

VITIBEN®

A Processing Aid for Wine and Juice Production

Truly one of nature's gifts, wine is measured by its flavor, color, and stability. VITIBEN® — a natural bentonite clarifying agent — will help your wine taste better, look better, and last longer. VITIBEN is mined from a special vein of Wyoming bentonite, ideal for the wine and juice production industries.

VITIBEN is designed to "fine" or remove undesirable compounds from wine and juice. These compounds include phenolics, proteins, and tannins, which are present in the fruit or result from natural enzyme reaction during processing and aging. Undesirable compounds cause haze, browning reactions, off-flavors, post-bottling settling, and poor shelf life.

VITIBEN adsorbs and coagulates these undesirable substances so they can be easily filtered out during fining or clarification. Since VITIBEN is filtered out as well, it is unnecessary to list it as an ingredient on the product's label.

BENEFITS

Made of the purest bentonite, VITIBEN produces superior clarity and heat stability that fine wines deserve. Rigorous quality control and Statistical Process Control assure that each batch meets the same high standards. VITIBEN is the only premium bentonite clarification agent manufactured in an ISO 9002 registered facility.

- **Superior Dispersibility:** Save time, money, and energy with cold water dispersible VITIBEN.
- **Easier Handling:** VITIBEN's lower viscosity when dispersed results in an easy-to-handle fluid.
- **Higher Yields:** Reduced lees with VITIBEN means higher yields and lower processing costs.
- **Higher Activity:** VITIBEN has more montmorillonite (the active ingredient for fining) and more active surface area than other bentonite clarifying agents.
- **Longer Equipment Life:** Lower sand content reduces abrasion and extends the life of pumps and mixing equipment.

BENTONITE FINING OF WINE

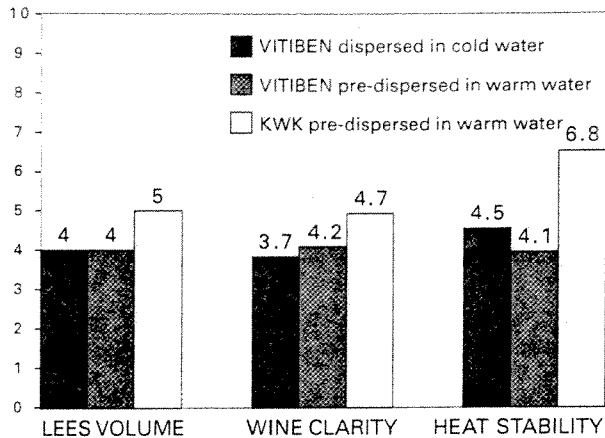
A Comparative Laboratory Evaluation

Clarifying Agents: VITIBEN® Versus KWK®*

NOTE: Lower NTU's (nephelometric turbidity units) correspond to greater clarity and stability.

DOSAGE: Dosages are expressed as pounds of clarifying agent per 1,000 gallons of wine.

Wine Type: CHARDONNAY (California)

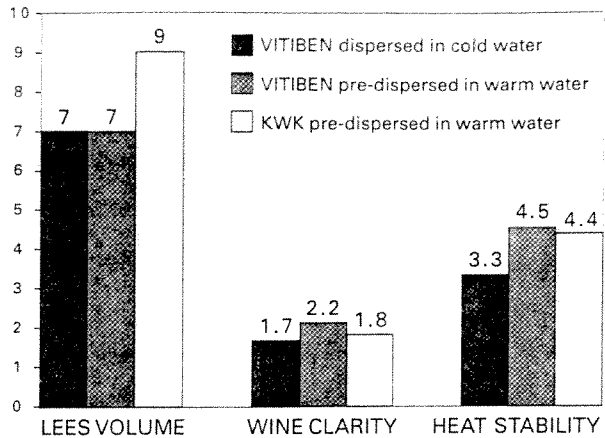


Lees Volume: Millimeters of lees in a 375-milliliter sample bottle containing 2 lbs.

Wine Clarity: At dosage of 2 lbs.

Heat Protein Stability: At dosage of 1 lb.

Wine Type: CHARDONNAY (New York)

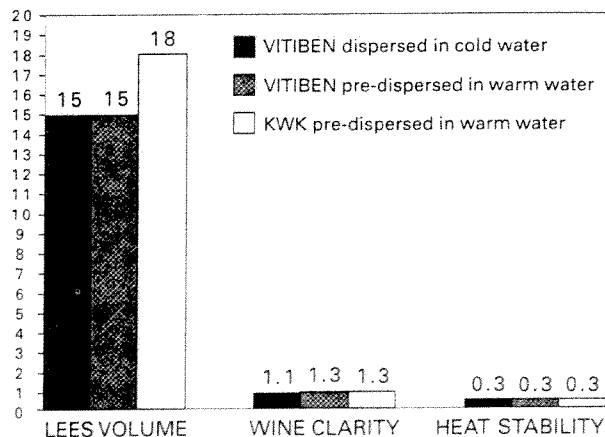


Lees Volume: Millimeters of lees in a 375-milliliter sample bottle containing 4 lbs.

Wine Clarity: At dosage of 4 lbs.

Heat Protein Stability: At dosage of 2 lbs.

Wine Type: SAUVIGNON BLANC (California)

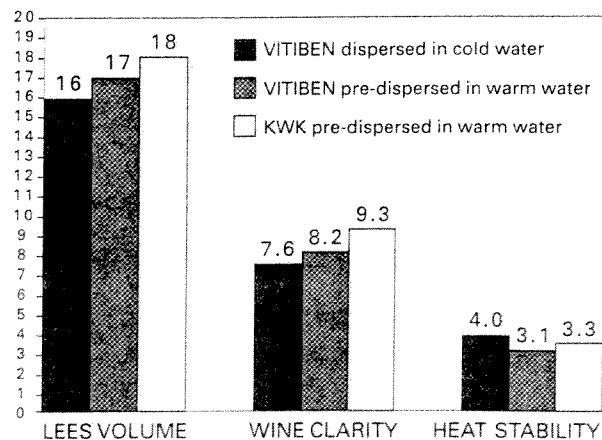


Lees Volume: Millimeters of lees in a 375-milliliter sample bottle containing 10 lbs.

Wine Clarity: At dosage of 10 lbs.

Heat Protein Stability: At dosage of 10 lbs.

Wine Type: GEWURTZTRAMINER (Washington)



Lees Volume: Millimeters of lees in a 375-milliliter sample bottle containing 12 lbs.

Wine Clarity: At dosage of 12 lbs.

Heat Protein Stability: At dosage of 8 lbs.

VITIBEN® is a registered trademark of Bentonite Performance Minerals.

KWK® is a registered trademark of American Colloid Company.

* Testing results reported in "Comparison of Bentonites in Wine" performed by The Wine Lab in Napa, California, in May 1989.

Clarifying Agents: VITIBEN® Versus KWK® and KRYSTAL KLEAR®

PURPOSE

VITIBEN®, KRYSTAL KLEAR®, and KWK® (traditional) bentonite were evaluated for their performance as processing aids in wine production, using two California white wines.*

THE WINES

Two commercial white wines of different varieties and from different growing areas of California, known to require large amounts of bentonite, were used to compare these products. One was a 1995 Sauvignon Blanc from Amador County; the other was a blended 1995 Semillon Chardonnay from the Central Coast.

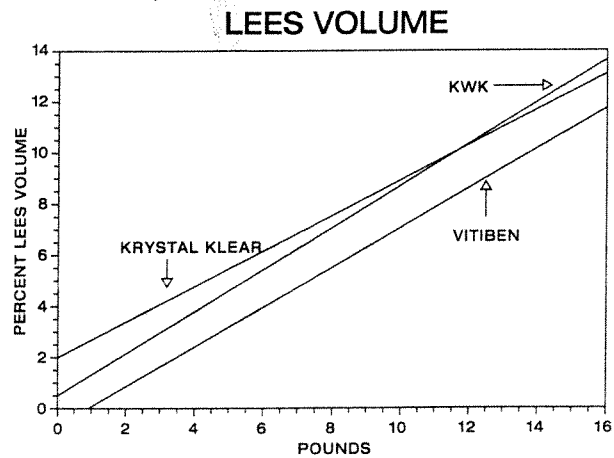
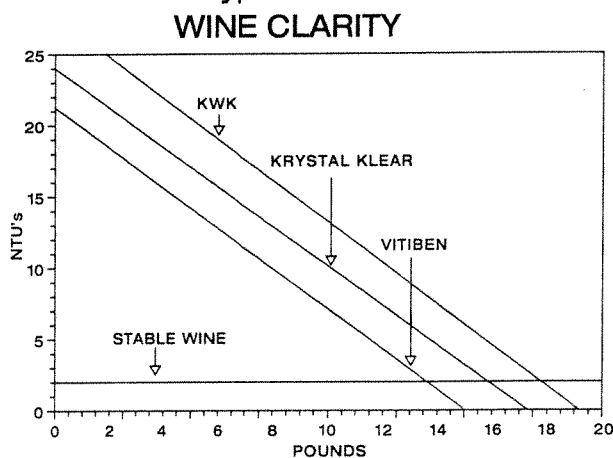
NOTE: Lower NTU's (nephelometric turbidity units) correspond to greater wine clarity and stability.

DOSAGE: Dosages are expressed as pounds of clarifying agent per 1,000 gallons of wine.

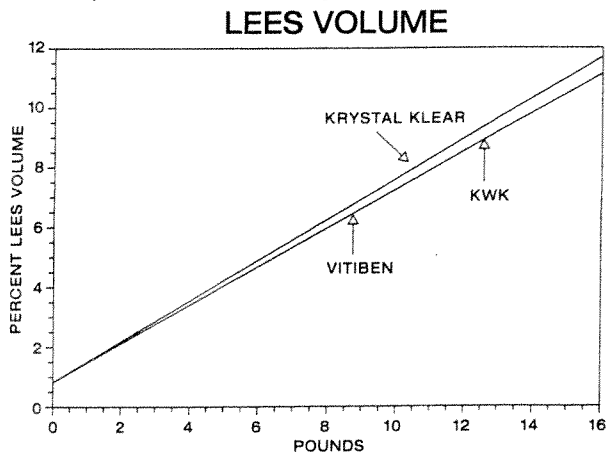
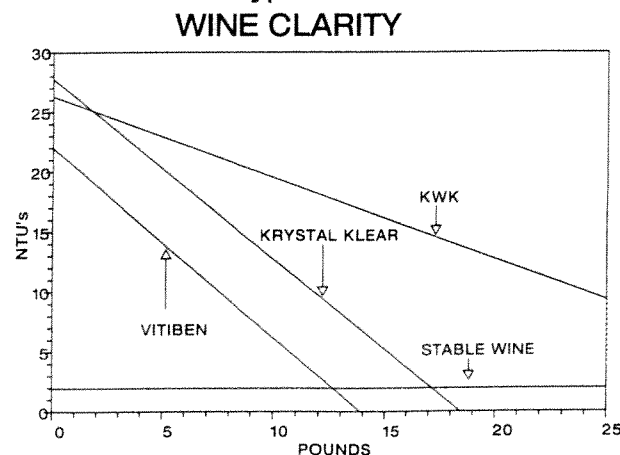
LEES VOLUME: Lees are expressed as a percent of the total wine volume.

SAMPLE PREPARATION: VITIBEN and KRYSTAL KLEAR were dispersed in cold water, KWK was pre-dispersed in hot water.

Wine Type: '95 SEMILLON CHARDONNAY (Central Coast, California)



Wine Type: '95 SAUVIGNON BLANC (Amador County, California)



RESULTS

Viscosity: VITIBEN and KRYSTAL KLEAR were less viscous than KWK and allowed more concentrated solutions to be hydrated. This means less water is needed for the same amount of bentonite fining.

Heat Stability: Pound for pound, VITIBEN was 20 to 30 percent (or more) effective in reaching the same level of heat stability. KWK was the least effective, with KRYSTAL KLEAR being intermediate.

Grit: VITIBEN had only a small amount of sand and grit and was the least abrasive. KRYSTAL KLEAR had an intermediate amount, and KWK contained the most. Sand and grit cause wear on winery equipment and increase lees losses.

Initial Chemistry

pH
Total acidity - pH titration (g/100 ml)
SO₂, Free (AO) (ppm)
SO₂, Total (AO) (ppm)
ML Fermentation (Chromatogram)
Alcohol, ebulliometer (%)
Reducing sugar, L/E (g/100 ml)
Bentonite Fining Trials - lbs. of KWK

Mixing: VITIBEN and KRYSTAL KLEAR mixed well and hydrated uniformly when mixed into cold water for one-half hour. KWK required hot water mixing, overnight soaking, and vigorous re-mixing to hydrate uniformly.

Dispersion: VITIBEN dispersed evenly into very fine clay particles with minimum mixing. This is an advantage to the cellar for uniform distribution throughout the tank.

Lees Volume: At equal dosages, lees volumes were 15 to 20 percent less using VITIBEN. Both wines showed similar trends. VITIBEN produced the least amount of lees, KRYSTAL KLEAR an intermediate amount, and KWK produced the most lees.

	Sauvignon Blanc Amador County	Semillon Chardonnay Central Coast
pH	3.75	3.67
Total acidity - pH titration (g/100 ml)	0.62	0.69
SO ₂ , Free (AO) (ppm)	11	22
SO ₂ , Total (AO) (ppm)	70	60
ML Fermentation (Chromatogram)	not started	appears completed
Alcohol, ebulliometer (%)	13.7	13.5
Reducing sugar, L/E (g/100 ml)	0.61	0.38
Bentonite Fining Trials - lbs. of KWK	>14	>12

CONCLUSION

Using VITIBEN means less wine lost in the bentonite fining process and higher yields.

VITIBEN® is a registered trademark of the Bentonite Performance Minerals.

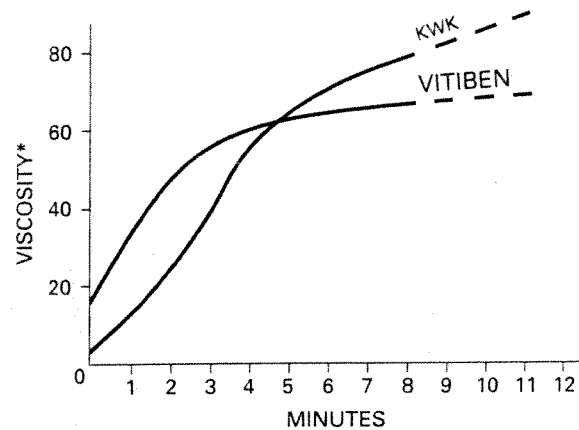
KWK® and KRYSTAL KLEAR® are registered trademarks of the American Colloid Company.

* Testing results reported in "Bentonite Comparison Study" performed by The Wine Lab in Napa, California, in June 1996.

DISPERSION CHARACTERISTICS*

VITIBEN reaches a stable viscosity more quickly than KWK. VITIBEN's lower viscosity when dispersed results in an easier-to-handle fluid.

FANN® at 600 RPM's.



CO-FINING

As a processing aid, VITIBEN is sometimes used with other fining agents like gelatin and colloidal silica to rapidly adsorb and coagulate undesirable compounds in difficult to treat wines and fruit juices. For co-fining, VITIBEN is added first as a 5% slurry. The gelatin is added next as a 5% solution, followed by colloidal silica. Starting dosages (per thousand gallons) for laboratory trials are three pounds VITIBEN, four ounces gelatin, and three pounds colloidal silica.

DOSAGE

VITIBEN is used to clarify and heat stabilize wine and fruit juice. Frequent laboratory trials are recommended to determine the amount of VITIBEN needed to prevent protein precipitation. Dosages are expressed as pounds per thousand gallons. Many wines need one pound or less, but some wines and juices require ten pounds or more.

SHIPPING, STORAGE, AND HANDLING

VITIBEN is supplied in 50-pound paper sacks. Absorption of atmospheric moisture should be avoided. After the original package is opened, it should be closed tightly. The product may be stored indefinitely, provided it is not exposed to moisture.

* Tests performed by Bentonite Performance Minerals.

FANN® is a registered trademark of Halliburton Energy Services, Inc.

PHYSICAL PROPERTIES		CHEMICAL PROPERTIES	
Moisture Content (%)	9 - 10	Chemical Analysis (%)	
Free Swell (ml)	28.0	SiO ₂	63.59
pH (6% Suspension)	9 - 10	Al ₂ O ₃	21.43
Specific Gravity	2.5	Fe ₂ O ₃	3.78
Loose Bulk Density (lbs/ft ³)	60.0	CaO	.66
DRY SCREEN ANALYSIS		MgO	2.03
Percent Passing 20-mesh	83 to 87	Na ₂ O	2.70
Percent Passing 30-mesh	29 to 33	K ₂ O	.31
Percent Passing 40-mesh	4 to 6	Bound Water	5.50
Percent Passing 140-mesh	<1		

REGULATORY INFORMATION

VITIBEN, a natural bentonite clay, is listed by the Food and Drug Administration (FDA) as Generally Recognized As Safe (GRAS) under 21CFR Part 184. VITIBEN is GRAS as a direct human food ingredient under Part 184.1155. When used as a processing aid for wine and fruit juice, VITIBEN should subsequently be removed by filtration or other acceptable methods. VITIBEN is certified as Kosher by the Scroll K.



Warranty: No guarantee, expressed or implied, is made concerning the use of Bentonite Performance Minerals products. Bentonite Performance Minerals disclaims any liability incurred in connection with the use of this data or its products. Products are sold on the basis of the user determining the suitability of Bentonite Performance Minerals products in user's products or processes.

Availability: VITIBEN® clarifying agent may be purchased from Bentonite Performance Minerals.

EXTRACTABLE TRACE METALS*

Arsenic (As)	0.01
Barium (Ba)	0.1
Cadmium (Cd)	0.01
Chromium (Cr)	0.05
Lead (Pb)	0.1
Mercury (Hg)	0.002
Selenium (Se)	0.01
Silver (Ag)	0.01

* EPA SW-846, 40 CFR Chapter 1, Appendix II to Part 261-TCLP Test Method 1311.



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