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Abstract

The appropriate storage conditions for a compound file are a crucial factor for the success of drug discovery projects. In this study, 778 highly diverse compounds dissolved in 100% DMSO were stored under 3 industry-wide accepted storage conditions, and the compound integrity was monitored for a period of 6 months. The storage conditions selected were (1) under argon at +15 °C, (2) under argon at -20 °C, and (3) under ambient atmosphere at -20 °C. Each sample was assessed every 4 weeks by liquid chromatography coupled to mass spectrometry (LC/MS). Based on the resulting experimental data, a statistical projection of compound integrity over a period of 4 years for each of the 3 storage conditions was generated applying a linear mixed-effects model. A moderate loss of compound integrity of 12% was calculated for storage at -20 °C under argon, a loss of 21% for storage at -20 °C under ambient atmosphere, and a strong decrease of 58% for storage at +15 °C under argon over this period. The initial purity of the compounds does also influence the rate of compound degradation. Compounds with an initial purity of 50% to 75% degraded faster than compounds with an initial purity of more than 75%. The results of the study enable the prediction of the point in time, when the purity of a compound population falls below a predefined threshold that would trigger the resolubilization or retirement of the compound population represented by the analyzed samples.