The Importance of Analyzing Industry Fats for Nutrient Database Development

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OBJECTIVE

To examine fatty acid profiles estimated by available food composition data and analyzed oils and fats.

BACKGROUND

- The Harvard School of Public Health nutrient database is developed using analyzed data as well as the USDA National Nutrient Database for Standard References.
- Every four years Harvard’s nutrient databases are updated in order to support the development of year specific food frequency questionnaires used in the Nurses’ Health Studies, the Health Professional Follow-Up Study, and the Growing Up Today Study.
- Current market share and label ingredient information is collected in order to update the nutrients for food items on the questionnaires, distributed to the cohorts.
- 41 samples were analyzed for fatty acid profiles which included foods, oils, and margarines at a cost of $6,765.00.
- Recipe development, utilizing label ingredients, is one way to derive nutrient values for the databases when sources such as USDA or publications do not provide necessary information.
- One ongoing issue with database development is obtaining accurate, constantly changing fatty acid profiles to represent current industry shortenings and oils found as ingredients on manufacturer’s labels for foods.

DESCRIPTION

- A list of ingredient fats were compiled from the food labels used to develop food profiles for the 2010/2011 Harvard database.
- The USDA Nutrient Database (Standard Release 24) was then consulted to determine if the fats listed as label ingredients were maintained in the current USDA database.
- Sixteen oils and shortenings listed as label ingredients were not maintained by USDA. Five oils and one shortening were successfully obtained from manufacturers. Fatty acid analysis was completed by the Harvard University Biomarker Laboratory, using gas liquid chromatography.
- A test biscuit recipe was developed using newly analyzed oils (partially hydrogenated soybean and cottonseed oil, partially hydrogenated soybean oil, partially hydrogenated palm kernel oil) according to label ingredient fats, based on top market share brands.
- Results were compared to recipe derived values, using the closest match from USDA Standard Release 24, Shortening Special Purpose for Baking (soybean (hydrogenated), palm and cottonseed (NDB # 04587).

RESULTS

- 26 of 32 food profiles analyzed for fatty acids had at least one analyzed partially hydrogenated oil as an ingredient.
- 7 foods primarily contain the newly analyzed fats. Biscuit recipe example shows significant improvement. Analyzed saturated, monounsaturated, and polyunsaturated values for biscuit match within 95%-99%.
- 13 foods contain a mix of unavailable and analyzed oils.
- 6 foods contain only unavailable oils.
- As per oil descriptions on the USDA Food Composition Database, USDA does not maintain all oil blend combinations currently found on manufacturer’s labels, such as those containing partially hydrogenated coconut oil, partially hydrogenated cottonseed oil, or partially hydrogenated canola oil.

CONCLUSIONS

- Manufacturers are continually changing oil and shortening blends in their food products by incorporating partially hydrogenated and fully hydrogenated fats in varying combinations.
- Recipe for biscuit, using USDA Shortening values, did not accurately reflect fatty acid values of analyzed biscuit.
- Lack of available USDA or published fatty acid data and analytical costs necessitates the need to derive fatty acid profiles for many foods using recipes.
- Accurate individual partially hydrogenated and hydrogenated oils and blends must be maintained in nutrient databases to better match label ingredients and improve accuracy of fatty acid recipe calculations.
- More collaboration with industry is needed to accurately represent the fatty acid profiles of ingredient oils and shortenings.

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