The mechanism study of chemical stability improvement of hydrocortisone acetate in topical preparations

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Objectives: PIC/S GMP Guidelines require ongoing stability testing for the market-life of all medicinal products. Therefore, stability issues associated with hydrocortisone acetate (HA) deserve significant attention during pharmaceutical topical product development. Topical steroid pharmaceuticals are applied in treatment for diverse skin diseases clinically, but the instability of HA when compounded in water or polyethylene glycol ointment bases has been previously demonstrated. In this thesis, the chemical stability of hydrocortisone acetate in ointment bases was studied. **Methods:** By means of stability tests of different bases, including MQ water, PG, PEG400 and Vaseline oil, with dissolving hydrocortisone acetate at two kinds of temperature, respectively, we want to figure out what makes hydrocortisone acetate instable at liquid state. While operating high performance liquid chromatography (HPLC), a fast simple and precise method had been developed, in order to assay the content of the drug in vehicles and topical preparations at time 0 and after 90 days, offering a better way for drug industry at qualitative control. Besides, the variations of pH in hydrocortisone acetate in aqueous condition are also been taken down. **Results:** Comparing to the water-washable base, hydrocortisone acetate is practically insoluble no matter in water or oil without co-solvent. Degradation rates of hydrocortisone acetate mainly depend on solubility and dissolution rate of solid drug in vehicle of products, and then the resultant factors were to derive a stability modeling equation. The aging effect on the stability of HA could be predicted through the mathematic equation. No matter status in running cooler or hotter, the pH of hydrocortisone acetate in aqueous condition doesn't differ much from the originals.

Key words: Hydrocortisone acetate, Chemical stability, Mechanism, Topical preparation