




Abstract

Climate-Friendly, Health-Promoting, and Culturally Acceptable Diets for Belgian Adult Omnivores, Pescatarians, Vegetarians, and Vegans [†]

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[†] Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

Abstract: Background and aim: Many countries have committed themselves to substantially reducing greenhouse gas emissions (GHGEs) to address climate change. Due to the large share of emissions coming from food production, shifting to a more plant-based diet is desirable, but an uncontrolled shift may compromise its nutritional adequacy and health-promoting properties. This study aimed to develop a climate-friendly, nutritionally adequate, health-promoting, and culturally acceptable food basket for 18–29-year-old Belgian adult omnivores, pescatarians, vegetarians, and vegans. Methods: A database was created, including 418 foods from Belgian supermarkets, with each item's price, nutritional composition, GHGE values, and the observed intake values from national dietary surveys were included. Linear programming was applied using the least deviation from the observed intake for each food group as the goal function. Dietary recommended values of the Superior Health Council of Belgium and the maximum desired GHGEs, as suggested by the Intergovernmental Panel on Climate Change (1.6 kg CO₂eq/day), were applied as constraints. For the omnivores, the optimized diets matched the Belgian food-based dietary guidelines. Results: The observed diets did not meet the Belgian dietary recommendations on some nutrients. Though reducing the GHGEs, solely switching to a nutritionally adequate diet was not sufficient to bring the GHGEs below the daily threshold value of 1.6 kg CO₂eq. For all dietary patterns, it was possible to calculate a culturally acceptable and nutritionally adequate diet, meeting the desired GHGE limit. Compared to the observed diet, the climate-friendly omnivorous diet contained less red meat, dairy products, and sweetened beverages but more bread, vegetables, and fruits. Conclusion: The optimized diets may support sustainable nutrition by providing nutritionally adequate food choices that can sustain people's physical well-being. There is a strong need for people to switch towards a more plant-based diet without the necessity to omit all animal-based products.

Keywords: linear programming; nutritional adequacy; cultural acceptability; sustainability; greenhouse gas emission; food basket; Belgium



Citation: Parlesak, A.; Reis, K.; Masino, T.; Eustachio Colombo, P.; Tetens, I. Climate-Friendly, Health-Promoting, and Culturally Acceptable Diets for Belgian Adult Omnivores, Pescatarians, Vegetarians, and Vegans. *Proceedings* **2023**, *91*, 3. <https://doi.org/10.3390/proceedings2023091003>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 13 November 2023



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Author Contributions: Conceptualization, K.R., T.M., A.P. and P.E.C.; methodology, A.P. and P.E.C.; validation, A.P., P.E.C. and I.T.; formal analysis, K.R. and A.P.; investigation, K.R. and A.P.; resources, K.R.; data curation, A.P.; writing—original draft preparation, K.R.; writing—review and editing, A.P., P.E.C., T.M. and I.T.; visualization, K.R. and A.P.; supervision, A.P.; All authors have read and agreed to the published version of the manuscript.

Funding: This project did not receive any specific funding.

Institutional Review Board Statement: Does not apply.

Informed Consent Statement: Does not apply.

Data Availability Statement: Data can be provided upon justified research interest.

Conflicts of Interest: The authors declare no conflict of interest.

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