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## Broccoli Nutrient Density Results

The following data was recorded from a trial comparing standard synthetic fertiliser (S.F.) against MinRock mineralised compost (M.C.).
The trial was conducted in Gatton, Lockyer Valley, Queensland Australia. The application of the treatments and planting of the trial were conducted on the same day.

### Nutritional Analysis of Broccoli grown with Standard Fertiliser and MinRock Compost

| | Unit | S.F. | M.C. |
|---|---|---|---|
| **Water** | **g** | 89.3 | 91.8 |
| **Protein** | **kJ** | 2.02 | 2.7 |
| **Total lipid (fat)** | **g** | 0.37 | 0.39 |
| **Ash** | **g** | 0.87 | 0.91 |
| **Carbohydrate, by difference** | **g** | 5.64 | 6.62 |
| **Fiber, total dietary** | **g** | 2.6 | 3.2 |
| **Sucrose** | **g** | 0.1 | 0.41 |
| **Glucose** | **g** | 0.28 | 0.61 |
| **Fructose** | **g** | 0.68 | 0.8 |
| **Lactose** | **g** | 0.21 | 0.39 |
| **Maltose** | **g** | 0.21 | 0.29 |
| **Galactose** | **g** | 0 | 0.01 |
| **Calcium, Ca** | **g** | 39 | 50 |
| **Iron, Fe** | **mg** | 0.59 | 0.8 |
| **Magnesium, Mg** | **mg** | 18 | 22 |
| **Phosphorus, P** | **mg** | 63 | 72 |
| **Potassium, K** | **mg** | 296 | 318 |
| **Pantothenic acid (Vit B5)** | **mg** | 0.57 | 660 |
| **Total nutrient density** | | **519.44** | **1230.93** |

Note: Total Nutrient Density figures are the sum of all tested nutrient parameters

All nutritional components tested were significantly higher in the MinRock compost treatment compared to the standard fertiliser treatment, except for total lipids. The standout difference was the massive increase (115,000%) of the essential vitamin, Pantothenic acid (Vit. B5).

Pantothenic acid is a B vitamin (Vit. B5) and an essential nutrient. All humans and animals need pantothenic acid to synthesize coenzyme A, which is essential for cellular energy production and for the

synthesis and degradation of proteins, carbohydrates, and lipids. It is also important for maintaining healthy skin.

Some of the other standout increases in nutrient parameters of the MinRock compost treatment compared to the standard fertiliser treatment are;

- Fiber, total dietary – 23% increase
- Protein – 33% increase
- Carbohydrate – 17% increase
- Calcium – 28% increase
- Iron – 35% increase
- Magnesium – 22% increase
- Phosphorus – 14% increase
- Potassium – 7% increase

| | S.F | M.C. |
|---|---|---|
| **Head Weight (g)** | 437.10 | 600.00 |
| **Head Dome Width (mm)** | 105.00 | 133.40 |

There was also a significant difference in broccoli head weight and head dome width which were greater in the MinRock compost treatment compared to the standard fertiliser treatment.

**Conclusion**

Nutrient density reflects the ratio of the nutrient content to the total energy content of the food. Density is a degree of consistency measured by the quantity of mass per unit of volume—or, the proportion of one substance in relation to a whole. The concept of nutrient density, therefore, refers to the quantity of nutrients in relation to the total quantity of a particular food (usually measured by the number of calories).

Over the past 70 years we have seen major changes in the way we farm and produce food, and we have seen a drastic decline in the nutrient density of our food over this time. Most of this can be attributed to the increased use of synthetic fertilisers and chemicals (pesticides and fungicides), the reduction or omission of organic inputs and the decline of our soil health and its associated microbiome.

The results from this initial study on nutrient density of broccoli shows that we can produce nutrient dense food / produce if we are willing to change our farming methods, and in particular the inputs we are applying to our soil. The benefits can be seen by replacing the synthetic fertiliser inputs and using an organic based compost, fortified with natural rock minerals that supplies complete nutrition to not only the plants we are growing, but to the microbes in the soil. We must look at our growing systems in a holistic approach to increase yields, while achieving nutrient density. We need to consider the soil, the microbes, and the plant for this system to function fully and efficiently.

More expansive testing of other nutrient parameters will be undertaken with subsequent trials.

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