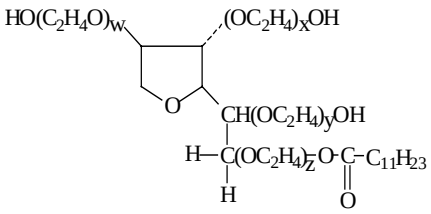
POLYOXYETHYLENESORBITAN MONOLAURATE
(Tween 20)
Sigma Prod. Nos. P1379, P7949, and P6585

ProductInformation



sum of w, x, y, z = 20

CAS NUMBER: 9005-64-5
SYNONYMS: Tween 20, Polysorbate 20; PEG(20)sorbitan monolaurate

PHYSICAL DESCRIPTION:

Appearance: Clear yellow to yellow-green viscous liquid[1]
Boiling point: > 100°C[2]
Brookfield viscosity of neat liquid at 25°C is 370-430 cps.[1]
pH of 1% aqueous solution: between 5 and 7[1]
Refractive index: 1.4685[3]
Specific gravity: 1.1[2]
HLB value: 16.7[4]
CMC value: 60 mg/L[4] or ~6x10^{-3} mole/L[5]
Structure: Tween 20 is a polyoxyethylene sorbitol ester, with a calculated molecular weight = 1225, assuming 20 ethylene oxide units, 1 sorbitan and lauric acid as the primary fatty acid. Fatty acid constituents of this product are determined by transesterification to yield fatty acid methyl esters which are identified by gas chromatography. "Purity" relates to the observed percent of the expected fatty acid that is associated with this product.

METHOD OF PREPARATION:

The method of preparation of P1379 and P7949 is considered proprietary by the manufacturer. P6585 was treated to reduce peroxide and carbonyl levels, and contains BHT to minimize re-oxidation.

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STORAGE / STABILITY AS SUPPLIED:

Reagent grade P1379 and SigmaUltra P7949 are stable for at least five years if stored sealed at room temperature. Tween 20R, P6585, has been packaged under argon and should be stored at 2-8°C to minimize peroxide development.

SOLUBILITY / SOLUTION STABILITY:

Tween 20 dissolves in water at 100 mg/mL, giving a clear yellow solution.[1] It is also miscible with alcohol, dioxane, and ethyl acetate; practically insoluble in liquid paraffin and fixed oils.[6]

Aqueous solutions of polysorbates undergo autoxidation during storage, changes being catalyzed by light, increased temperature and copper sulfate.[7] Although Tween 20R contains BHT as an antioxidant, solutions should be stored under inert gas. Autoclaving is not recommended without testing for changes in properties; Tween 20 may not be stable to autoclaving, particularly with metal cations in buffer solutions.[2] Polysorbates have been reported to be incompatible with alkalis, heavy metal salts, phenols and tannic acid. Polysorbates may reduce the activity of many preservatives.[6]

USAGE:

Tween 20 is a nonionic detergent widely used in biochemical applications. Sigma offers a number of products for research, some tested for suitability in a given application. The standard reagent is P1379; the SigmaUltra P7949 is tested for trace mineral content. Tween 20R, P6585, is offered for use in applications sensitive to peroxide levels.

Other Tween 20 products available from Sigma:
P9416 - tested for molecular biology use
P2287 - tested for cell culture use
P9203 - a 20% solution (w/v in water) - tested for electrophoresis use
P5927 - tested for electrophoresis use

Tween 20 is a frequently used member of the polysorbate family. These have been used as emulsifying agents for the preparation of stable oil-in-water emulsions, particularly in pharmaceutical applications.[6] Tween 20 has been used in pre-extraction of membranes to remove peripheral proteins (used at 2% for extraction of membrane-bound proteins).[8] Several resources may be helpful in determining usage concentrations.[9-11] Tween 20 has been used as a blocking agent on nitrocellulose at a typical concentration of 0.05%.[12]

REFERENCES:

1. Sigma quality control.
2. Supplier data.

NOTES: (continued)

3. *Sys. Analysis of Surface Active Agents*, 2nd ed., p. 533.
4. *Data for Biochemical Research*, 3rd ed., Dawson et al., eds. (Oxford Press, 1989), p. 289.
5. Helenius A. et al., *Methods in Enzymology*, 56, 734-749 (1979).
6. *Martindale: The Extra Pharmacopoeia*, 30th ed. (Pharmaceutical Press, 1993), p. 1030.
7. Donbrow, M. et al, *J. Pharmaceutical Sciences*, 67, 1676-1681 (1978).
8. Helenius, A. and Simons, K., *Biochem. Biophys. Acta*, 455, 796 (1976).
9. Neugebauer, J.M., *Methods in Enzymology,* 182, 239 (1992).
10. *Protein Purific. Methods: A Practical Approach*, Harris and Angal, eds. (IRL Press, 1989).
11. *Protein Purific. Applic: A Practical Approach*, Harris and Angal, eds. (IRL Press, 1989).
12. Sigma Immunochemical Technical Service.