



## Development of the iOTA Model<sup>®</sup>; a dietary optimisation tool for assessing nutrient adequacy, environmental impact and acceptability of diets in New Zealand

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Based on the World Health Organization's definition<sup>(1)</sup>, sustainable healthy diets are “dietary patterns that promote all dimensions of an individuals' health and well-being; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable”. Over the past decade, there has been an increasing interest in the environmental sustainability of diets, but little attention has been paid to the nutrient adequacy, consumer acceptability and affordability of such diets. Such knowledge is particularly scarce in New Zealand where approximately 40% of adults and 20% of children may live under severe to moderate food insecurity<sup>(2,3)</sup>. The iOTA Model<sup>®</sup> is a dietary optimisation tool designed to fill this gap by bringing the various aspects of diet sustainability together and providing evidence-based knowledge on not just the environmental impact of food but also its economic and nutritional sustainability at a national level. The iOTA Model<sup>®</sup> was constructed using mixed integer linear programming by integrating New Zealand-specific dietary data. This underlying data was obtained from various open-access sources including but not limited to New Zealand's Food Composition Database, New Zealand Total Diet Study and the nutrient reference values published by the Ministry of Health. Diet-related greenhouse gas emissions were also incorporated into the model based on the data obtained from the scientific literature. Results derived from the preliminary development of the iOTA Model<sup>®</sup> suggest that meeting nutrient adequacy is possible with minimal dietary pattern changes in New Zealand. It is also evident that adhering to dietary guidelines may provide 26% reduction in dietary greenhouse gas emissions. This is consistent with the findings of previous studies showing that following dietary guidelines alone assists reduction of dietary greenhouse gas emissions. Further features such as digestibility and bioavailability considerations have also been incorporated as part of the iOTA Model<sup>®</sup>, allowing for a more accurate estimation of nutrient supply. The model will be available as an open-access tool and will allow users to explore various sustainability implications of their diet.

**Keywords:** dietary optimisation; sustainable diets; diet modelling; environmental footprint

### Ethics Declaration

No

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### References

1. WHO & FAO (2019) Sustainable healthy diets: guiding principles. FAO; WHO.
2. University of Otago & Ministry of Health (2011) A Focus on Nutrition: Key findings of the 2008/09 New Zealand Adult Nutrition Survey. Wellington, Ministry of Health.