Storage/Stability

Aqueous solutions of polysorbates as well as the neat liquid will undergo autoxidation over time, with changes being catalyzed by light, increased temperature, and copper sulfate. Product can be stored at a dark and cool place for two years. We recommend storage under argon or nitrogen. Solutions are reasonably stable at 2-8°C for short periods. Autoclaving is not recommended without testing for changes in properties. May not be stable to autoclaving, particularly with metal cations in buffer solutions. Heat sensitive and will darken when exposed to elevated temperatures. Polysorbates have been reported to be incompatible with alkalis, heavy metal salts, phenols, and tannic acid. Polysorbates may reduce the activity of many preservatives. No plastic incompatabilities have been observed.

Impact of degradation on the stability of therapeutic proteins in parenteral formulations

"The degradation of polysorbate leads to a buildup of various molecules, some of which are poorly soluble, including fatty acids and polyoxyethylene (POE) esters of fatty acids. Spiking studies showed that the insoluble degradants could potentially impact protein stability and that the presence of sufficient intact polysorbate was crucial to prevent this. End-of-shelf-life shaking of protein formulations showed that the stability of various monoclonal antibodies was, however, not affected. Although some degradants can potentially influence the stability of the protein (as discerned from spiking studies), degradation of polysorbates did not impact the stability of the different proteins tested in pharmaceutically relevant temperature and storage conditions." [1]

| | Synonyms | Chemical Formula | MW | Density (g/mL) | CMC (mM) 25°C | Cloud Point (°C) | Appearance | Solubility | Applications |
|---|---|---|---|---|---|---|---|---|---|
| Tween 20 | Polysorbate 20, Polyoxyethylene sorbitan monolaurate, PEG (20) sorbitan monolaurate | $C_{58}H_{114}O_{26}$ | 1228 | 1.1 | 0.06 | 76 | Clear, yellow to yellow-green viscous liquid | Partly soluble in Water. Insoluble in: mineral oil, rapeseed oil, Kerosene, Methyl oleate, Butyl stearate | a broad range of applications: as a blocking agent in PBS or TBS wash buffers for ELISA, Western blotting and other immunoassay methods; for lysing mammalian cells; and as a solubilizing agent for membrane proteins. |
| Tween 80 | Polysorbate 80, Polyoxyethylene sorbitan monooleate, PEG (80) sorbitan monooleate | $C_{64}H_{124}O_{26}$ | 1310 | 1.06-1.09 | 0.016 | 93 | amber colored viscous liquid | Soluble in Water. Partly soluble in Ketone, Methyl oleate. Insoluble in: mineral oil, rapeseed oil, Butyl stearate | as a stabilizing agent for proteins; used in tests for the identification of phenotype of some mycobacteria. |

Table 1 - Properties of Tween 20 and Tween 80[2]

Literature

***1*** *The degradation of polysorbates 20 and 80 and its potential impact on the stability of biotherapeutics.* Kishore RS[1], Kiese S, Fischer S, Pappenberger A, Grauschopf U, Mahler HC. (Pharm Res. 2011 May;28(5):1194-210)

***2*** *Detergents: Triton X-100, Tween-20, and More.* Mary Johnson PhD. (MATER METHODS 2013;3:163 Synatom Research, Princeton, New Jersey, United States)