TABLE 1. Stabilizing Agents for Biotechnology Preparations.

CLASS	AGENT	ACTION
Amino acids	Alanine	Serves as a solubilizer
	Arginine	Serves as a buffer
	Aspartic acid	Inhibits isomerism
	Glycine	Serves as a stabilizer
	Glutamic acid	Serves as a thermostabilizer
	Leucine	Inhibits aggregation
Antioxidants	Ascorbic acid	Helps stabilize protein conformation
	Cysteine hydrochloride	
	Glutathione	
	Thioglycerol	
	Thioglycolic acid	
	Thiosorbitol	
Chelating agents	EDTA salts	Inhibits oxidation by removing metal ions, glutamic acid, and aspartic acid
Fatty acids	Choline	Serves as stabilizers
	Ethanolamine	
	Phosphotidyl	
Proteins	Human serum albumin	Prevents surface adsorption; stabilizes protein conformation; serves as a complexing agent and cryoprotectant
Metal ions	Ca++	Helps stabilize protein conformation
	Ni++	
	Mg++	
	Mn++	
Polyhydric alcohols	Ethylene glycol	Serves as a stabilizer
	Glucose	Strengthens conformation
	Lactose	Serves as a stabilizer
	Mannitol	Serves as a cryoprotectant
	Propylene glycol	Prevents aggregation
	Sorbitol	Prevents denaturation and aggregation
	Sucrose	Serves as a stabilizer
	Trehalose	Serves as a stabilizer
Polymers	Polyethylene glycol	Prevents aggregation
	Povidone	
Surfactants	Poloxamer 407	Prevents denaturation and stabilizes cloudiness
	Polysorbate 20 and polysorbate 80	Retards aggregation

Source: Bontempo JA. Development of Biopharmaceutical Parenteral Dosage Forms. New York, NY: Marcel Dekker; 1997: 112–113.