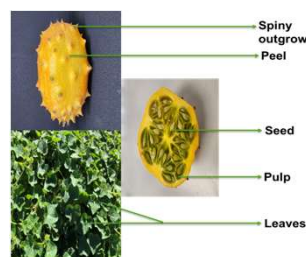


## Nutritional Composition of New Zealand Grown Kiwano Fruit: A Comprehensive Analysis

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## INTRODUCTION &amp; OBJECTIVES

- Kiwano or African horned cucumber (*Cucumis metuliferus* E. Mey. Ex. Naudin) is an exotic fruit native to Africa and grown in New Zealand since the 1980s (Bacon, 2013).
- However, kiwano is relatively unknown in the domestic markets of NZ emphasizing the need for this research to raise awareness of its nutritional value, health benefits, and potential for food development.
- Additionally, analysing different parts of kiwano is essential for identifying geographical variations in nutrient composition, ensuring a comprehensive understanding of its nutritional potential and targeted food applications.
- Thereby promoting its use and minimizing waste through the valorisation of 40% fruit rejects that KAMMI Produce experience, along with typically discarded parts.

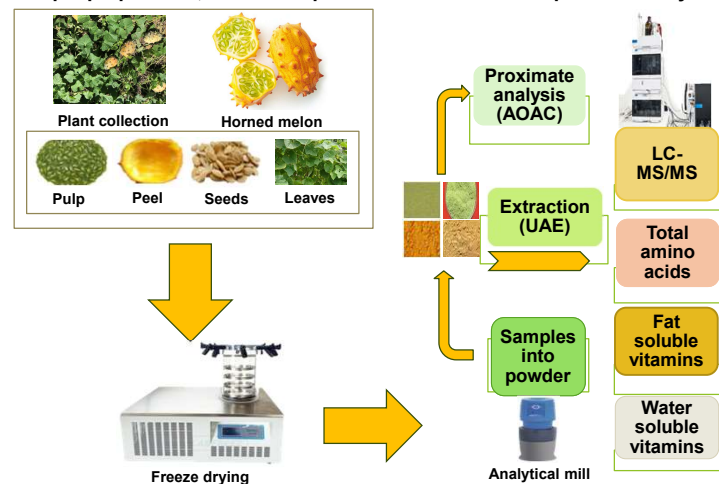


## Specific objectives

- To determine the macro- and micro-nutrients of New Zealand-grown kiwano fruit, including the pulp, seeds, peel, and leaves.
- To compare the macro- and micro-nutrients obtained from NZ-grown kiwano with that of literature and the potential health benefits.

## METHODS

## Sample preparation, nutritional profile and chemical composition analysis



## RESULTS &amp; DISCUSSIONS

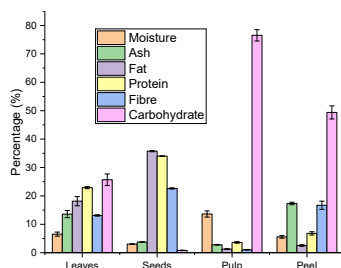
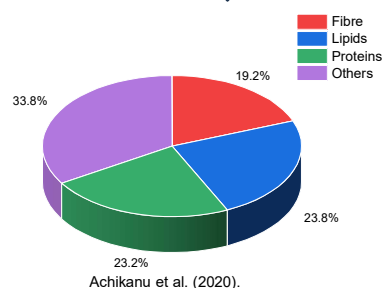


Figure 1. Proximate composition of kiwano plant parts.

## Our study VS Literature



## Main points

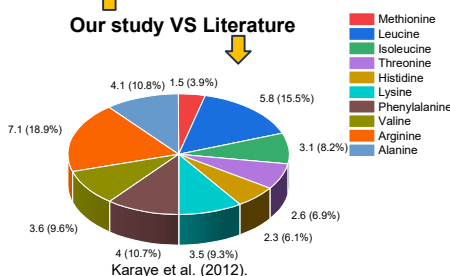
- Kiwano seeds was rich in **fat (35.75%)**, **protein (34.02%)**, and **fiber (22.63%)** indicating a high nutritional content that could contribute to human health and enhance consumer acceptance.
- Pulp has a higher value of **carbohydrate (76.54%)** and **moisture (13.63%)**.
- Peel shows higher value of **ash content (17.33%)** which serves as an indicator of the mineral composition in food.

Table 1. Amino acid contents of kiwano plant parts.

| TAA (mg/100g dw)                 | Leaves        | Seeds         | Pulp          | Peel          |
|----------------------------------|---------------|---------------|---------------|---------------|
| <b>Essential amino acids</b>     |               |               |               |               |
| Histidine                        | 17.13         | 23.23         | ND            | ND            |
| Threonine                        | 36.13         | 48.13         | 27.5          | 21.93         |
| Lysine                           | 40.03         | 55.9          | 21.13         | 17.27         |
| Methionine                       | 10.03         | 10.73         | ND            | ND            |
| Valine                           | 42.53         | 50.7          | 26.53         | 18.93         |
| Isoleucine                       | 27.37         | 41.63         | 19.37         | 17.53         |
| Leucine                          | 25.13         | 41.63         | 19.37         | 17.53         |
| Phenylalanine                    | 49.13         | 66.37         | 35.2          | 30.7          |
| Tryptophan                       | 2.63          | 8.6           | ND            | 1.63          |
| <b>Total EAA</b>                 | <b>250.11</b> | <b>346.92</b> | <b>149.1</b>  | <b>125.52</b> |
| <b>Non-essential amino acids</b> |               |               |               |               |
| Arginine                         | ND            | 32.77         | ND            | ND            |
| Serine                           | 36.9          | 41.47         | 59.7          | 23.93         |
| Glycine                          | 44.6          | 46.8          | 38.63         | 15.77         |
| Aspartic acid                    | 72.1          | 63.83         | 111.47        | 44.9          |
| Glutamic acid                    | 101.03        | 125.73        | 139.43        | 50.3          |
| Alanine                          | 44.47         | 29.53         | 20.46         | 7.43          |
| Proline                          | 37.57         | 26.5          | 51.77         | 19.47         |
| Cystine                          | 10.3          | 5.77          | ND            | ND            |
| Tyrosine                         | 29.5          | 23.3          | 41.1          | 19.03         |
| <b>Total non-EAA</b>             | <b>376.47</b> | <b>395.7</b>  | <b>462.56</b> | <b>180.83</b> |

ND: Not detected. Dark red indicate higher values and dark green indicate lower values.

## Our study VS Literature



## Main points

- Histidine, methionine, isoleucine, leucine, and phenylalanine were higher in leaves and seeds.
- Threonine, lysine, and tryptophan were only high in seeds.
- Increase in essential amino acids in seeds suggest higher protein synthesis and various bodily functions (metabolism, hormone production, etc.).

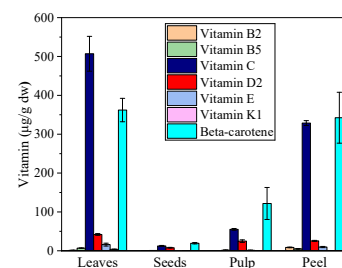
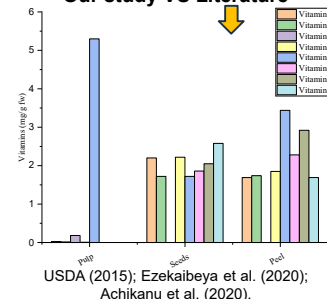


Figure 2. Vitamin analysis of kiwano plant parts (vitamin B2, B5, E, and K1 not obviously shown).

## Our study VS Literature



## Main points

- Vitamins B5, C, D2, E, and K1 were relatively high in the leaves.
- Beta-carotene was high in both the leaves and peel.
- Vitamin C and E play a synergistic role as antioxidants in improving the immune system.
- Beta-carotene which is a key dietary source of vitamin A contributes to disease resistance, delay aging, and supports the health of eyes.
- Furthermore, the leaves and peel could serve as promising sources of natural food colourants.

## CONCLUSION

Overall, New Zealand grown kiwano have higher fat, protein, fibre, and essential amino acids than reports from Nigeria and other regions, highlighting its potential for functional food development and the need for further regional comparisons.

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## FUTURE RESEARCH

Further research is needed to examine the seasonal impact on the nutritional profile and chemical composition of the kiwano plant, as well as the potential food applications of its non-edible part.

## ACKNOWLEDGEMENTS

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