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Phase transformation in thiamine hydrochloride tablets: Influence on tablet microstructure, physical properties, and performance

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The objective of the study was to monitor phase transformation in thiamine hydrochloride, from a nonstoichiometric hydrate (NSH) to a hemihydrate (HH), in stored tablets, prepared both by direct compression and wet granulation, and to relate the storage-induced phase transformation due to changes in tablet microstructure, physical properties, and performance. Raman spectroscopy revealed complete NSH HH transformation in tablets, within 30 h of storage at 40 °C/75% relative humidity. When the tablets were prepared by wet granulation of NSH alone, there was a marked increase in both tablet volume and hardness on storage. However, when microcrystalline cellulose (MCC) was included in granulation, the resulting stored tablets also exhibited a pronounced increase in disintegration time. In contrast, tablets prepared by dry processing via compression of a NSH–MCC physical mixture did not exhibit any changes in properties, despite the *in situ* solid form conversion. Scanning electron microscopy revealed growth of needle-like HH crystals in all stored tablets and mercury porosimetry revealed considerable changes in the pore size distribution during storage. Longer storage led to crystal growth (Ostwald ripening), causing further gradual and less dramatic changes in properties. The phase transformation and the complex inter-particulate associations in the tablet influenced the changes in tablet microstructure, compact physical properties, and product behavior.

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Size and diffusion phenomena of cetyltrimethylammonium bromide /alcohol/water system in the presence of thymidine by dynamic light scattering

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In this paper precise measurements of Dynamic Light Scattering (DLS) of the effects of temperature, solvents (alcohols), water on the size and diffusion of CTAB reversed micelles in the thymidine/ CTAB/alcohol/ water system are reported. The concentrations of CTAB were varied from 0.051 to 0.28 mol/L. Thymidine concentration in during auto-correlation function registration was the same in each solvent 0.001 mol/L. Water concentration in the studied systems was defined by R parameter according to relation: R=[H2O]/[CTAB]. DLS measurements were done at 298.15 and 308.15K. DLS experiment involved on detection two relaxation modes (fast and slow) in the systems containing CTAB reversed micelles, water, thymidine and solvents (methanol and Butanol). The DLS data clearly show the solvent influence as well as thymidine presence on CTAB reversed micelles size and consequently their diffusion coefficients.

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