



**Figure 3.13** (a) Pseudo first-order reaction kinetics for formation of aggregate in freeze-dried mAb (left panel). Size exclusion chromatograph (SEC) after storage at 30 °C for 1 year (lower right panel). Online weight average molecular weight (MW) using light scattering detection (upper right panel) and lower table. (b) Nonreduced and reduced SDS PAGE (using β-mercaptoethanol). Lane 1: MW standards; lane 2: mAb freeze-dried without excipients after 1 year at 30 °C.

Adapted from [Andya, Hsu, and Shire \(2003\)](#).