

HI 83740

Photometer

for the Determination of Copper in Wine

**Why it is important to monitor Copper in wine**

Instability, which is initially manifested as a white haze (white wines) and later as a reddish-brown precipitate, could result from storage of bottled wine containing levels of copper above 0.5 mg/L. The precipitated casse (see table 1) develops only in the strong reducing conditions found in bottled wine. Instability can damage the quality of wine irreparably. Excessive levels of copper are toxic. Excessive levels of copper in wine may be removed or reduced by treatment of potassium ferrocyanide (blue fining, see table 2).

Significance of Use

Grapes accumulate normally only a small amount of copper by natural translocation from roots. Unless exposed to significant airborne borne pollution or vineyard sprays, increased concentrations in wine result from contamination during post fermentation processing, like contact with non stainless steel equipment and as impurities in fining agents and filter media.

The copper concentration in wine is normally low, less than 0.10 to 0.30mg/L, because excess copper is precipitated during fermentation due to adsorption onto the yeast cells. This adsorption and precipitation can reduce the initial copper concentration with 40 to 89%. At higher concentration copper plays an important role in catalyzing oxidation reactions of wine phenols.

It is important to check the copper content both in must and in wine, because at levels about 9 mg/L copper becomes a metabolic toxin that inhibits or delays alcoholic fermentation, and concentrations exceeding 1mg/L may be sensorial detected and should be avoided.

Other copper related problems can be manifested as formation of white haze (in white wines) and later as a reddish brown amorphous precipitate. This precipitated "casse" develops only under the strongly reducing conditions found in bottles wines. It has been found that this casse is a mixture of copper compounds and proteins.

HANNA's HI 83740 is an invaluable instrument to monitor this crucial parameter in the winemaking process.

ORDERING INFORMATION

HI 83740-01 (115V) and **HI 83740-02** (230V) is supplied with sample cuvetts and caps (2), reagents for 5 tests (HI 83740A-O, HI 83740B-O, HI 83740C-O, HI 83740D-O), 20 mL glass vials with caps (2), 1 mL plastic pipette (2), 3 mL plastic pipette (2), spoons (2), 12 VDC adapter, 1.5V AA batteries (4), cuvet cleaning cloth and instruction manual in a rugged carrying case.

REAGENT SETS

HI 83740-20 Copper reagent set for wine (20 tests)

HI 83742-25 Color Reagent Set for wine (Wine Solvent-1)

ACCESSORIES

HI 740027P 1.5V AA batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Glass cuvetts (4)

HI 731325W Caps for cuvetts (4)

HI 93703-50 Cuvet cleaning solution (250 mL)

HI 740231 20 mL glass cylinder with caps (2)

TABLE 1: FACTORS FAVORING COPPER CASSE

CONDITIONS FOR COPPER CASSE FORMATION	PREVENTIVE MEASURES
Strong reducing conditions	Maintain copper levels at less than 0.3 mg/L
Low ion concentrations	Limit SO ₂ addition
High protein levels	Cold-stabilize and bentonite fine to reduce proteins in white wine
Light and heat	

TABLE 2: COPPER ELIMINATION WITH POTASSIUM FERROCYANIDE TREATMENT

WINE BEFORE TREATMENT	WINE AFTER $\text{Fe}(\text{CN})_6\text{K}_4$ TREATMENT (BLUE FINING)	
IRON (MG/L)	COPPER (MG/L)	COPPER (MG/L)
20	5	0.2
10	5	0.5
5	5	1.0
2.5	5	1.5
1	5	2.0
Small traces	5	3.0

SPECIFICATIONS	HI 83740 COPPER PHOTOMETER
Range	0.00 to 1.50 mg/L
Resolution	0.05 m/L
Precision	SD ± 0.05 mg/L @ 0.50 mg/L
Light Source	Tungsten lamp with narrow band interference filter @ 560 nm
Sensor	Silicon photocell
Method	Extraction method 2.2 bichinoline
Environment	0 to 50°C; max 95% RH non-condensing
Battery Type	(4) 1.5V AA batteries/12 VDC adapter
Auto Shut-off	After 15 minutes of non-use
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17.6 oz.)