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### Abstract

It is common knowledge in the pharmaceutical industry that the quality of a company's compound collection has a major influence on the success of biological screening in drug discovery programs. DMSO is the widely accepted solvent of choice for storage of compounds, despite the hygroscopic nature of the solvent, which can lead to stability issues. Other factors that can affect compound stability (e.g., degradation, precipitation) include concentration of compound, intrinsic compound stability, presence of reactive contaminants, storage format-related factors (vessel, sealing, etc.), storage conditions (temperature, humidity, freeze-thaw technique and cycles, etc.), and storage time. To define the best practice for the storage and handling of solution samples, GlaxoSmithKline has undertaken stability experiments over more than a decade, initially to support the implementation of new automated liquid stores (ALS) and, subsequently, to enhance storage and use of compounds in solution through an understanding of compound degradation under storage and assay conditions. The experiments described used a number of technologies, including hyphenated liquid chromatography, electrospray mass spectrometry, flow chemiluminescence nitrogen detection, nuclear magnetic resonance, and Karl Fischer titration.