

## Transdermal Medicated- Layered Extended-Release Patches for Co-delivery of Carbamazepine and Pyridoxine

**Authors :** Sarah K. Amer, Walaa Alaa

**Abstract :** Epilepsy is an important cause of mortality and morbidity, according to WHO statistics. It is characterized by the presence of frequent seizures occurring more than 24 hours apart. Carbamazepine (CBZ) is considered first-line treatment for epilepsy. However, reports have shown that CBZ oral formulations failed to achieve optimum systemic delivery, minimize side effects, and enhance patient compliance. Besides, the literature has signified the lack of therapeutically efficient CBZ transdermal formulation and the urge for its existence owing to its ease and convenient method of application and highlighted capability to attain higher bioavailability and more extended-release profiles compared to conventional oral CBZ tablets. This work aims to prepare CBZ microspheres (MS) that are embedded in a transdermal gel containing Vitamin B to be co-delivered. MS were prepared by emulsion-solvent diffusion method using Eudragit S as core forming polymer and hydroxypropyl methylcellulose (HPMC) polymer. The MS appeared to be spherical and porous in nature, offering a large surface area and high entrapment efficiency of CBZ. The transdermal gel was prepared by solvent-evaporation technique using HPMC that, offered high entrapment efficiency and Eudragit S that provided an extended-release profile. Polyethylene glycol, Span 80 and Pyridoxine were also added. Data indicated that combinations of CBZ with pyridoxine can reduce epileptic seizures without affecting motor coordination. Extended-release profiles were evident for this system. The patches were furthermore tested for thickness, moisture content, folding endurance, spreadability and viscosity measurements. This novel pharmaceutical formulation would be of great influence on seizure control, offering better therapeutic effects.

**Keywords :** epilepsy, carbamazepine, pyridoxine, transdermal

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