

Application of the Automated Self-Administered 24-Hour (ASA24) Dietary Assessment Tool's New Carbon Footprint Dataset

Erika Faust,¹ Amelia Willits-Smith,² Donald Rose,² Lisa Kahle³ and Kirsten Herrick,⁴

¹National Institutes of Health; ²School of Public Health and Tropical Medicine, Tulane University; ³Information Management Services, Inc. and ⁴National Cancer Institute

Objectives: Increasing concern about the environmental impacts of food production has motivated the development of a new dataset of food-related greenhouse gas emissions (GHGE). The dataset integrates with the Automated Self-Administered (ASA24) Dietary Assessment Tool, a popular web-based tool used by researchers. This paper aims to demonstrate the utility of this dataset by assessing the GHGE, or carbon footprint, of a menu from a consumer education program.

Methods: Three days of a sample menu (breakfast, lunch, dinner, and snack) from the University of New Hampshire's Extension program were entered into ASA24. The menu was based on a balanced food pattern with a range of protein sources, including meat and fish. The database of Food Recall Impacts on the Environment for Nutrition and Dietary Studies (dataFRIENDS) was linked, by food code, with the ASA24-2020 items output file. Matches were found for all items

except eight spices. Total calories and CO₂ equivalents were calculated by meal and day, based on the weight of each food item. Healthy Eating Index (HEI) total and component scores were estimated for each day. Documentation of the development of GHGE data for ASA24 foods and how to use them will be located on NCI's ASA24 website.

Results: For the three days, total kcal were 1612, 2168, and 1666, and dietary GHGE were 2.2, 3.4, and 3.2 kg CO₂-eq. The third day included two types of meat: ground beef, which contributed 40.7% of that day's carbon footprint; and a turkey patty, which contributed 3.4%. HEI scores for the three days were 94.0, 83.3, and 89.0, varying inversely with dietary GHGE. The day with the largest carbon footprint had the highest total protein component score, yet the lowest seafood and plant protein score. The opposite was true for the day with the smallest carbon footprint.

Conclusions: This paper demonstrates the application of dataFRIENDS, a new resource for ASA24 users to examine dietary carbon footprints and inform the literature on the environmental impact of food choices. The database can be used to examine menus and dietary intake data, and to compare dietary GHGE with diet quality metrics, which may affect individual food choices. Further analyses can provide context for policies regarding sustainability for federal dietary guidance.

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