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# Improved skin transport and hypoglycemic efficacy of Glimepiride transdermal patches

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**Purpose:** Utilization of hydroxybutyl- β-cyclodextrin (HB-β-CD) and polyvinyl pyrrolidone (PVP) in the enhancement of glimepiride (GMD) transdermal delivery.

**Methods:** Matrix type transdermal patches containing GMD, drug coprecipitate or its inclusion complex were prepared using different gelling agents. The prepared patches were characterized, and *in vitro* skin permeation study for the test formulations was conducted using automated diffusion system. Prepared patches were assessed for their hypoglycemic activity and by determination of GMD plasma concentration in rats.

**Results:** GMD- HB-β-CD binary systems (1:2 molar ratio) enhanced GMD aqueous solubility by more than 10 times. Diffusion studies showed improved release of GMD-HB-β-CD inclusion complex compared with its GMD alone. Permeability parameters of the prepared GMD patches, alone or as inclusion complex or co-precipitate through rat skin showed 26.973 and 14.28 µg/cm2 as maximum cumulative amounts of GMD permeated from patches, in the form of GMD- HB-β-CD, containing chitosan and HPMC, respectively. GMD complex-chitosan films showed significant ($p < 0.05$) improvement in permeation data compared with GMD-HPMC data after 6 hours of permeation. Both chitosan and HPMC patches of GMD-HB-β-CD revealed substantial reductions ($P < 0.05$) in blood glucose levels (192.67±21.18) and (201±15.11) mg/dl from the base line value in 240 minutes, respectively.

**Conclusion:** Application of chitosan and HPMC transdermal patches of GMD-HB-β-CD can be used as a valuable alternative to peroral GMD with improved bioavailability and patient compliance.

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