

Vital Earth Resources

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2004 Crop Results

Vitazyme on Potatoes

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Location: Hooper, Colorado

Variety: Norkotah

Planting date: May 6, 2004

Soil: loamy sand

Row spacing: 34 inches

In-row spacing: 9, 10, and 11 inches

Previous crop: wheat

Soil test results: pH, 8.3; NO₃-N, 12 lb/acre; P, 74 units; K, 376 mg/l; S, 41 mg/l; Zn, 1.05 mg/l; Fe, 4.4 mg/l; Cu, 0.39 mg/l; Mn, 8.4 mg/l; Na, 3% of CEC; salinity hazard, low; lime hazard, high.

Experimental design: A center pivot irrigated field was divided into Vitazyme treated and untreated areas for three different in-row spacings — 9, 10, and 11 inches — to determine effects on tuber yield and tuber size.

- (1) 9-inch spacing: Control
- (2) 10-inch spacing: Control
- (3) 11-inch spacing: Control
- (4) 9-inch spacing: Vitazyme
- (5) 10-inch spacing: Vitazyme
- (6) 11-inch spacing: Vitazyme

Fertilization: 195-209-50 lb/acre of N-P₂O₅-K₂O, 78.5 lb/acre of S, 4 lb/acre of Zn

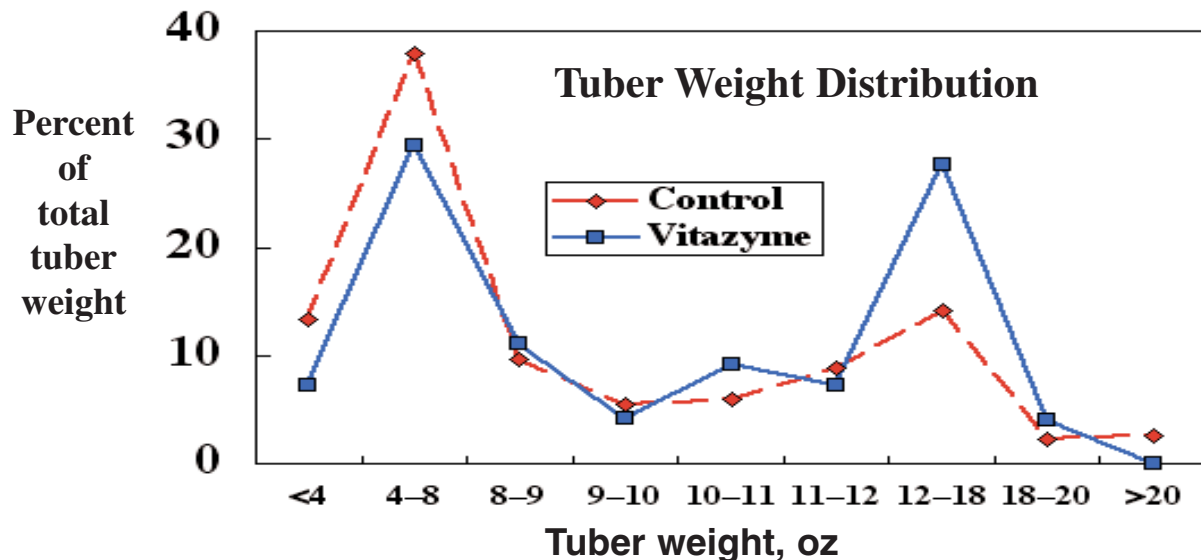
Vitazyme application: (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

Harvest date: September 25, 2004

Tuber size results: Samples were dug and weighed for each treatment, and a sack of tubers for each treatment was collected. These tubers were all weighed and recorded for later analysis, when they were arranged with-in different size units.

9-Inch Spacing

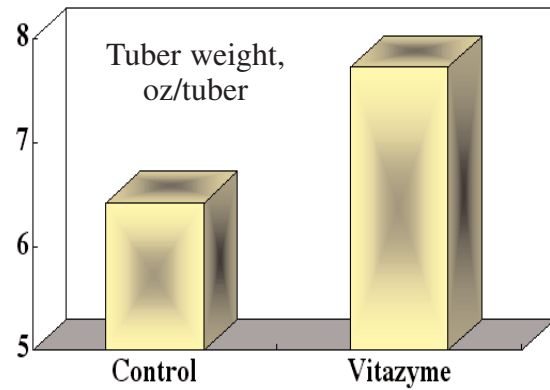
Treatment	≤4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
Control	13.3%	37.9%	9.7%	5.4%	6.0%	8.9%	14.1%	2.2%	2.6%
Vitazyme	7.3%	29.4%	11.1%	4.1%	9.1%	7.3%	27.6%	4.0%	0



Average Tuber Weight

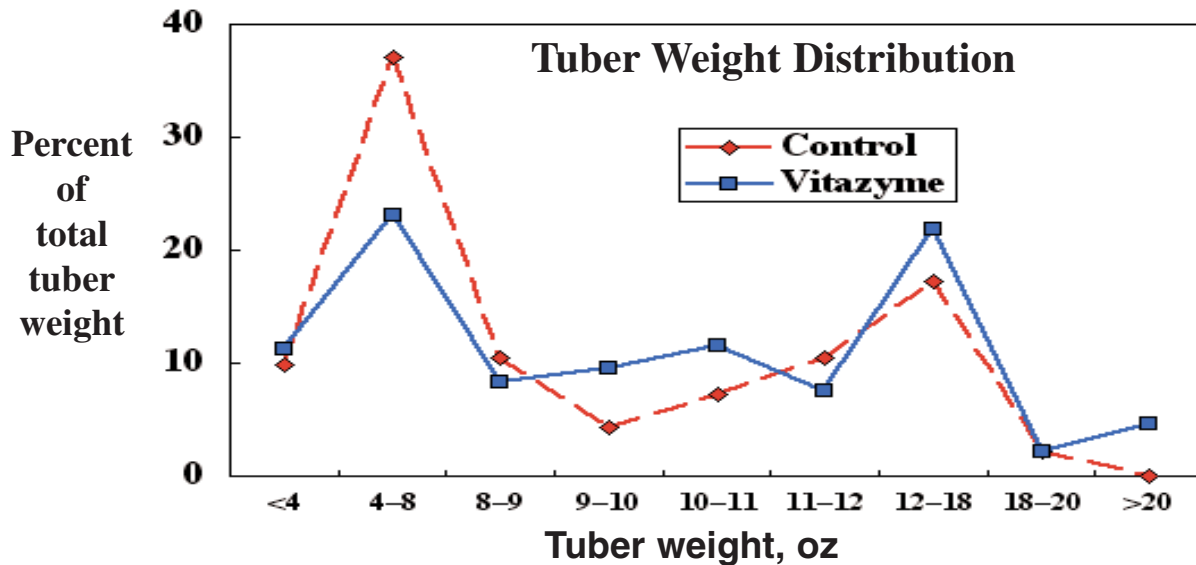
Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	6.42	—
Vitazyme	7.73	+1.31 (+ 20 %)

Increase in tuber weight: + 20%



10-Inch Spacing

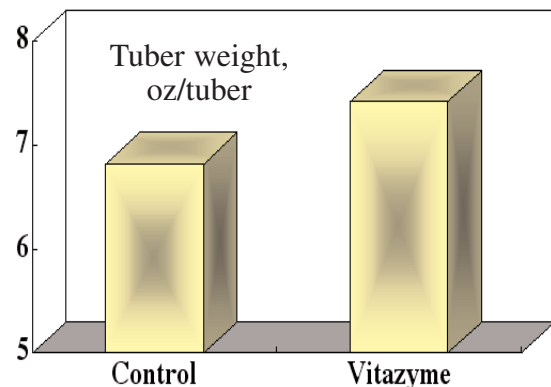
Treatment	≤4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
Control	9.9%	37.1%	10.5%	5.3%	7.2%	10.5%	17.3%	2.2%	0
Vitazyme	11.3%	23.1%	8.3%	9.5%	11.5%	7.6%	21.9%	2.2%	4.6%



Average Tuber Weight

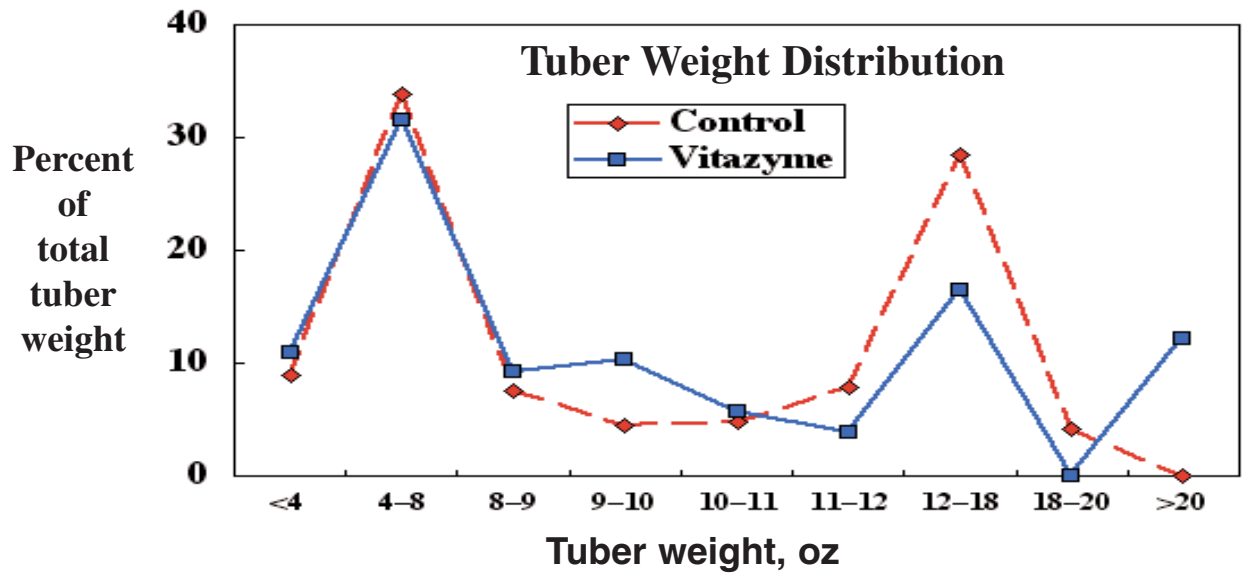
Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	6.82	—
Vitazyme	7.42	+0.60 (+ 9%)

Increase in tuber weight: + 9%



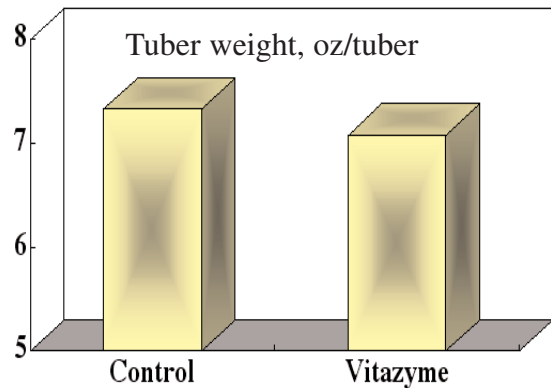
11-Inch Spacing

Treatment	<4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
Control	8.9%	33.9%	7.6%	4.4%	4.7%	7.9%	28.4%	4.2%	0
Vitazyme	10.9%	31.6%	9.3%	10.3%	5.7%	3.8%	16.4%	0	12.1%



Average Tuber Weight

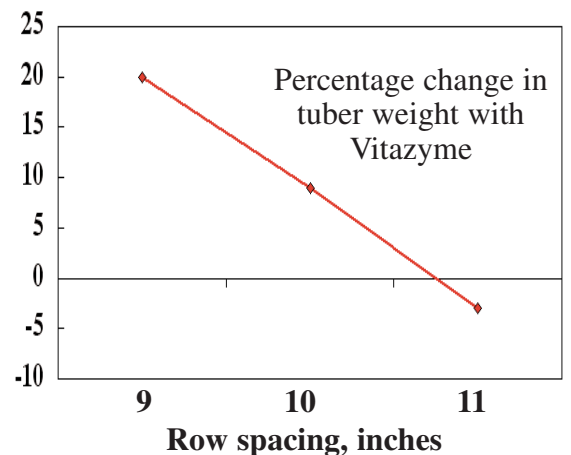
Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	7.33	—
Vitazyme	7.08	(-) 0.25 (-3%)



Increase in tuber weight: + 9%

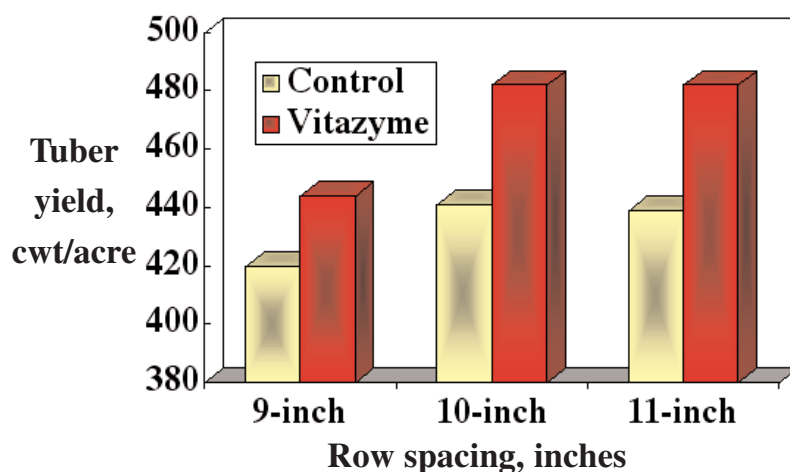
Vitazyme increased the average tuber weight by 20% at the 9-inch spacing, but by only 9% at the 10-inch spacing, while actually decreasing tuber weight slightly at the 11-inch spacing. The relationship between tuber weight change and in-row spacing is nearly straight-line, as shown in the graph. Vitazyme is shown to more effectively increase tuber weight at closer spacing intervals than at wider intervals.

At 9 and 10-inch spacings the tuber size distribution was very similar, with Vitazyme producing more tubers in the 9 to 18 ounce range than the control. At the 11-inch spacing, Vitazyme caused the growth of more 9 to 11 ounce tubers, but reduced the number of tubers on either side of that range, except for the large tubers over 20 ounces.



Yield results: Samples for each treatment were weighed and calculated to determine per acre yields.

Treatment	Tuber weight	Change
	cwt/acre	cwt/acre
9-inch spacing		
Control	420	—
Vitazyme	444	24 (+ 6%)
10-inch spacing		
Control	441	—
Vitazyme	482	41 (+9%)
11-inch spacing		
Control	439	—
Vitazyme	482	43 (+ 10%)



Yield increases at all three row spacings were consistent, ranging from 6 to 10%

Income results: Each tuber size category was weighted with the market price for that category on a percentage basis, and the size values were added to give a total value per cwt for each treatment.

Tuber Weight Increase

9-inch spacing: + 6%
10-inch spacing: + 9%
11-inch spacing: +10%

Treatment	Tuber weight	Tuber price*	Total income	Income increase
	cwt/acre	\$/cwt	\$/acre	\$/acre
9-inch spacing				
Control	420	6.42	2,696.40	—
Vitazyme	444	7.73	3,432.12	735.72
10-inch spacing				
Control	441	6.82	3,007.62	—
Vitazyme	482	7.42	3,576.42	568.80
11-inch spacing				
Control	439	7.33	3,217.87	—
Vitazyme	482	7.08	3,412.56	194.69

* Potato prices per cwt in the San Luis Valley of Colorado for November, 2004, are \$1.00 (<4oz), \$4.50 (4-8oz), \$5.51 (8-9oz), \$6.15 (9-10oz), \$6.82 (10-11oz), \$7.42 (11-12 oz), \$6.00 (12-18oz), \$2.00 (18-20oz), and \$1.00 (>20oz).

Vitazyme substantially increased potato income at all three row spacings, but especially at the 9 and 10-inch spacings. For the 9 and 10-inch spacings the tuber value was improved due to Vitazyme tuber size improvements, though such an effect was not noted for the 11-inch spacing.

Increase in potato income with Vitazyme

9-inch spacing: \$735.72/acre
10-inch spacing: \$568.80/acre
11-inch spacing: \$194.69/acre

Conclusions: In this Colorado potato trial using 9, 10, and 11-inch row spacings, Vitazyme boosted potato yields 6, 9, and 10%, respectively. These yield increases resulted in a higher value for the tubers, because of size improvements, for the 9 and 10-inch spacings, although this did not hold true for the 11-inch spacing. The increased total yield and better sizes contributed to good income increases for all three row spacings, but especially for the 9-inch spacing where an increase of \$735.72/acre was achieved.

