Seed&Field

Technical Report

Evaluation of Bio-stimulant Products on Lettuce Under Commercial Field Conditions

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Summary

A replicated field trial was conducted under commercial growing conditions in Pukekawa, Pukekohe, to assess the effect of seven bio-stimulant products on lettuce growth, yield, and overall plant health. Treatments were compared with an untreated control using a Randomized Complete Block Design with four replicates.

Three foliar applications were made during key crop growth stages, from transplant establishment through to head formation. Assessments included crop vigour, plant height, leaf number, fresh weight, marketable yield, disease incidence, and crop safety.

While some treatments produced numerical improvements in fresh weight and marketable yield, no statistically significant treatment differences were detected across the key measured parameters. Variability in plant development and transplant establishment across the trial area likely contributed to overall trial variability and reduced the ability to clearly separate treatment performance. As a result, the findings from this trial should be considered inconclusive with respect to identifying a consistently superior product. Further replicated evaluation under more uniform growing conditions is recommended to better determine treatment responses.

Trial Objective

The objective of this trial was to evaluate the influence of selected bio-stimulant products on lettuce production and crop health under commercial field conditions. The primary response measured was marketable yield, with secondary responses including plant size, vegetative growth, vigour, and crop quality.

Materials and Methods

The trial was established in a commercial lettuce crop at Pukekawa, Pukekohe, using a Randomized Complete Block Design (RCBD). The lettuce was transplanted on the 20th of November. Eight treatments, including an untreated control, were replicated four times. Individual plots measured one bed width by six metres, with buffer zones maintained between treatment plots to minimise spray overlap and border effects.

Applications were made using a calibrated CO_2 plot sprayer fitted with TeeJet 11002 AITTJ60 nozzles. Treatments were applied at transplant establishment, pre-head formation, and head formation stages.

Treatments Applied

Treatment No.	Product	Rate
1	Untreated	-
2	Bridgeway	2 L/ha
3	Status	0.25 L/ha
4	Marine	30 L/ha
5	Wuxal Amino	5 L/ha
6	Indra	1 L/ha
7	Foliacin	1 L/ha
8	Coda Mag	5 L/ha

Application Timing

Application	Date	Growth Stage
A	24 Nov 2025	Transplant
B	1 Dec 2025	Pre-head formation
C	10 Dec 2025	Head formation

Results

Crop Safety and Plant Health

No phytotoxicity symptoms were observed from any treatment throughout the duration of the trial. All products were well tolerated by the crop under the application timings and rates used. Disease pressure remained low across the site, and no significant treatment effects on infected heads were detected.

Vegetative Growth

Differences in plant height and leaf number were observed numerically between treatments; however, these differences were not statistically significant. Variation in transplant establishment and crop development across the trial site was noted and likely influenced vegetative growth measurements.

Treatment	Leaf Number (Dec-10)	Plant Height (Dec-15)
Untreated	17.5	237.5
Bridgeway	16.5	205.0
Status	16.8	217.5
Marine	16.3	212.5
Wuxal Amino	15.3	232.5
Indra	16.0	240.0
Foliacin	17.8	195.0
Coda Mag	18.0	242.5
Tukey's HSD P=.05	4.86	86.75

Fresh Weight and Marketable Yield

Numerically, some treatments recorded higher fresh weight and marketable yield than the untreated control. Wuxal Amino produced the highest final fresh weight and marketable yield, followed by Bridgeway and Coda Mag. However, no statistically significant treatment differences were detected for either final fresh weight or marketable yield.

Treatment	Fresh Weight (g)	Marketable Yield (g)
Untreated	4857.5	4607.8
Bridgeway	5349.0	5246.8
Status	4720.5	4509.3
Marine	4957.0	4794.3
Wuxal Amino	5746.8	5593.0
Indra	4576.5	4257.3
Foliacin	4940.8	4569.0
Coda Mag	5261.3	4840.3
Tukey's HSD P=.05	1326.03	1585.36

Discussion

Under the conditions of this trial, no statistically significant differences were detected between treatments for yield or biomass. While some treatments (including Wuxal Amino and Bridgeway for yield, and Coda Mag for vegetative growth) showed numerically higher values than the untreated control, these differences were not significant and should be interpreted with caution.

Variability in transplant size, early establishment, and overall plant development across the site likely contributed to increased plot-to-plot variation, reducing the ability of the trial to detect treatment effects.

As a result, it is not possible to conclusively determine from this trial which bio-stimulant product performed best. While some treatments showed promising indications, responses were not sufficiently consistent to draw firm conclusions.

Further evaluation across additional sites, seasons, and more uniform crop conditions will be important to confirm whether the observed numerical trends are repeatable and commercially meaningful.

Conclusion

This trial demonstrated that all products were safe to the crop and that several treatments produced numerical improvements in lettuce fresh weight and marketable yield. However, no statistically significant differences were observed among treatments.

Due to variability in transplant establishment and plant development across the trial area, the results should be considered inconclusive in determining a clear best-performing product. Additional replicated trials under more uniform growing conditions are recommended to better assess product performance and identify any consistent agronomic or yield benefits.

Appendix

Appendix 1 – Weather Data

Date	November			December			January		
	Max (°C)	Min (°C)	Rainfall (mm)	Max (°C)	Min (°C)	Rainfall (mm)	Max (°C)	Min (°C)	Rainfall (mm)
1	-	-	-	24.1	13.5	0	24.2	15.4	0.1
2	-	-	-	23.1	19	9.1	25.2	13.2	20.8
3	-	-	-	25.5	13.5	29.4	23.8	12.2	17.9
4	-	-	-	21.7	14.7	0	26.5	12.6	0
5	-	-	-	22.6	14.6	0	26.5	13.2	0
6	-	-	-	25	12.3	0	26.1	15.4	0
7	-	-	-	28.4	12	0	27	15.7	0
8	-	-	-	29.5	14.8	0	24.3	15.3	0
9	-	-	-	29.6	14	0	25	17.2	0
10	-	-	-	30.5	15.3	0	26.7	14.7	0
11	-	-	-	27.1	14.8	0	28.5	16.9	0
12	-	-	-	23.1	11.8	0	24.6	11.5	0
13	-	-	-	26.3	12.2	0	27.6	17.4	0
14	-	-	-	25.4	11.7	0	28	19.6	3.7
15	-	-	-	24.1	16.7	0.3	26.3	18	28.6
16	-	-	-	26.2	12.1	16.1	25.4	13.4	0
17	-	-	-	20.3	9.2	1.2	26.3	13.6	3
18	-	-	-	22.7	13.3	0.7	22	13.8	0.3
19	-	-	-	21.7	16.1	4.8	24.4	16.8	6.6
20	22.9	14.4	0	22.1	13.9	0.4	19.7	17.7	16.8
21	26	11.2	0	22.1	9.4	0	20.2	18.6	55.9
22	26	13.4	0	23.5	18.6	4	21.9	16.7	0.7
23	24.4	14	0	23.1	19.3	2.2	24.2	12.6	6.4
24	23.4	11.7	0	25.1	11.6	0.1	19.9	13	18.1
25	24.4	16.1	0	26	12.4	0	21.3	12.9	6.5
26	26.4	16.7	0	26.9	14.2	9.9	21.8	14.1	3.1
27	27.8	18.9	1.9	19.6	11.2	2	24.1	13.1	0
28	26.5	12.1	0	23	14.7	0	25.4	13.7	0
29	25.6	11.6	0	22.3	16.4	6.4	27.1	13	0
30	24	15.9	22.4	25.1	18	3.9	-	-	-
31	-	-	-	24.8	16.3	7.2	-	-	-