

# Penergetic New Zealand - Cabbage & Lettuce Trials: 2021 - 2022

This is a report on plant-growth trials of winter cabbage and lettuce conducted on behalf of Penergetic New Zealand Limited by Dr Charles N Merfield (HND Comm. Hort., M.Appl.Sci. Hons, PhD, MRSNZ) of The BHU Future Farming Centre - Permanent Agriculture and Horticulture Science and Extension [www.bhu.org.nz/future-farming-centre](http://www.bhu.org.nz/future-farming-centre)

## Introduction

This report presents the results of two field experiments that trialled Penergetic-b Soil and Penergetic-p Plant products on cabbage and lettuce crops. The trial objectives were to assess if the use of Penergetic-b Soil and Penergetic-p Plant has an impact on crop yield versus control plots.

## The Company

Penergetic International AG, based in Switzerland, formulates and manufactures a wide range of agricultural products using proprietary biostimulation technology - utilising frequencies from selected natural substances to 'inform' carrier materials making up the final products. Penergetic organic certified products are distributed to around 40 countries around the world.

## Trial Method and Design

The trials were based at the BHU Organics Trust, Lincoln University. The BHU are a certified organic property (by Organic Farm NZ), enabling the trials to be managed in accordance with organic regulations.

**Cabbage Trial:** This trial ran over winter, from 29 March to 25 October 2021. Cabbages were chosen as the test crop, as they are suitable for overwinter production (being robust and reliable performers), they are a commonly grown crop, so represent a good 'model crop' on which to test the Penergetic products.

**Lettuce Trial:** This trial ran from the 9 November 2021 to 11 February 2022. Lettuces were chosen as the test crop, as they are a widely grown summer vegetable crop in New Zealand. The lettuces were grown in the same plots as the previous overwinter cabbage trial. This simulates typical New Zealand vegetable growing practices of following a winter crop with a summer crop without a break, e.g. a cover crop or pasture, to maximise land use.

A randomised complete block (RCB) design was used with six replicates and two treatments, 1) a null control and 2) Penergetic treatments including Penergetic-b Soil and Penergetic-p Plant (Vegetable variant).

Buffer	1m	Pasture	Cabbage	Pasture	Cabbage	Pasture
Rep 1	5m		Penergetic		Control	
Buffer	1m					
Rep 2	5m		Control		Penergetic	
Buffer	1m					

Rep 3	5m		Penergetic		Control	
Buffer	1m					
Rep 4	5m		Control		Penergetic	
Buffer	1m					
Rep 5	5m		Control		Penergetic	
Buffer	1m					
Rep 6	5m		Penergetic		Control	
Buffer	1m	1.7m	1.7m	1.7m	1.7m	1.7m

Total length 37 m

Total width 8.5m

**The Cabbage and Lettuce Trials:** used the vegetable bed system on 1.70 m wheel centres, giving a bed top of 1.40 m. The plots consisted of two 37 m long beds, with each plot being 5 m long, with a one-meter grassed buffer between plots. There was an additional untreated bed between the two 37 m beds that was grassed, to also act as a buffer – buffer space minimised the effect of the Penergetic products spreading through the soil. To ensure treatment plots had the same vegetation on all sides, two more beds were cultivated on the outsides of the trial beds and were also grassed.

The process used in the plot preparation and the application of Penergetic b Soil treatment allowed 30 days between application of the Penergetic-b Soil product and the first Penergetic-p Plant product. Penergetic-b was mixed with a commercially available seed sowing mixture for the plants in the Penergetic treatment plots. The same number of seed trays were filled with untreated commercial seed sowing mixture. All trays were then sown with new commercially available seed. The seedlings were placed in the BHU twin-skinned, unheated propagation tunnel. They were watered with the automatic overhead sprinkler system until the three to four leaf growth stage.

The Penergetic Soil product was applied at 3 kg/ha, and at designated growth stages the seedlings were manually treated with 2 applications Penergetic-p at the rate of 200g/ha, one before and one after transplantation.

At seedling stage, the seedlings were transplanted with control plots planted first then Penergetic plots to minimise cross-contamination. Each 5 × 1.4 m plot bed top was marked out with four rows 30 cm apart, with 50 cm spacing down the row, planted on diagonals to give a square planting pattern / equidistant spacing.

This gave a total of 42 plants per plot. To avoid edge effects, and to further increase treatment separation, only 17 plants from the centre two rows were used for measurements, and the first and last plants at the ends of the plots were also excluded. The total number of heads and combined weight of heads per plot was recorded (the leaf beet recording was slightly different and detailed below).

### **Trial Yield Results for Penergetic vs Control**

**Cabbages + 29%:** For the fresh harvest weight, the total plot weight of the control cabbages was 3.72 kg and the Penergetic cabbages was 4.79 kg ( $p=0.011$ ,  $LSD_{5\%}=0.671$ ), being a 29% weight increase due to Penergetic treatment. The results show a clear statistically and biological significant increase in weight due to Penergetic treatment for the cabbages.



Cabbage trial: Control plot (left) **Penergetic plot (right)** on 27 September after being hand weeded.

**Lettuces + 13%:** The average weight of the control lettuces was 4.31 kg and the Penergetic treated lettuces was 4.89 kg, a 13% increase ( $p$  value of 0.082 and  $LSD_{5\%}$  of 0.669) which is significant at the 10% threshold. Due to the exceptionally wet weather in the week leading up to harvest, a total of 51 mm of rain over four days, some of the lettuces rotted off, so that the aim of harvesting 26 lettuces per plot could not be achieved, instead, the plot with the lowest number of harvestable lettuces was identified, which was 17, and then 17 lettuces were randomly harvested from the centre of every plot, and then the lettuces from each plot were weighed together.



Lettuce Trial: Control plot (left) **PENERGETIC plot (right)** on 2<sup>nd</sup> January 2022

### **Company and Product Summary:**

Penergetic International AG, based in Switzerland, formulates and manufactures a wide range of agricultural products using proprietary biostimulation technology - utilising frequencies from selected natural substances to 'inform' carrier materials making up the final products. Penergetic organic certified products are distributed globally to 40 countries. Penergetic NZ are the Distributors of the Penergetic range of Products in New Zealand. Following is a brief description of the products used in this trial.

**Penergetic-b Soil** uses biostimulation processes to boost soil activity. The sustainable product promotes humus formation and supports soil life. Activating soil life results in a change in the soil structure and soil compaction is reduced in the long term. Improved root growth helps optimize availability of nutrients in the soil for the plants.

**Penergetic-p Plant** is used as a plant tonic and as described by Penergetic has a stabilizing effect on plant growth and strengthens the immune system of plants. This reduces susceptibility to diseases and pest infestation. An additional benefit is the stimulation on microbiology in the root area and increase of the plant's natural nutrient uptake. Plants become more resistant and through that a better productivity. Penergetic-p and b products are designed to be used together, according to application/dosage instructions, and when used accordingly the effect of both Penergetic-b & Penergetic-p is optimised.