Final Report (2021-78)

Title: Healthier or not? A closer look at the diet quality of plant-based diets and associations with health status.
Funding Period: 01.06.2022 – 31.05.2025
Lead Institution: Bern University of Applied Sciences, Switzerland
Principal Investigator: Prof. Dr. Leonie-Helen Bogl, Email: leonie-helen.bogl@bfh.ch

1. Executive Summary

This three-year research project focused on the development and validation of tools to assess the quality of plant-based diets and examine their associations with health outcomes. As plant-based diets including vegan and vegetarian diets are becoming increasingly popular across Europe, it is critical to distinguish between healthy and unhealthy plant-based dietary patterns and understand their nutritional adequacy and health implications.

We addressed this challenge by creating two novel scoring systems:

- A Vegan Diet Quality Score (DQS-V) specifically tailored to the Swiss context, developed using detailed three-day weighed food records from 52 healthy vegan adults, and the development of Swiss nutrition guidelines for vegans.
- A Plant-Based Diet Propensity (PBDP) score for use in large-scale epidemiological datasets (based on over 15,000 children, adolescents, and adults from the I.Family cohort across Europe). This score quantifies how closely an individual's diet aligns with healthy or unhealthy plant-based patterns.

Key findings include:

- Healthy plant-based diets (rich in wholegrains, legumes, vegetables, and nuts) were associated with higher intakes of fiber and key micronutrients, as well as more favorable anthropometric and metabolic health indicators, such as higher HDL cholesterol, improved bone stiffness and lower triglycerides.
- Unhealthy plant-based diets (high in refined grains, sweets, and processed plant foods) were associated with lower nutritional quality and biomarkers indicative of poorer health status, including lower HDL cholesterol in adults.
- In the Swiss study, the DQS-V correlated positively with markers of diet quality (e.g., fiber, PUFA, potassium) and inversely with intakes of less desirable foods and lower vitamin status, particularly beta-carotene and vitamin C.
- Dietary pattern analysis identified two patterns. The healthier pattern included high intake of green leafy vegetables, whole grains, oils, nuts, and seeds. The less healthy pattern featured high consumption of refined grains, white bread, legumes, snacks, sugary drinks, tea, and coffee, with low fruit intake. The healthier pattern showed no significant link to serum biomarkers, while the less healthy pattern was associated with lower blood levels of beta-carotene and vitamin C.

These results validate the utility of both scoring systems for distinguishing plant-based diet quality. The PBDP score is a practical tool for nutritional epidemiology in diverse populations, while the DQS-V offers a precise measure of vegan diet quality and can support clinical and public health guidance.

We further developed the first Swiss dietary guidelines for vegans, now published in English language:

Fig. 1 Swiss dietary recommendations for vegans – The vegan food pyramid

2. Discussion and Interpretation

Data from almost 16,000 people from eight European countries, including children, adolescents and adults, was analysed. This study shows that a plant-based diet is not automatically healthy. People who mainly eat highly processed plant-based foods (e.g. white bread, sweets) do not benefit their health. Only a balanced plant-based diet with plenty of vegetables, fruit and wholemeal products brings benefits, for example better cholesterol levels and healthier bones. This project highlights the importance of distinguishing between healthy and less healthy plant-based eating patterns and provides practical tools to do so.

3. Publications and Dissemination

This 3-year project has resulted in the following two high-quality peer-reviewed journal articles:

- **Development and Validation of Healthy and Unhealthy Plant-Based Diet Propensity Scores in European Children, Adolescents and Adults From the I.Family Study** *Published in the Journal of Human Nutrition and Dietetics (2025)* DOI: 10.1111/jhn.70021
  This paper describes the development of a novel, continuous index to characterize healthy and unhealthy plant-based diet patterns and investigates their association with health indicators.

- **Development of a diet quality score and adherence to the Swiss dietary recommendations for vegans** *Published in the Journal of Health Population Nutrition (2024). DOI: 10.1186/s41043-024-00498-3*
  This study presents the DQS-V, a scoring tool for evaluating vegan diet quality, and demonstrates its correlation with dietary intake and biomarker status.

The results have been additionally disseminated at the Swiss Society for Nutrition (SGE) Conference 2024 in Switzerland and the ECO Conference 2025 in Málaga, and have also been shared through our project website: Healthier or not? A closer look at the quality of plant-based diets

A major outcome of the project is the first Swiss scientific publication proposing evidence-based recommendations for vegan diets, which is a milestone, as such national guidance is still lacking in most countries: Schweizer Ernährungsempfehlungen für Veganer*innen | BFH Berner Fachhochschule

4. Future Directions

Broader validation will involve testing the DQS-V in larger and more diverse vegan populations, including adolescents, older adults, and individuals with chronic conditions. Additionally, these diet quality scores may be integrated into digital tools such as interactive web-based apps or screeners to support self-assessment, public health initiatives, and clinical counselling. Future research will also explore prospective links between these diet patterns and long-term health outcomes, including cardiometabolic disease risk. Given their design, these tools are well suited for cross-national comparisons and may facilitate harmonized dietary surveillance across European countries.

The healthy and unhealthy plant-based diet scores, along with the newly developed Diet Quality Score for Vegans (DQS-V) will therefore be further validated and tested in large European datasets EUROPEAN PROJECT: VeganScreener - VEGANScreener, including the extensive VEGANScreener VEGANScreener | BFH Berner Fachhochschule dataset. This funding from the Ekhagatiftelsen and will be mentioned in at least two more upcoming publications.