Hazelnut *with Vitazyme application*

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Research organization: I D Fruit, NG Asesorias, Chile, and Plant Designs, Rochester, New York, respectively
Farm cooperator: Agricola Forrahue, Chile
Trial location: Osorno, Chile
Variety: Yamhill (*Corylus avellana)*
Planting date: 2017
Planting density: 5 x 2.5 meters (800 trees/ha)
Soil type: volcanic ash (Andisol)
Experimental design: A hazelnut orchard was selected to evaluate the effect of Vitazyme biostimulant on the fruit set, productivity, nut weight, kernel yield, and empty nuts of the crop as compared to the grower's standard program and a commercial competitor product. A seaweed product was added to both biostimulant treatments. Five replicates were used with one tree as an experimental unit. These trees were selected for homogenicity by measuring the cross-sectional trunk area at 50 cm above ground level (ASTT = $C^2/4$ pi).

Hazelnut trees were selected for uniformity, these photos showing sectors 1 (left) and 2 (right).

The trees were marked for assessment of fruit set, as can been seen by this example.

❶ ***Control (Stimplex + Kelpak)***
❷ ***Stimplex + Brasstec***
❸ ***Stimplex + Vitazyme***

Fertilization: unknown

Product application:

Treatment	Product	Application rate	Application method	Phenological stage	Date of application
1	Stimplex, Kelpak	2 liters/ha, 1% of spray	foliar spray foliar spray	a. Shoots 5-10 b. 20 days c. Fruit 5-10 mm	November 6, 2024 December 2, 2024 December 12, 2024
2	Stimplex, Brasstec	2 liters/ha, 3 liters/ha	foliar spray foliar spray	a. Shoots 5-10 b. 20 days c. Fruit 5-10 mm	November 6, 2024 December 2, 2024 December 12, 2024
3	Stimplex, Vitazyme	2 liters/ha, 2 liters/ha	foliar spray foliar spray	a. Shoots 5-10 b. 20 days c. Fruit 5-10 mm	November 6, 2024 December 2, 2024 December 12, 2024

Stimplex. A liquid formulation of *Ascophyllum nodosum* kelp that claims to improve plant growth and modulate the production of plant hormones and activate metabolic pathways to increase stress tolerance, root growth, and nutrient uptake.
Kelpak. A liquid formulation of *Ecklonia maxima* kelp that claims to influence plant cell and tissue development by influencing hormonal action to improve root growth, leaf growth, seed germination and development, and crop yields.

Brasstec. A plant biostimulant containing *Ascophyllum nodosum* kelp, brassinosteroids, and various elements, carbohydrates, and amino acids.

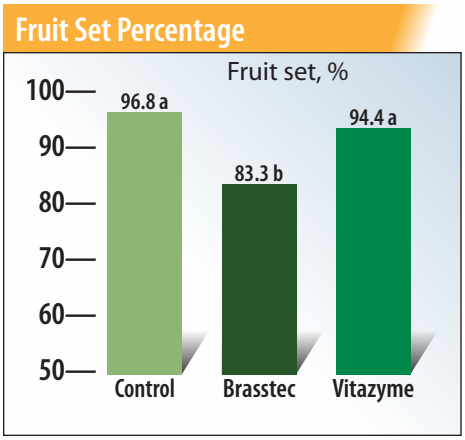
Vigor results: There were no significant differences in tree vigor before product applications, the ASTT (cm^2) values ranging from 58.5 cm^2 for the Brasstec treatment to 61.5 cm^2 for the control.

Fruit set results: Evaluations were made on December 19, 2024.

Treatment	Fruit set[1]	Fruit set change
	%	%
1. Control	96.8 a	—
2. Brasstec	83.3 b	-13.5
3. Vitazyme	94.4 a	-2.4

[1]Means followed by the same letter are not significantly different according to ANOVA; treatment P = 0.048, LSD = 10.72%.

Improvement in fruit set with Vitazyme compared to Brasstec: 11.1 percentage points

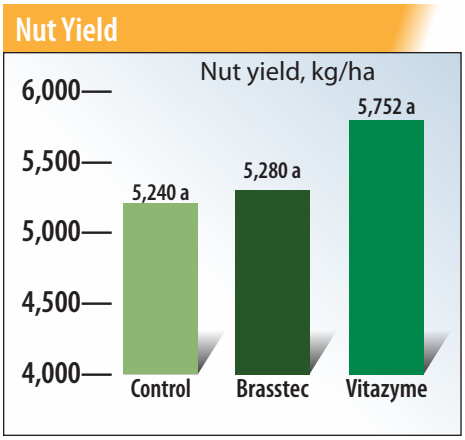


Productivity results: Nut yield was adjusted to 6% moisture.

Treatment	Nut yield[1]	Per hectare yield	Yield change
	kg/tree	kg/ha	kg/ha
1. Control	6.55 a	5,240 a	—
2. Brasstec	6.60 a	5,280 a	40 (+ 1%)
3. Vitazyme	7.19 a	5,752 a	512 (+ 10%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to ANOVA, due to high plot yield variability.

Increase in nut yield with Vitazyme: 10%



Hazelnuts, showing the cross-section.

Even though the 10% nut yield increase with Vitazyme was not significant due to tree yield variability, the increase is quite large.

Productive efficiency results: This value, expressed as kg/cm^2 ASTT, though not significant revealed a value of 0.120 compared to 1.106 for the control. This improvement suggests a better conversion of structural biomass into yield for Vitazyme.

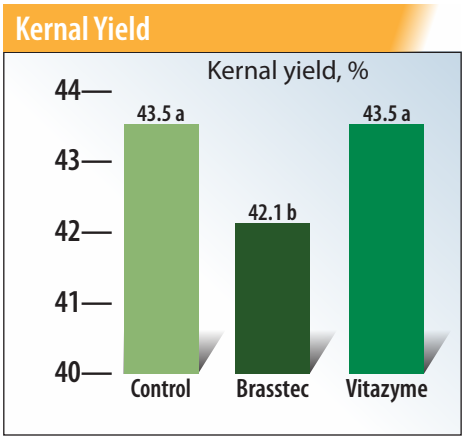
Nut weight results: The average nut weight was highest with the Vitazyme treatment — 0.84 g per nut — compared to 0.81 g per nut for both of the other treatments. These differences were not significant at P = 0.05.

Kernel yield results:

Treatment	Kernel yield[1]	Yield change
	%	%
1. Control	43.5 a	—
2. Brasstec	42.1 b	-1.4 (-3%)
3. Vitazyme	43.5 a	0

[1]Means followed by the same letter are not significantly different according to AN0VA. The Tukey P = 0.067.

Increase in kernel yield with Vitazyme compared to Brasstec: 1.4 percentage points



Empty nut results: There were no significant difference among the three treatments for empty nuts. All three were below 3%.

Conclusions: The homogeneous ASTT at trial start validates that subsequent differences are attributable to treatments rather than initial vigor. Vitazyme maintained fruit set at the level of the field program and avoided the reduction observed with Brasstec. This supports a positive effect of Vitazyme on early reproductive success (pollen tube growth, ovary cell division and retention). Although mean yield per tree did not differ statistically, Vitazyme's advantage of approximately + 500 kg/ha is agronomically meaningful at commercial scale. Productive efficiency trends corroborate better conversion of structural biomass into yield with Vitazyme. Kernel yield is a key economic driver in hazelnut. Brasstec significantly reduced kernel yield, while Vitazyme matched the field program. Empty nuts remained low and statistically similar across treatments. Overall, integrating Vitazyme within the biostimulant strategy preserved fruit set and kernel yield while improving projected yield, without detrimental effects on quality metrics.

The best overall treatment was Stimplex + Vitazyme, which gave the most consistent technical advantages across fruit set, productivity, and kernel yield. Commercial relevance: The projected yield increase with Vitazyme can materially improve gross returns at farm scale, and nut weight and kernel yield were maintained by Vitazyme in all cases.

Hazelnuts-2 *with Vitazyme application—Demonstration Trial—Nut Falling*

Researcher: Nicolas Miranda.
Research organization: Plant Designs, Rochester, New York
Location: Longavi, Maule, Chile, Agricola Pachacama Farm
Variety: European hazelnut (*Corylus avellana.*), cv. Tondadi Giffani
Planting date: 2019 ***Tree spacing:*** unknown
Soil type: unknown
Experimental design: A commercial hazelnut orchard was utilized to evaluate the effect of Vitazyme on the maturation of the nuts for the purpose of enhancing the early dropping of the nuts. Plots of six trees were selected for the treated and for the untreated treatments, without replications. The standard farm program was applied to both treatments

❶ *Control* ❷ *Vitazyme*

Fertilization: unknown
Vitazyme application: a single Vitazyme foliar spray at 1 liter/ha (13 oz/acre), using a 1,000 liter/ha spray volume, on November 29, 2024, at advanced nut filling to early maturation (BBCH 721P–722P)
Fallen nut results: Ground-fallen nuts were collected from each plot at each evaluation date and weighed; total weight per plot was recorded (g). A 100-nut subsample weight (g per 100 nuts) was recorded for some replicates as a reference for average nut weight; data were incomplete in the first collection and are considered secondary. Originally, 3-4 partial collections were planned, but the orchard was commercially harvested between the first and second evaluations; therefore, only two collections were completed.

Collection 1 was taken on March 3, 2025.
Collection 2 was taken on March 12, 2025.

This photo shows the fallen hazelnuts in the orchard of a Vitazyme study, in which the first collection of fallen nuts was increased by 15% with product application.

Treatment	Fallen nut weight, six trees[1]			
	Collection 1	Change[2]	Collection 2	Change
	kg	kg	kg	kg
1. Control	3.89 b	—	5.16 a	—
2. Vitazyme	4.47 a	0.58 (+ 15%)	5.14 a	- 0.02 (+ 0%)

[1]Means followed by the same letter are not significantly different at P = 0.05 according to ANOVA, though because the trees were not randomized and replicated according to standard statistical protocols, these differences must be treated as indicative.
[2]Main cause for the weight difference: The 100-nut weights were around 330-340 g/100 nuts (Control) and near 300 g/100 (Vitazyme). This suggests the first-collection difference in total weight was driven mainly by a higher number of nuts collected, with a potentially lower moisture level affecting individual nut weight in the Vitazyme samples

Increase in fallen nuts with Vitazyme (Collection 1): 15%

Cumulative Fallen Nut Weight (two collections)

Treatment	Nut weight	Weight change
	kg	kg
1. Control	54.34	—
2. Vitazyme	57.60	3.26 (+6%)

Increase in cumulative fallen nut weight with Vitazyme: 6%

Discussion and agronomic interpretation:

(1) Early response at the first collection: The higher fallen nut weight observed on March 3 may indicate improved nut retention and/or late-season filling in the Vitazyme sector, increasing the fraction of nuts recovered earlier.

(2) Convergence by the second collection: Similar weights on March 12 suggest the control sector caught up as the season progressed, reducing the initial gap.

(3) Practical relevance: A cumulative + 6% difference in recovered fallen nuts could be economically meaningful in commercial production; however, the magnitude cannot be robustly converted to yield per hectare without full-harvest measurements.

Limitations of the study:

(1) Evaluation was based on fallen nuts, not total harvested yield per tree/row/area.

(2) The report does not describe formal randomization and blocking; treatment sectors may differ for reasons unrelated to the product.

(3) Only two partial collections were completed due to commercial harvest between dates.

(4) 100-nut weight data were incomplete in the first collection.

Hazelnuts in Chile responded well to Vitazyme in terms of both yield and fallen nuts to expedite harvest.

Conclusions: A single foliar application of Vitazyme at advanced nut filling/early maturation (November 29, 2024) was associated with +15% higher fallen nut weight per plot in the first collection (March 3, 2025). At the second collection (March 12), fallen nut weight was similar between treatments. Across both collections, Vitazyme accumulated approximately +6% fallen nut weight than the control. Given the demonstration nature and methodological constraints ,these results should be considered preliminary and justify further trials with a randomized design, more replications, and full-yield measurements, plus quality parameters (e.g., nut size, kernel percentage, and blanks).