

# CHAPTER 8

## CELLAR TREATMENT

### GENERAL

Cellar treatment involves the use of various methods or materials to correct or stabilize wine

Cellar treatment may not result in an alteration of the class and/or type of the wine

### AUTHORIZED CELLAR TREATMENT

General parameters for the cellar treatment of both IMPORTED and AMERICAN wines are set forth in the chart below

#### AUTHORIZED CELLAR TREATMENTS

AUTHORIZED CELLAR TREATMENT	RESTRICTIONS ON USE
Treatment with filtering equipment	Good commercial practice
Treatment with fining agents	Good commercial practice
Treatment with sterilizing agents	Good commercial practice
Treatment with sulfur dioxide	May not exceed 350 parts per million (ppm) in the finished wine
Treatment with pasteurization	1) May not change the basic composition of the wine and 2) May not eliminate any of the wine's characteristic elements
Treatment with refrigeration	1) May not change the basic composition of the wine and 2) May not eliminate any of the wine's characteristic elements
Treatment with methods and materials to correct cloudiness, precipitation or abnormal color, odor or flavor developing in wine	May be treated only to the minimum extent necessary to achieve correction
Treatment with the use of constituents naturally present in the kind of fruit or other agricultural product from which the wine is produced to correct deficiencies of these constituents	May be treated only to the extent that constituents would be present in normal wines of the same class or type not so treated
Treatment involving volatile fruit-flavor concentrates	Volatile fruit-flavor concentrates: 1) May be added only to wine of a winemaker's own production and 2) Must be produced from the same kind of fruit or the same variety of berry or grape from which the wine was made and 3) Proportion of volatile fruit-flavor concentrate added to the wine may not exceed the equivalent proportion of volatile fruit-flavor concentrate of the original juice or must from which the wine was produced and 4) Must be produced at a volatile fruit-flavor concentrate plant
Use of carbon dioxide to maintain counterpressure during the transfer of finished sparkling wines from bulk processing tanks to bottles or bottle to bottle	Carbon dioxide may not be increased by more than 0.009 grams per 100 ml during the transfer operation

## AUTHORIZED TREATING MATERIALS

The specific materials authorized for the treatment of AMERICAN wine are detailed in the chart below

### MATERIALS AUTHORIZED FOR TREATMENT OF AMERICAN WINE AND JUICE

MATERIAL	USE	REFERENCE OR LIMITATION
Acacia (gum arabic)	To clarify and to stabilize wine	The amount used shall not exceed 2 lbs./1000 gals. (0.24 g/L of wine.) 21 CFR 184.1330 (GRAS*)
Activated carbon	To assist precipitation during fermentation	27 CFR 24.176. GRAS* per FDA advisory opinion dated 1/26/79
	To clarify and to purify wine	The amount used to clarify and purify wine shall be included in the total amount of activated carbon used to remove excessive color in wine. 27 CFR 24.241 and 24.242 (GRAS*)
	To remove color in wine and/or juice from which the wine was produced	The amount used to treat the wine, including the juice from which the wine was produced, shall not exceed 25 lbs./1000 gal. (3.0 g/L). If the amount necessary exceeds this limit, a notice is required pursuant to 27 CFR 24.242 (GRAS*)
Albumen (egg white)	Fining agent for wine	May be prepared in a light brine 1 oz. (28.35 grams) potassium chloride, 2 lbs. (907.2 grams) egg white, 1 gal. (3.785 L) of water. Usage not to exceed 1.5 gals. of solution per 1000 gals. of wine. (GRAS*)
Alumino-silicates (hydrated) e.g., Bentonite (Wyoming clay) and Kaolin	To clarify and to stabilize wine or juice	21 CFR 182.2727, 182.2729, 184.1155 (GRAS*) and 186.1256. GRAS* per FDA advisory opinion dated July 26, 1985
Ammonium phosphate (mono- and di basic)	Yeast nutrient in wine production and to start secondary fermentation in the production of sparkling wines	The amount used shall not exceed 8 lbs. per 1000 gals. (0.96 g/L) of wine. 21 CFR 184.1141 (GRAS*)
Ascorbic acid iso-ascorbic acid (erythorbic acid)	To prevent oxidation of color and flavor components of juice and wine	May be added to grapes, other fruit (including berries), and other primary wine making materials, or to the juice of such materials, or to the wine, within limitations which do not alter the class or type of the wine. 21 CFR 182.3013 and 182.3041 (GRAS*)
Calcium carbonate (with or without calcium salts of tartaric and malic acids)	To reduce the excess natural acids in high acid wine, and in juice prior to or during fermentation	The natural or fixed acids shall not be reduced below 5 g/L. 21 CFR 184.1069 and 184.1099 and 184.1191 (GRAS*)
	A fining agent for cold stabilization	The amount used shall not exceed 30 lbs./1000 gals. (3.59 g/L) of wine
Calcium sulfate (gypsum)	To lower pH in sherry wine	The sulfate content of the finished wine shall not exceed 2.0 g/L expressed as potassium sulfate. 27 CFR 24.214. 21 CFR 184.1230 (GRAS*)
Carbon dioxide (including food grade dry ice)	To stabilize***and to preserve wine	27 CFR 24.245 21 CFR 184.1240 (GRAS*)
Casein, potassium salt of casein	To clarify wine	GRAS* per FDA opinions of 2/23/60 and 8/25/61, 27 CFR 24.243
Citric acid	To correct natural acid deficiencies in wine	27 CFR 24.182 and 24.192. 21 CFR 182.1033 (GRAS*)
	To stabilize wine other than citrus wine	The amount of citric acid shall not exceed 5.8 lbs./1000 gals. (0.7 g/L). 27 CFR 24.244. 21 CFR 182.1033 (GRAS*)

MATERIAL	USE	REFERENCE OR LIMITATION
Copper sulfate	To remove hydrogen sulfide and/or mercaptans from wine	The quantity of copper sulfate added (calculated as copper) shall not exceed 0.5 part copper per million parts of wine (0.5 mg/L) with the residual level of copper not to be in excess of 0.5 part per million (0.5 mg/L). 21 CFR 184.1261 (GRAS*)
Defoaming agents (polyoxyethylene 40 monostearate, silicone dioxide, dimethylpoly-siloxane, sorbitan monostearate, glyceryl mono-oleate and glyceryl dioleate)	To control foaming, fermentation adjunct	Defoaming agents which are 100% active may be used in amounts not exceeding 0.15 lbs./1000 gals. (0.018 g/L of wine. Defoaming agents which are 30% active may be used in amounts not exceeding 0.5 lbs./1000 gals. (0.06 g/L) of wine. Silicon dioxide shall be completely removed by filtration. The amount of silicon remaining in the wine shall not exceed 10 parts per million. 21 CFR 173.340 and 184.1505
Dimethyl dicarbonate	To sterilize and to stabilize wine, dealcoholized wine and low alcohol wine	Must meet the conditions prescribed by FDA in 21 CFR 172.133. DMDC may be added to wine, dealcoholized wine, and low alcohol wine in a cumulative amount not to exceed 200 parts per million (ppm)
Enzymatic activity  Carbohydrase (alpha-Amylase)  Carbohydrase (beta-Amylase)  Carbohydrase (Glucoamylase, Amyloglucosidase)  Catalase  Cellulase  Glucose oxidase  Pectinase  Protease general  Protease (Bromelin)	Various uses as shown below:  To convert starches to fermentable carbohydrates  To convert starches to fermentable carbohydrates  To convert starches to fermentable carbohydrates  To clarify and to stabilize wine  To clarify and to stabilize wine and to facilitate separation of the juice from the fruit  To clarify and to stabilize wine  To clarify and to stabilize wine and to facilitate separation of juice from the fruit  To reduce or to remove heat labile proteins  To reduce or to remove heat labile proteins	The enzyme preparation used shall be prepared from nontoxic and nonpathogenic microorganisms in accordance with good manufacturing practice and must be acceptable to FDA <sup>1</sup>  The amylase enzyme activity shall be derived from <i>Aspergillus niger</i> , <i>Aspergillus oryzae</i> , <i>Bacillus subtilis</i> or barley malt per FDA advisory opinion of 8/18/83 or from <i>Rhizopus oryzae</i> per 21 CFR 173.130 or from <i>Bacillus licheniformis</i> per 21 CFR 184.1027  The amylase enzyme activity shall be derived from barley malt per FDA advisory opinion dated 8/18/83  The amylase enzyme activity shall be derived from <i>Aspergillus niger</i> or <i>Aspergillus oryzae</i> per FDA advisory opinion dated 8/18/83 or from <i>Rhizopus oryzae</i> per 21 CFR 173.130 or from <i>Rhizopus niveus</i> per 21 CFR 173.110  The enzyme activity used shall be derived from <i>Aspergillus niger</i> or bovine liver per FDA advisory opinion dated 8/18/83 (GRAS*)  The enzyme activity used shall be derived from <i>Aspergillus niger</i> per FDA advisory opinion of 8/18/83 (GRAS*)  The enzyme activity used shall be derived from <i>Aspergillus niger</i> per FDA advisory opinion dated 8/18/83 (GRAS*)  The enzyme activity used shall be derived from <i>Aspergillus niger</i> or <i>Bacillus subtilis</i> per FDA advisory opinion dated 8/18/83 or from <i>Bacillus licheniformis</i> per 21 CFR 184.1027 (GRAS*)  The enzyme activity used shall be derived from <i>Ananus comosus</i> or <i>Ananus bracteatus</i> (L) per FDA advisory opinion dated 8/18/83 (GRAS*)

<b>MATERIAL</b>	<b>USE</b>	<b>REFERENCE OR LIMITATION</b>
Protease (Ficin)	To reduce or to remove heat labile proteins	The enzyme activity used shall be derived from Ficus spp. per FDA advisory opinion dated 8/18/83 (GRAS*)
Protease (Papain)	To reduce or to remove heat labile proteins	The enzyme activity used shall be derived from Carica papaya (L) per 21 CFR 184.1585 (GRAS*)
Protease (Pepsin)	To reduce or to remove heat labile proteins	The enzyme activity used shall be derived from porcine or bovine stomachs per FDA advisory opinion dated 8/18/83 (GRAS*)
Protease (Trypsin)	To reduce or to remove heat labile proteins	The enzyme activity used shall be derived from porcine or bovine pancreas per FDA advisory opinion dated 8/18/83 (GRAS*)
Urease	To reduce levels of naturally occurring urea in wine to help prevent the formation of ethyl carbamate	The urease enzyme activity shall be derived from Lactobacillus fermentum per 21 CFR 184.1924. Use is limited to not more than 200 mg/L and must be filtered prior to final packaging of the wine
Ethyl maltol	To stabilize wine	Use authorized at a maximum level of 100 mg/L in all standard wines except natural wine produced from Vitis vinifera grapes. FDA advisory opinion dated 12/1/86
Ferrocyanide compounds (sequestered complexes)	To remove trace metal from wine and to remove objectionable levels of sulfide and mercaptans from wine	No insoluble or soluble residue in excess of 1 part per million shall remain in the finished wine and the basic character of the wine shall not be changed by such treatment. GRAS* per FDA advisory opinion of 6/22/82
Ferrous sulfate	To clarify and to stabilize wine	The amount used shall not exceed 3 ozs./1000 gals. (0.022 g/L) of wine. 21 CFR 184.1315 (GRAS*)
Fumaric acid	To correct natural acid deficiencies in grape wine	The fumaric acid content of the finished wine shall not exceed 25 lbs./1000 gals. (3.0 g/L). 27 CFR 24.182 and 24.192. 21 CFR 172.350
	To stabilize wine	The fumaric acid content of the finished wine shall not exceed 25 lbs./1000 gals. (3.0 g/L). 27 CFR 24.244. 21 CFR 172.350
Gelatin (food grade)	To clarify juice or wine	(GRAS*)
Granular cork	To smooth wine	The amount used shall not exceed 10 lbs./1000 gals. of wine (1.2 g/L). GRAS* per FDA advisory opinion dated 2/25/85
Isinglass	To clarify wine	GRAS* per FDA advisory opinion dated 2/25/85
Lactic acid	To correct natural acid deficiencies in grape wine	27 CFR 24.182 and 24.192 21 CFR 184.1061 (GRAS*)
Malic acid	To correct natural acid deficiencies in juice or wine	27 CFR 24.182 and 24.192. 21 CFR 184.1069 (GRAS*)
Malo-lactic bacteria	To stabilize grape wine	Malo-lactic bacteria of the type Leuconostoc oenos may be used in treating wine. GRAS* per FDA advisory opinion dated 2/25/85
Maltol	To stabilize wine	Use authorized at a maximum level of 250 mg/L in all standard wine except natural wine produced from Vitis vinifera grapes. FDA advisory opinion dated 12/1/86
Milk (Pasteurized whole or skim)	Fining agent for white grape wine or sherry	The amount used shall not exceed 2.0 liters of pasteurized milk per 1000 liters of white grape wine or sherry (0.2 percent V/V)

<b>MATERIAL</b>	<b>USE</b>	<b>REFERENCE OR LIMITATION</b>
Nitrogen gas	To maintain pressure during filtering and bottling or canning of wine and to prevent oxidation of wine	21 CFR 184.1540 (GRAS*)
Oak chips or particles, uncharred and untreated	To smooth wine	21 CFR 172.510
Oxygen and compressed air	May be used in juice and wine	None
Polyvinyl-polypyr-rolidone (PVPP)	To clarify and to stabilize wine and to remove color from red or black wine or juice	The amount used to treat the wine, including the juice from which the wine was produced, shall not exceed 60 lbs./1000 gals. (7.19 g/L) and shall be removed during filtration. PVPP may be used in a continuous or batch process. The finished wine shall retain vinous character and shall have color of not less than 0.6 Lovibond in a one-half inch cell or not more than 95 percent transmittance per AOAC Method** 11.003-11.004 (14th Ed.). 21 CFR 173.50
Potassium bitartrate	To stabilize grape wine	The amount used shall not exceed 35 lbs./1000 gals. (4.19 g/L) of grape wine. 21 CFR 184.1077 (GRAS*)
Potassium carbonate and/or potassium bicarbonate	To reduce excess natural acidity in wine, and in juice prior to or during fermentation	The natural or fixed acids shall not be reduced below 5 parts per thousand (5 g/L). 21 CFR 184.1619 and 184.1613 (GRAS*)
Potassium citrate	pH control agent and sequestrant in treatment of citrus wines	The amount of potassium citrate shall not exceed 25 lbs./1000 gals. (3.0 g/L) of finished wine. 27 CFR 24.182. 21 CFR 182.1625 and 182.6625 (GRAS*)
Potassium meta-bisulfite	To sterilize and to preserve wine	The sulfur dioxide content of the finished wine shall not exceed the limitations prescribed in 27 CFR 4.22. 21 CFR 182.3637 (GRAS*)
Silica gel (colloidal silicon dioxide)	To clarify wine	Use shall not exceed the equivalent of 20 lbs. colloidal silicon dioxide at a 30% concentration per 1000 gals. of wine (2.4 g/L). Silicon dioxide shall be completely removed by filtration. (GRAS*)
Sorbic acid and potassium salt of sorbic acid	To sterilize and to preserve wine; to inhibit mold growth and secondary fermentation	The finished wine shall contain not more than 300 milligrams of sorbic acid per liter of wine. 21 CFR 182.3089 and 182.3640 (GRAS*)
Soy flour (defatted)	Yeast nutrient to facilitate fermentation of wine	The amount used shall not exceed 2 lbs./1000 gals. (0.24 g/L) of wine. (GRAS*)
Sulfur dioxide	To sterilize and to preserve wine	The sulfur dioxide content of the finished wine shall not exceed the limitations prescribed in 27 CFR 4.22(b)(1). 21 CFR 182.3862 (GRAS*)
Tannin	To adjust tannin content in apple juice or in apple wine  To clarify or to adjust tannin content of juice or wine (other than apple)	The residual amount of tannin shall not exceed 3.0 g/L, calculated as gallic acid equivalents (GAE). GRAS* per FDA advisory opinions dated 4/6/59 and 3/29/60. Total tannin shall not be increased by more than 150 milligrams/liter by the addition of tannic acid (polygalloylglucose)  The residual amount of tannin, calculated in gallic acid equivalents, shall not exceed 0.8 g/L in white wine and 3.0 g/L in red wine. Only tannin which does not impart color may be used in the cellar treatment of juice or wine. GRAS* per FDA advisory opinions dated 4/6/59 and 3/29/60. Total tannin shall not be increased by more than 150 milligrams/liter by the addition of tannic acid (polygalloylglucose)

MATERIAL	USE	REFERENCE OR LIMITATION
Tartaric acid	To correct natural acid deficiencies in grape juice/wine and to reduce the pH of grape juice/wine where ameliorating material is used in the production of grape wine	Use as prescribed in 27 CFR 24.182 and 24.192. 21 CFR 184.1099 (GRAS*)
Thiamine hydrochloride	Yeast nutrient to facilitate fermentation of wine	The amount used shall not exceed 0.005 lb./1000 gals. (0.6 mg/L) of wine or juice. 21 CFR 184.1875 (GRAS*)
Yeast, autolyzed	Yeast nutrient to facilitate fermentation in the production of grape or fruit wine	21 CFR 172.896 and 184.1983. GRAS* per FDA advisory opinion of 10/6/59
Yeast, cell wall/membranes of autolyzed yeast	To facilitate fermentation of juice/wine	The amount used shall not exceed 3 lbs./1000 gals. (0.36 g/L) of wine or juice. (GRAS*)

<sup>1</sup>See the explanation for this footnote in the APPROVAL OF NEW TREATING MATERIALS AND PROCESSES section of this chapter

\*GRAS - An acronym for "generally recognized as safe." The term means that the treating material has an FDA listing in 21 CFR Part 182 or Part 184 or is considered GRAS by FDA advisory opinion or by self-affirmation with no FDA objection

\*\*AOAC - Association of Official Analytical Chemists

\*\*\*To stabilize - To prevent or to retard unwanted alteration of chemical and/or physical properties

## AUTHORIZED PROCESSES

The specific processes authorized for the treatment of AMERICAN wine are detailed in the chart below

### PROCESSES AUTHORIZED FOR THE TREATMENT OF AMERICAN WINE, JUICE AND DISTILLING MATERIAL

PROCESSES	USE	REFERENCE OR LIMITATION
Elimination of sulfur dioxide by physical process	To reduce the sulfur dioxide content of juice	Use of a physical process to remove sulfur dioxide from juice must not alter the basic character of the juice so treated
Ion exchange	Various applications in the treatment of juice or wine	Anion, cation and non-ionic resins, except those anionic resins in the mineral acid state, may be used in batch or continuous column processes as total or partial treatment of wine, provided that with regard to juice or finished wine; 1) Such treatment does not alter the fruit character of the juice or wine 2) The treatment does not reduce the color of the juice or wine to less than that normally contained in such juice or wine 3) Treatment does not increase inorganic anions in the juice or wine by more than 10 mg/L 4) The treatment does not reduce the metallic cation concentration in the juice or wine to less than 300 mg/L 5) The treatment does not reduce natural or fixed acid in grape wine below 4 g/L for red table wines, 3 g/L for white table wines, 2.5 g/L for all other grape wines, 4 g/L for wine other than grape wine 6) Treatment does not reduce the pH of the juice or wine to less than pH 2.8 nor increase the

PROCESSES	USE	REFERENCE OR LIMITATION
		<p>pH to more than pH 4.5</p> <p>7) The resins used have not imparted to the juice or wine any material or characteristic (incidental to the resin treatment) which may be prohibited under any other section of the regulations in this part. The winemaker may employ conditioning and/or regenerating agents consisting of water, fruit acids common to the wine or juice being treated, and inorganic acids, salts and/or bases provided the conditioned or regenerated resin is rinsed with water until the resin and container are essentially free from unreacted (excess) conditioning or regenerating agents prior to the introduction of the juice or wine. 21 CFR 173.25</p>
Reverse osmosis*	To reduce the ethyl alcohol content of wine and to remove off flavors in wine	Permeable membranes which are selective for molecules not greater than 500 molecular weight with transmembrane pressures of 200 psi and greater. The addition of water other than that originally present prior to processing will render standard wine "other than standard." Use shall not alter vinous character
Spinning cone column*	To reduce the ethyl alcohol content of wine and to remove off flavors in wine	Use shall not alter vinous character. For standard wine, the same amount of essence must be added back to any lot of wine as was originally removed
Thermal gradient processing	To separate wine into low alcohol and high alcohol wine fractions	The fractions derived from such processing shall retain vinous character. Such treatment shall not increase the alcohol content of the high alcohol fraction to more than 24 percent by volume. The addition of water other than that originally present in the wine prior to processing will render standard wine "other than standard"
	To separate juice into low Brix and high Brix juice fractions	The low Brix fraction derived from such processing may be used in wine production. The high Brix fraction derived from such processing shall not be diluted with water for use in wine production
Thin-film evaporation under reduced pressure*	To separate wine into a low alcohol wine fraction and into a higher alcohol distillate	Use shall not alter vinous character. Water separated with alcohol during processing may be recovered by refluxing in a closed continuous system and returned to the wine. The addition of water other than that originally present in the wine prior to processing, will render standard wine "other than standard"
Ultrafiltration	To remove proteinaceous material from wine: to reduce harsh tannic material from white wine produced from white skinned grapes; to remove pink color from blanc de noir wine; to separate red wine into low color and high color wine fractions for blending purposes	Permeable membranes which are selective for molecules greater than 500 and less than 25,000 molecular weight with transmembrane pressures less than 200 psi. Use shall not alter vinous character. 21 CFR 175.300, 177.1520, 177.1550, 177.1630, 177.2440, 177.2600 and 177.2910

\*This process must be done on distilled spirits plant premises. However, reverse osmosis, under certain limited conditions, may be used on bonded winery premises if ethyl alcohol is only temporarily created within a closed system

## **APPROVAL OF NEW TREATING MATERIALS AND PROCESSES**

The specific materials currently authorized for the treatment of AMERICAN wine are detailed in the chart that follows:

- **AMERICAN WINE**

The specific materials and processes used in the treatment of AMERICAN wine must be approved by TTB prior to use. To request TTB consideration of a new material or process, an application must be filed with the Director of Industry Operations in the field division in which the bonded wine premises is located. The application must:

Show that the proposed material or process is consistent with good commercial practice

**AND**

Include all of the following:

- (1) The name and description of the material or process
- (2) The purpose, the manner and the extent to which the material or process is to be used together with any technical bulletin or other pertinent information relative to the material or process
- (3) A sample, if a proposed material
- (4) Documentary evidence of the U.S. Food and Drug Administration's (FDA) acceptance<sup>1</sup> of the material for its intended purpose in the amounts proposed for the particular treatment contemplated
- (5) The test results of any laboratory-scale pilot study conducted by the winemaker in testing the material and an evaluation of the product and of the treatment including the results of tests of the shelf life of the treated wine
- (6) A tabulation of pertinent information derived from the testing program conducted by the chemical manufacturer demonstrating the function of the material or process
- (7) A list of all chemicals used in compounding the treating material and the quantity of each component
- (8) The recommended maximum and minimum amounts, if any, of the material proposed to be used in the treatment and a statement as to the volume of water required, if any, to facilitate the addition of the material or operation of the process
- (9) Two 750 ml samples representative of the wine before and after treatment

- **IMPORTED WINE**

The specific materials and processes used in the treatment of IMPORTED wine must be:

Permissible under the laws and regulations of the country of origin

**AND**

Acceptable to the FDA<sup>1</sup> for the intended use at the stated levels

<sup>1</sup>FDA acceptance means that the material or process:

Is FDA approved under a specific regulation

**OR**

Has been affirmed as GRAS by FDA

**OR**

Has been self-affirmed as GRAS with no FDA objection

(FDA has established a self-affirmation process for certain materials and processes. While the TTB regulations do not expressly refer to the self-affirmation process, TTB will consider FDA approval to include self-affirmation where FDA has not objected to the material or process submitted)