

## Vital Earth Resources

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# 2006 Crop Results

## Vitazyme on Grapes (for wine) Year Three of a Continuing Study

Researcher: John Broeker

Variety: Cabernet Sauvignon

Grafting: none (self-rooted)

Bunch thinning: yes

Soil type: loam, high-calcium subsoil, low organic matter

Experimental design: A vineyard of grapes of equal age was partially treated with Vitazyme during the growing season to evaluate effects on grape yield and winemaking quality; all other treatments were identical. Both treatments were to be evaluated for overall effects on grape and wine quality by following through the preharvest period, and on to the actual wine itself after fermentation and aging. Eventually a taste panel will evaluate the quality of the two wines after sufficient aging.

Location: San Miguel, California

Vineyard: Mondello Vineyards

Grape plant age: 6 years (third harvest)

Row spacing: 12 x 6 feet

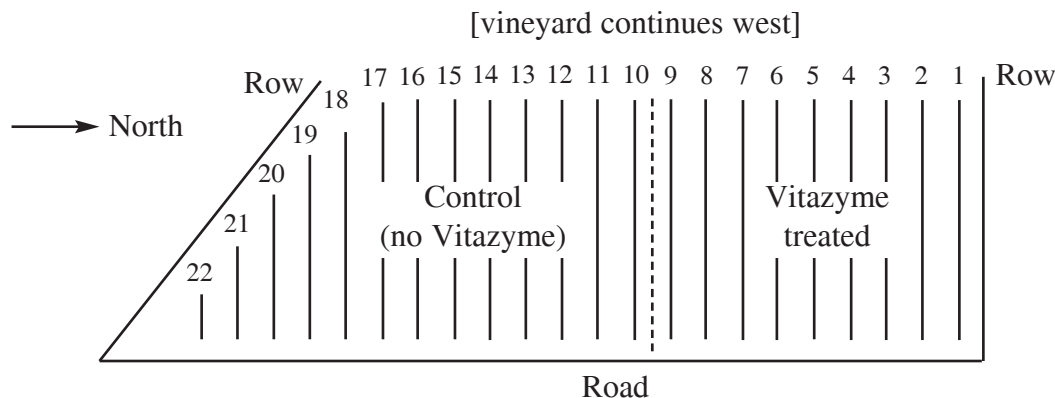
Plants/acre: 605

Yield goal: 3.5 tons/acre

Irrigation: drip

Shoot trimming: yes

Pruning: spur



Irrigation: semi-dryland system: four times of deep irrigation (18 to 20 hours of drip irrigation) from mid-June to late August

Fungicides: applied as needed

Fertilization: 200 lb/acre (NH<sub>4</sub>)<sub>2</sub> SO<sub>4</sub> broadcast in March before bud break; 9-18-9 or 3-18-18 (+ micronutrients) applied every two to three weeks at 2 to 3 gallons/acre during much of the growing season, usually with sulfur after veraison; a blue-green algae solution applied in the irrigation water periodically

Tillage: cover crop disked in

Vitazyme application: (1) 13 oz/acre with 9-18-9 fertilizer sprayed at bud break; (2) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at BB-sized fruit; (3) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at veraison; (4) 13 oz/acre 8 weeks before harvest (the end of August)

Harvest date: November 7, 2006

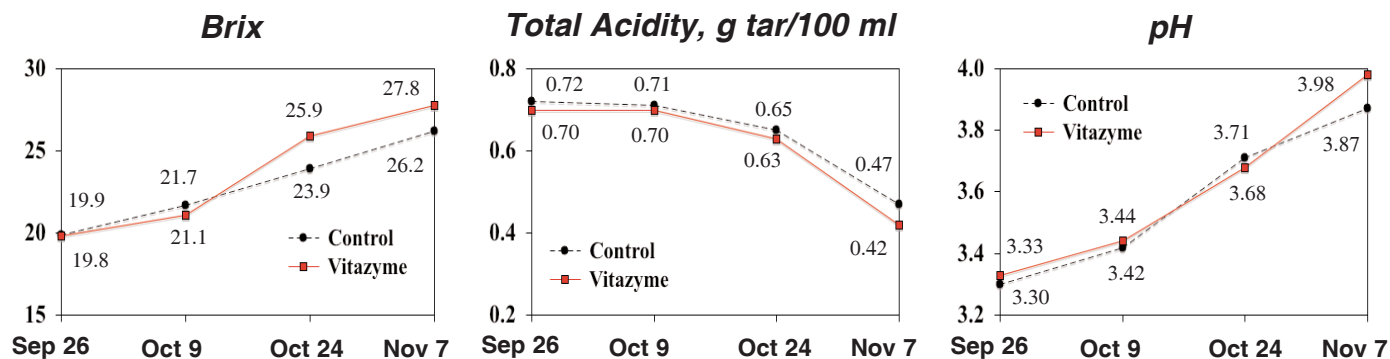
Vine growth: The researcher noted that there was considerably more leaf and vine growth for the Vitazyme treated grapes, perhaps 40% more total leaf mass than for the control plants. An analysis of canes for the plants of the two treatments revealed considerably more cane growth with Vitazyme application as well.

Leaf character at harvest: On November 7, at harvest, about 70% of the control leaves had already fallen from

the vines, whereas leaves from the Vitazyme treated plants were nearly all intact, green, and actively photosynthesizing.

**Preharvest to harvest grape and grape juice quality:** Grapes from each treatment were randomly collected at harvest. These samples were crushed, and the juice was analyzed for brix (soluble solids, mostly sugars), total acidity, and pH at Baker Wine and Grape Analysis, Paso Robles, California.

Differences in brix, total acidity, and pH throughout the season were minor. **Remarkably, the higher yield-**



**ing Vitazyme treatment did not produce grapes that were significantly lower in sugar content, but rather were higher in sugar by 1.6 points, showing the ability of the product to stimulate photosynthesis, carbon fixation, and mineral uptake to provide for the heavier grape load.**

During the testing period it was obvious which grape sample was treated: the grapes were larger and the bunches fuller. Despite minimal watering, Vitazyme enhanced water utilization and maintained grape fruit turgor pressure.

**Grape juice quality at harvest:** The grapes were harvested on November 7, 2006, and the juice was evaluated for color and chemical factors. Quality parameters were similar for both treatments.

Treatment	Color density	Color hue	Total phenolics	Anthocyanins	GF	Density	Potential alcohol
	AU	ratio	AU	ppm	grams/liter	grams/liter	%
Control	9.70	0.47	32.60	335	226	1.071	14.4
Vitazyme	11.65	0.46	37.40	385	246	0.973	15.3

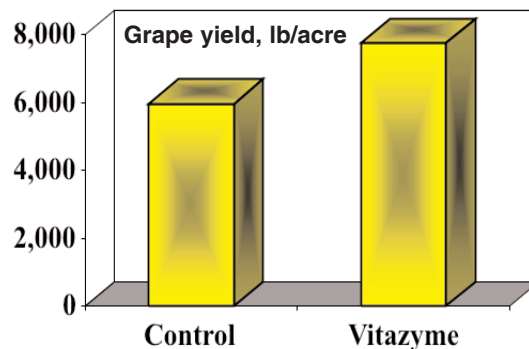
Treatment	Ammonia (NH <sub>3</sub> )	Amino acid	Yeast active nitrogen	Malic acid	Tartaric acid	Potassium
	ppm	ppm	ppm	grams/liter	grams/liter	ppm
Control	72	130	202	2.17	2.91	1502
Vitazyme	89	162	251	3.17	2.88	1664

**Yield results:** Grape yields were recorded for both treatments on the eastern end of the vineyard where soil characteristics were uniform. A border area between the treatments was avoided to remove possible product drift effects. Thinning had been performed equally on all areas, so Vitazyme effects were expressed entirely on grape and branch size.

Treatment	Grape yield per vine	Grape yield per acre*		Yield change
	lb/vine	lb/acre	tons/acre	lb/acre
Control	9.85	5,959	2.980	—
Vitazyme	12.79	7,738	3.869	1,779 (+30%)

\*Based on 605 plants per acre

**Increase in grape yield: 30%**



**Income results:** Based on a \$1,200/ton value of the grapes, the extra 1,779 lb (0.889 ton) of grapes produced \$1,066.80 more income per acre.

**Increased grape income: \$1,066.80/acre**

**Wine making:** On November 7, 2005, a half ton of grapes from both treatments was picked and crushed, and that day the winemaking process began. See the schedule below for details.

**November 7.** The grapes were destemmed and cold soaked for 48 hours. During this time tartaric acid was added to raise the acidity to 0.7.

**November 9.** Yeast was added to the destemmed grapes, as well as yeast nutrient (diammonium phosphate, yeast cell walls, and other items), and Color Pro (an enzyme material to extract more color from the skins, and stabilize the color).

**November 17.** After 8 days of fermentation, the juice was pressed from the mash. At this point there was 3% sugar left. Malic acid bacteria were added at this point to convert the malic acid to lactic acid. The fermenting wine was then placed in stainless steel barrels. Each barrel yielded 148 gallons of juice per ton of grapes.

**November 21.** After 4 more days, half of the wine from each treatment was put in an identical oak barrel; the remaining wine was retained in a stainless steel barrel.

**Conclusions for the third year:** This was the third year that Vitazyme was applied to the same grape plants in this vineyard near San Miguel, California. The Cabernet Sauvignon grapes responded very well to the product, increasing in yield by 30%, the vines also significantly increasing in length and girth. The yield increase was solely due to larger grapes in the treated area, since the bunches of both treatments were thinned the same early in the season. In spite of the higher yield, the juice brix and quality were equivalent for the two batches. These two lots of wine from the Vitazyme and control treatments will be evaluated periodically throughout the coming year for quality and taste differences.

The yields for the three years of the study are as follows:

Treatment	2004 (Yr 1)		2005 (Yr 2)		2006 (Yr 3)		Average	
	Yield	Change	Yield	Change	Yield	Change	Yield	Change
----- tons/acre -----								
Control	1.565	—	2.994	—	2.980	—	2.513	—
Vitazyme	2.287	0.722 (+46%)	3.588	0.644 (+22%)	3.869	0.889 (+30%)	3.248	0.735 (+29%)

The first three years of this Cabernet Sauvignon vineyard produced an average of 29% more grapes with Vitazyme applied three times during the growing season. With the wine from these two treatments being equivalent each year — by some opinions even favoring Vitazyme — there is every reason for the grape grower to utilize Vitazyme in his production system to greatly increase yield without decreasing wine quality.