Drug stability and compatibility are critical issues controlling accurate and appropriate delivery of drug therapy to patients. Stability is very important for antibacterial agents especially those given by intravenous route as they reach systemic circulation directly, and the clinical outcome and safety are directly correlated to drug levels in blood. The physical and chemical stability of Cefepime hydrochloride, a fourth generation cephalosporin, was determined at three different temperatures (5 °C/ 60 %RH, 25 °C/60 %RH & 45 °C/75% RH) and quantified by using a stability indicating RP-HPLC method. Decrease in drug concentration by more than 10% from initial concentration (0 time) was considered unstable (chemical instability). Change in pH by more than 1 was considered unstable (Physical instability). The drug solutions were clear and light yellow initially with intensity increasing over time, eventually becoming dark yellow for cefepime. HPLC analysis indicated that 40 mg/ml concentration of cefepime hydrochloride maintained adequate stability for 2 hours at 45°C and up to 24 hours at 25 °C and up to 7 days at 5 °C.

**KEYWORDS:** Cefepime; Stability studies; RP-HPLC; Physical instability; Chemical instability; Degradation.

**Introduction**

Stability is defined as the capacity of a drug substance or drug product to remain within established specifications to maintain its identity, strength, quality, and purity throughout the retest or expiration dating periods (FDA guidelines, 1998a). Drug stability is aimed at ensuring that the drug product remains within specifications established to ensure its identity, strength, quality and purity. Drug stability and compatibility are critical issues controlling accurate and appropriate delivery of drug therapy to patients. Impurities and degradation can lead to change in the pharmacological, chemical and toxicological properties of the drug which will affect its safety and efficacy (Ahuja, 1998, Ahuja and Alsante, 2003, FDA guidelines, 1998b). Stability is very important for antibacterial agents especially those given by Intravenous (I.V route) as they reach systemic circulation directly, and the clinical outcome and safety are directly correlated to drug levels in blood.

Stability testing of an active substance or finished product gives evidence about the quality of the active substance or finished product which varies over time because of the influence of environmental factors like temperature, humidity and light. Stability testing also provides vital information about the interaction of drug with its ingredients, possible degradations and their mechanisms, and degraded products. The results of stability studies are widely used by the pharmaceutical industry in deciding the storage conditions, suitable packaging material, shelf life and expiration date of the product (ICH guidelines, 2000, Grimm and Carstensen, 2000a, Dean and Carstensen, 2000b).

The increased use of parenteral drugs is revealed in surveys that show in the average hospital, 40% of the total dosage forms dispensed to patients are in the form of injections (Turco, 1994). Newer generation of parenteral antibiotics have lead to increased role of parenteral therapy. Continuous infusion is an efficient means of administering beta-lactams to maintain drug concentrations higher than the Minimum Inhibitory concentration (MIC) throughout the dosing interval. Continuous infusion has a pharmacoeconomic advantage over intermittent dosing by achieving the same effect with a lower daily dose of drug. Antibacterial agents, especially fourth generation cephalosporin like cefepime which has been selected for our study is commonly used by I.V route, alone and in combination therapy for treating severe multidrug resistant infections (AHFS drug information, 2004, USP, 2004). Most monograph literature on cefepime indicates stability of the drug at