

USDA FDC Food Component Analysis

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Background

- The United States Department of Agriculture (USDA) analyzes foods to determine their nutrient content.
- Analyzing the complete set of nutrients for specific foods can cost upwards of \$50,000.
- To become more cost-efficient, the USDA would like to gain a better understanding of which nutrients and components change over time and which do not. This way, they can assess what needs to be analyzed and what does not.
- Given two datasets: SR Legacy and Foundation Foods
- The SR Legacy dataset is a pre-2019 list of food nutrient content values (mean, min, max, and standard error).
- The Foundation Foods dataset is the most current list of food nutrient content values (mean, min, max, and standard error).

Have food components changed over time?
If so, how & why?

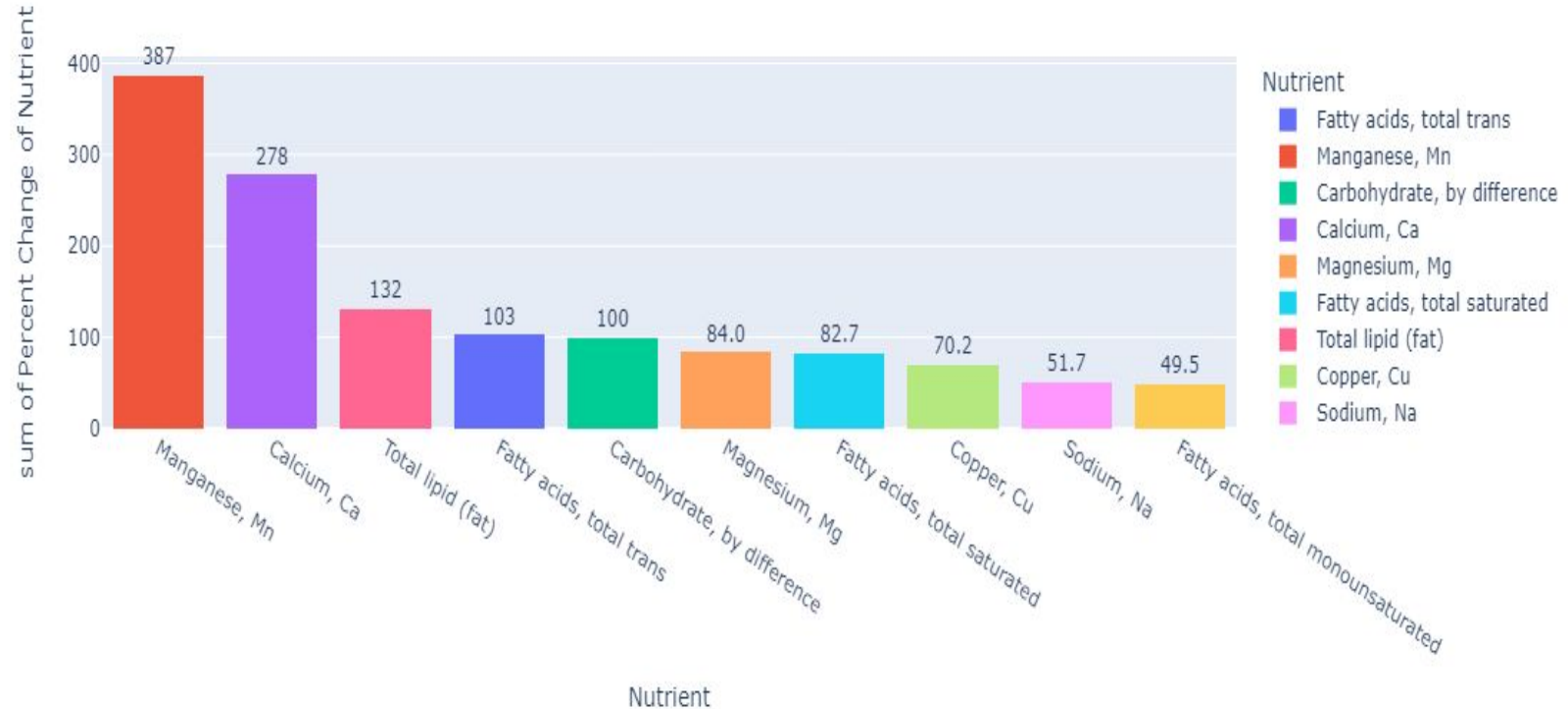
Approach

- Using Python & Pandas, slim down the given Foundation Foods (FF) and SR Legacy (SR) datasets
- Product: a six column data frame that describes each food item in the FF and SR datasets
 - ◆ Description of the food item
 - ◆ Identification for the food group the food item belongs to
 - ◆ Name of the nutrient in the food that was analyzed
 - ◆ Mean amount of nutrient per 100g of the food (from SR)
 - ◆ Mean amount of nutrient per 100g of the food (from FF)
 - ◆ The percent change of the nutrient between SR and FF
- Using this data frame, create histograms that display the ten most changed nutrients per food group
- Use histograms to better understand which nutrients change the most over time

Visualizing the Data

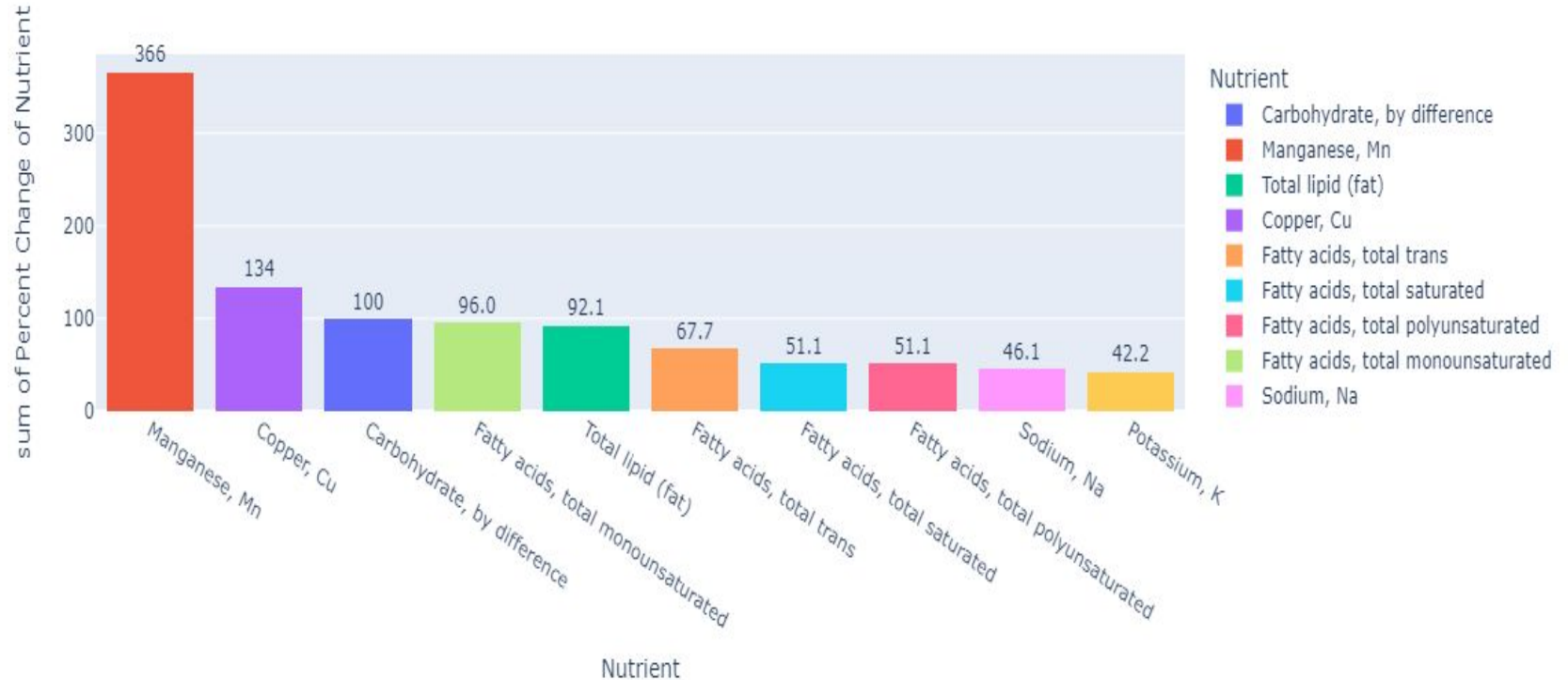
LIVESTOCK

Percent Change in the Nutrients of Beef Products



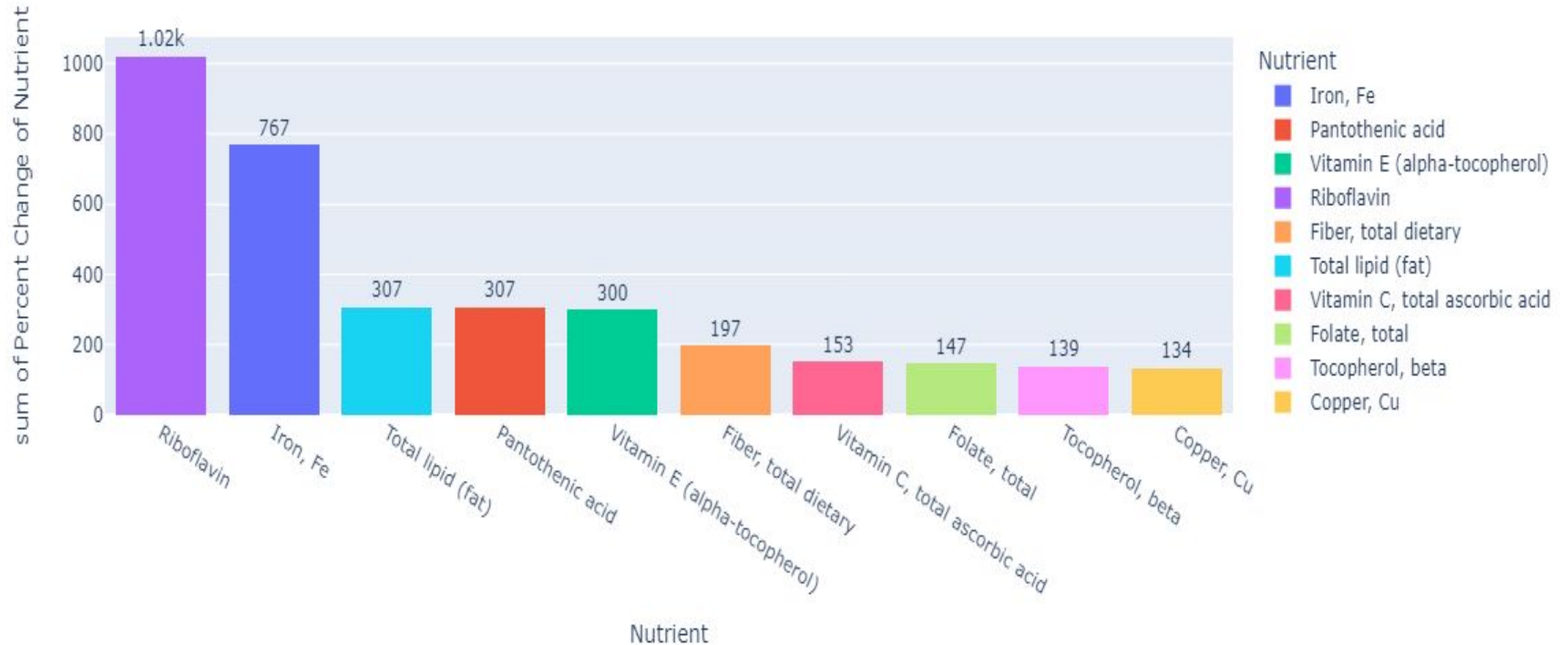
LIVESTOCK

Percent Change in the Nutrients of Poultry Products



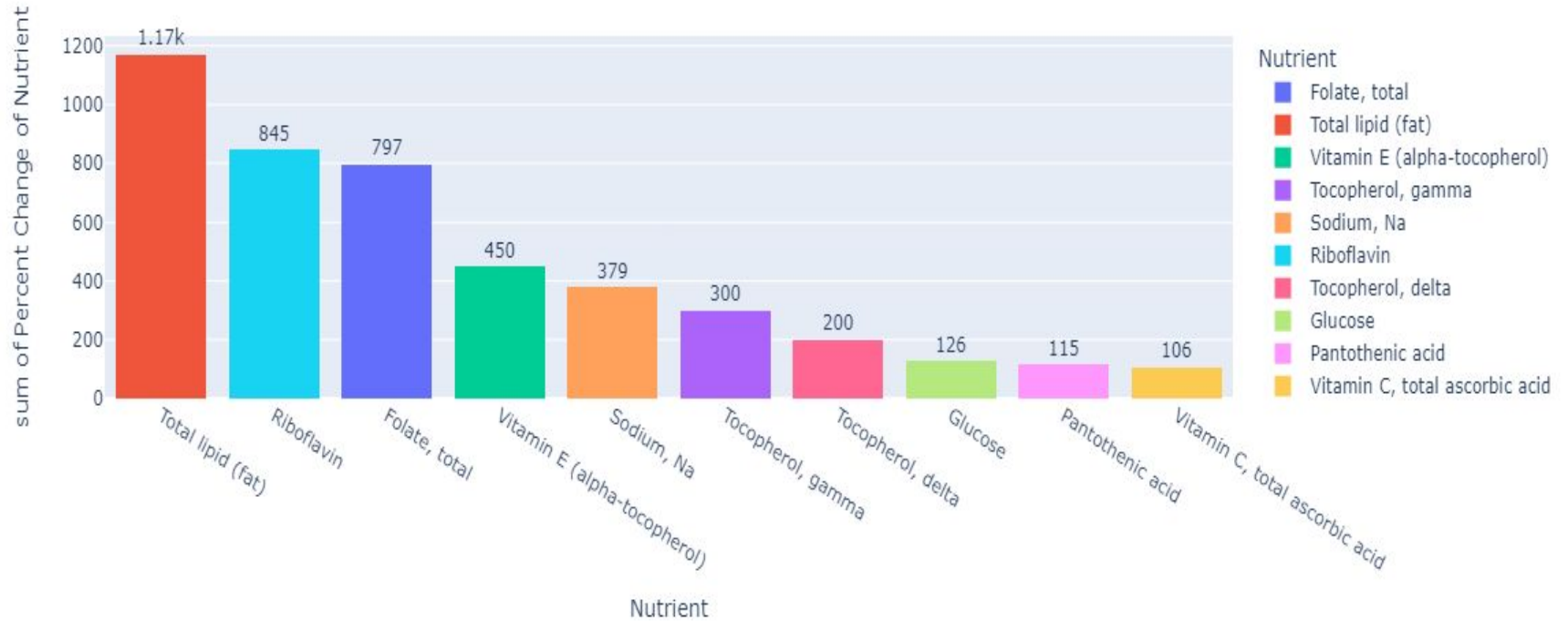
PLANTS

Percent Change in the Nutrients of Vegetables and Vegetable Products



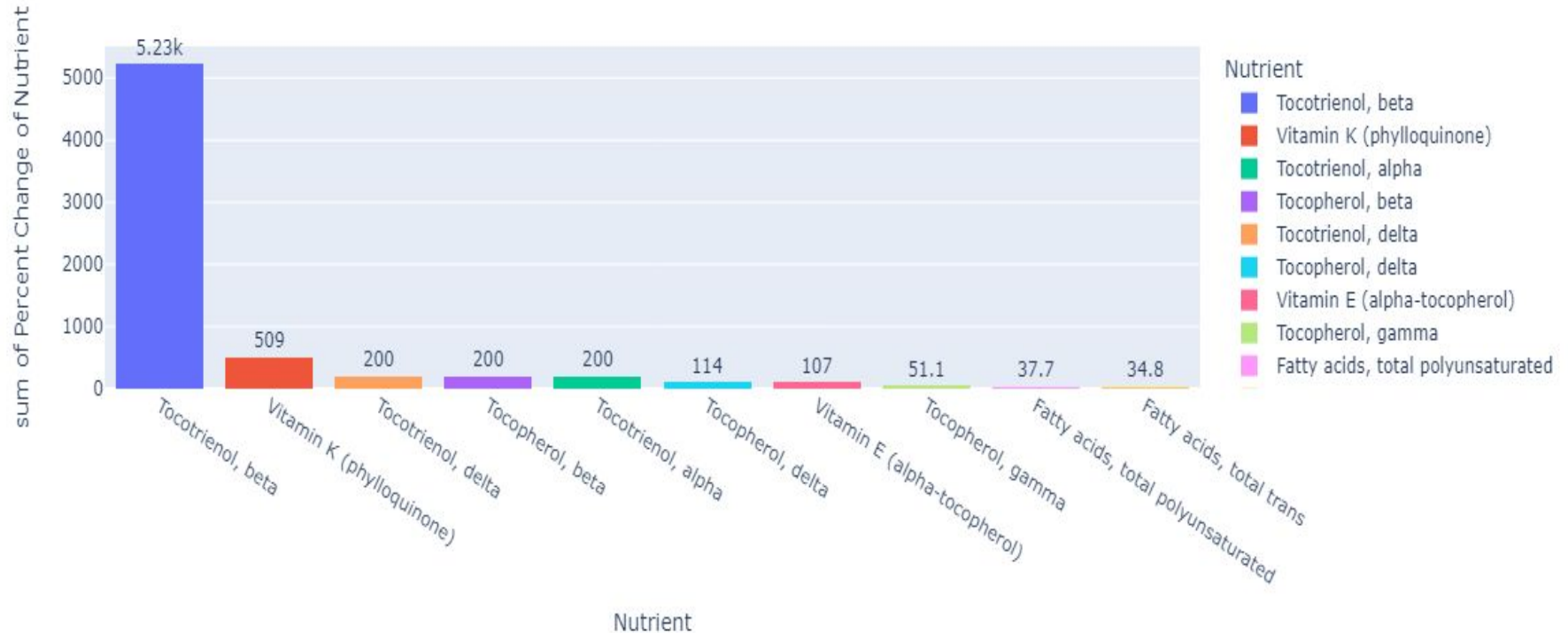
PLANTS

Percent Change in the Nutrients of Fruits and Fruit Juices



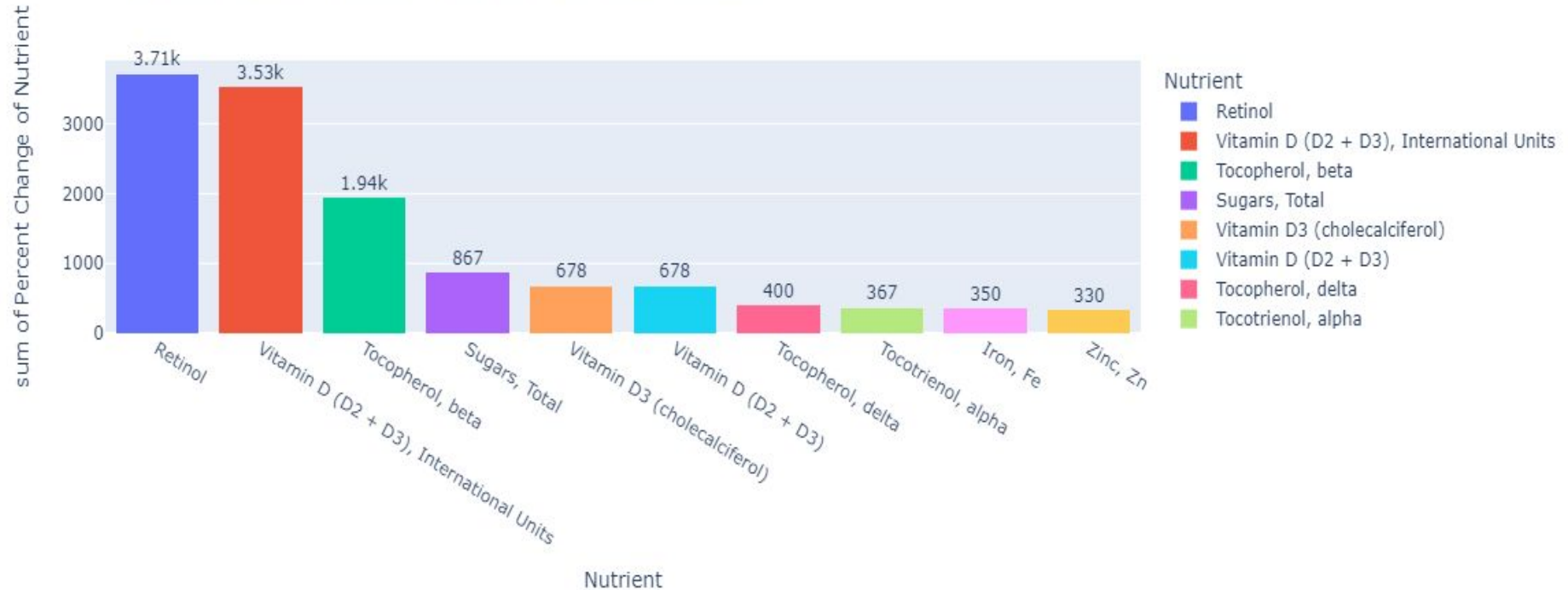
OUTLIERS

Percent Change in the Nutrients of Fats & Oils



OUTLIERS

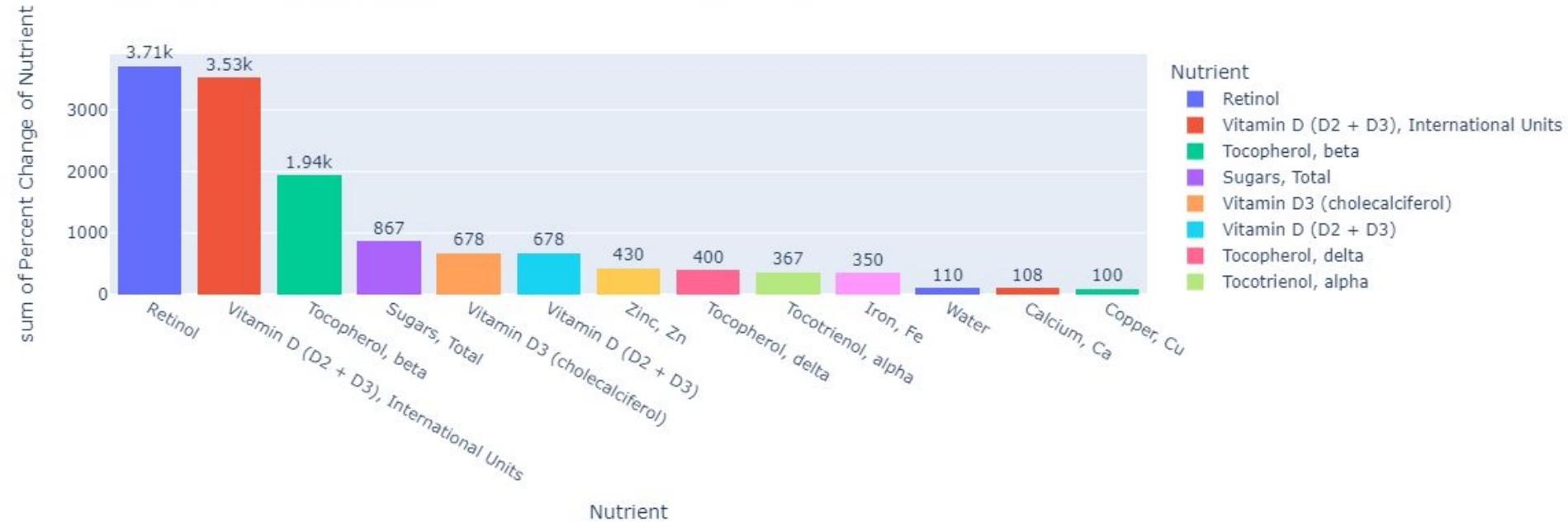
Percent Change in the Nutrients of Diary and Egg Products



Findings and Suggestions

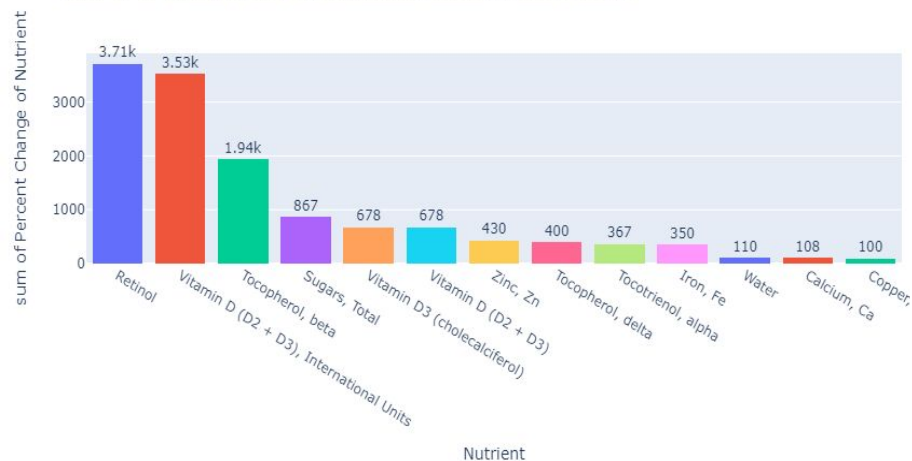
FINDINGS

Sum of % Change of Top 15 Nutrients Across All Food Groups



Suggested Solution

Sum of % Change of Top 15 Nutrients Across All Food Groups



- Generally prioritize analyzing micronutrients over macronutrients with the exception of sugars
- Similar trends can be noticed across similar food groups (meats vs. meats, plants vs. plants)
- Certain nutrients have drastic increases due to an initially extremely small content
- “The most widely used vehicles for fortification are among the most commonly consumed foods, including oils and fats, milk, sugar, salt, rice, wheat, or maize flour” (WHO)
- Other sources include genetic modification and new developments in the food industry (WHO)
- Macronutrient contents have not changed much due to already making up a majority of food by mass