and bioavailability-enhancing capacity of S-SNEDDS. Liquid SNEDDS loaded with 2.5 mg VNP composed of Maisine™ 35-1, Transcutol® HP, and Cremophor® EL was adsorbed on the solid carrier Aeroperl®. S-SNEDDS was mixed with the osmotic tablet excipients (sodium chloride, Avicel®, HPMC-K4M, PVP-K30, and Lubripharm®), then directly compressed to form the core tablet. The tablets were dip coated and mechanically drilled. A 32*21 full factorial design was adopted. The independent variables were: type of coating material (X1), concentration of coating solution (X2), and number of drills (X3). The dependent variables included % release at 2 h (Y1), at 4 h (Y2), and at 8 h (Y3). The in vivo performance of the optimum formula was assessed in rabbits. Zero-order VNP release was obtained by the single drilled 1.5% Opadry® CA coated osmotic tablets and twofold increase in VNP bioavailability was achieved. The combination of SNEDDS and osmotic pump tablet system was successful in enhancing the solubility and absorption of VNP as well as controlling its release. © 2017, © 2017 Informa UK Limited, trading as Taylor & Francis Group.

Reference: