Ingredient Diversity in Global Recipes

Data Analysis with TheMealDB API

Kamron Mason

In this project, I looked at recipes from different categories like beef, chicken, dessert, vegan, and seafood using data from TheMealDB API. The goal was to see which ingredients show up most often, how complex meals tend to be, and what differentiates vegetarian dishes from the rest.

This report shows findings such as which ingredients are most prominent in different meal categories, demonstrates the complexities and differences between vegan and non vegan meals, and dessert insights as well.

Motivation

This summer, I wanted to try learning a few new things, one of them being cooking.
I started making dishes I'd never tried before, using ingredients I wasn't really familiar with.

I then thought: how different are the ingredients in meals across different categories?
So, I took that curiosity and turned it into a project — using data to explore how diverse the ingredients are in different types of meals.

# *Research Objectives & Questions*

Research Objectives

- To explore ingredient diversity across meal categories using data from TheMealDB API.

- To identify which categories use the most unique ingredients.

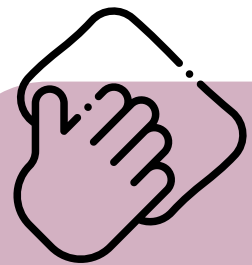- To visualize patterns in ingredient diversity.
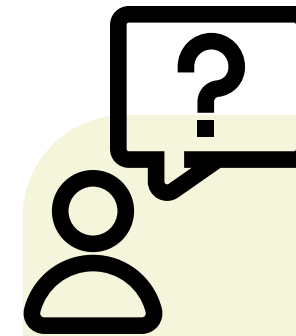
Research Questions

- What meal categories use the most unique ingredients?

- How much ingredient overlap exists between categories?

- Do simpler meal types tend to use fewer ingredients?

- What patterns can be seen in ingredient diversity across categories?
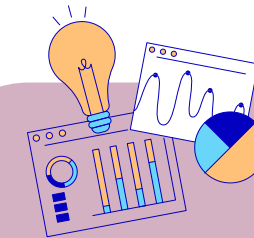
Data Cleaning and Manipulation
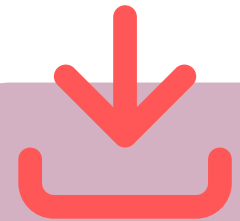
Retrieved Meal Data

Fetched meals by category from TheMealDB API, then pulled full details for each one, including up to 20 ingredients.

Prepared for Visulization

Filtered and formatted the cleaned data to be ready for visualization using Matplotlib.

Data Cleaning

Extracted all ingredient values, removed nulls, and converted text to lowercase for consitency.

Data Organization

Linked each ingredient to its meal and category in a structured table format for analysis.

chart 1

This chart compares how many unique ingredients are used across different meal categories. Chicken recipes come out on top with around 240 distinct ingredients, followed by beef at about 210. Dessert, seafood, and vegetarian dishes are all in a similar range; about 180 to 185. Overall, this data provides that chicken and beef meals tend to involve a wider variety of ingredients, making them more diverse in how they're prepared and flavored.
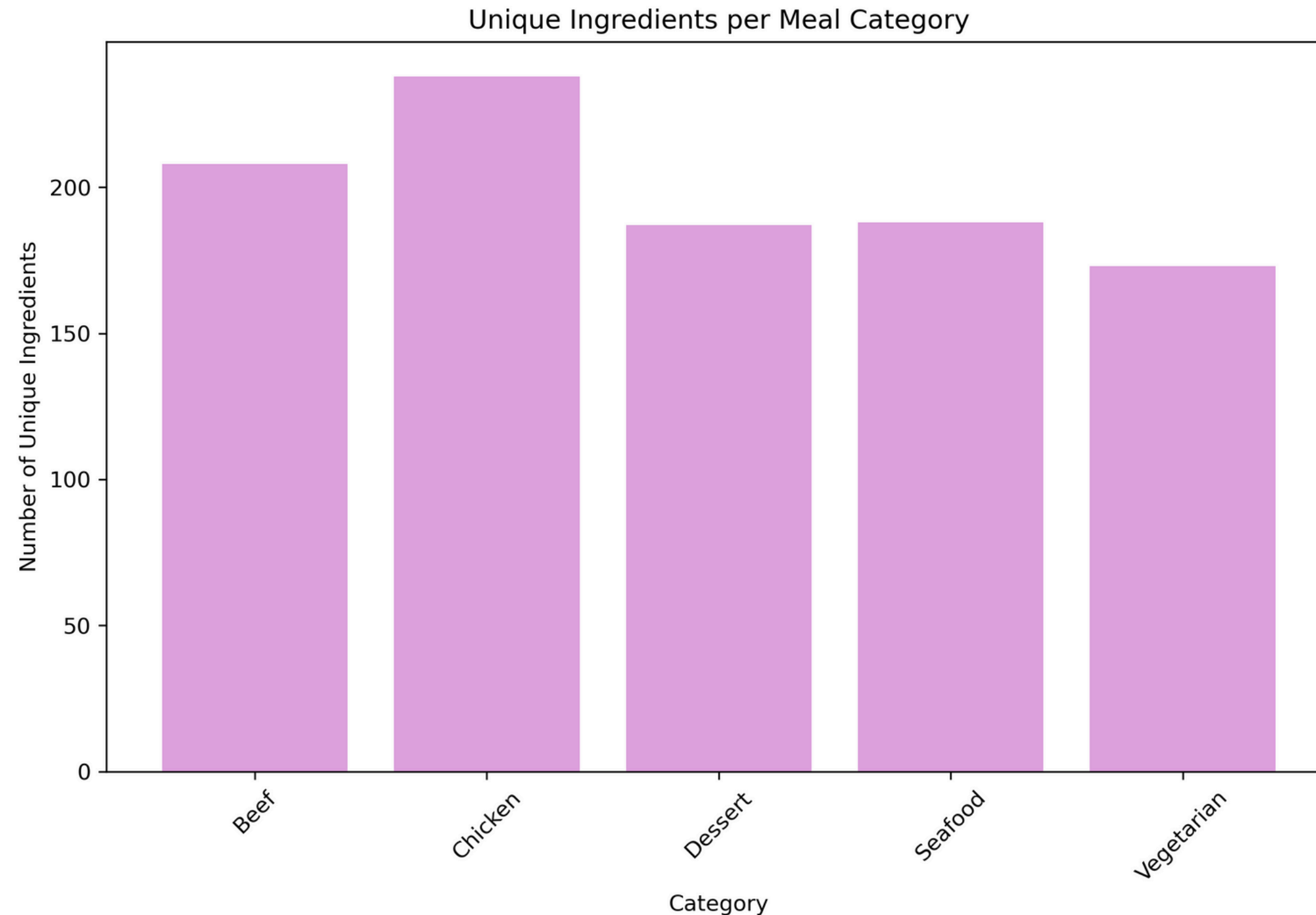

Unique Ingredients per Meal Category

chart 2

This bar chart highlights the 10 most commonly used ingredients across all the meals in the dataset. Butter stands out at the top with around 81 uses, followed closely by salt, olive oil, and garlic. The rest of the list, including onions, eggs, and pepper, shows that classic pantry staples play a major role in most recipes. It's a clear reminder that simple, everyday ingredients are the foundation of a lot of meals, no matter the category.
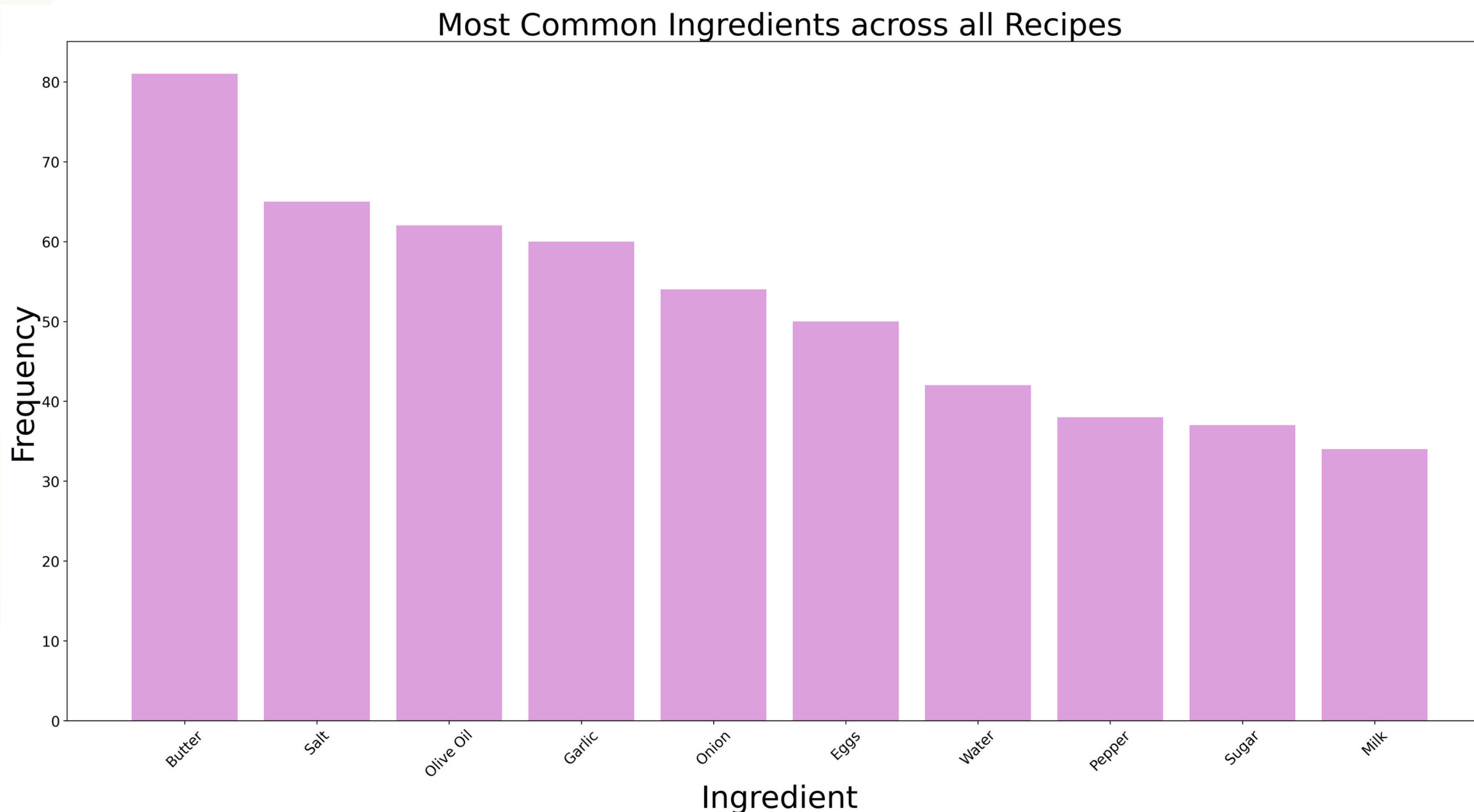

Most Common Ingredients across all Recipes

chart 3

This chart shows the top 10 meals with the most ingredients. Five of them are tied at the maximum of 20 ingredients, including dishes like Jerk Chicken, General Tso's Chicken, and Jamaican Beef Patties. These meals come from various categories, but many are chicken and beef recipes—supporting what we saw earlier about those categories having the greatest ingredient variety.

Top 10 Meals with the Most Ingredients
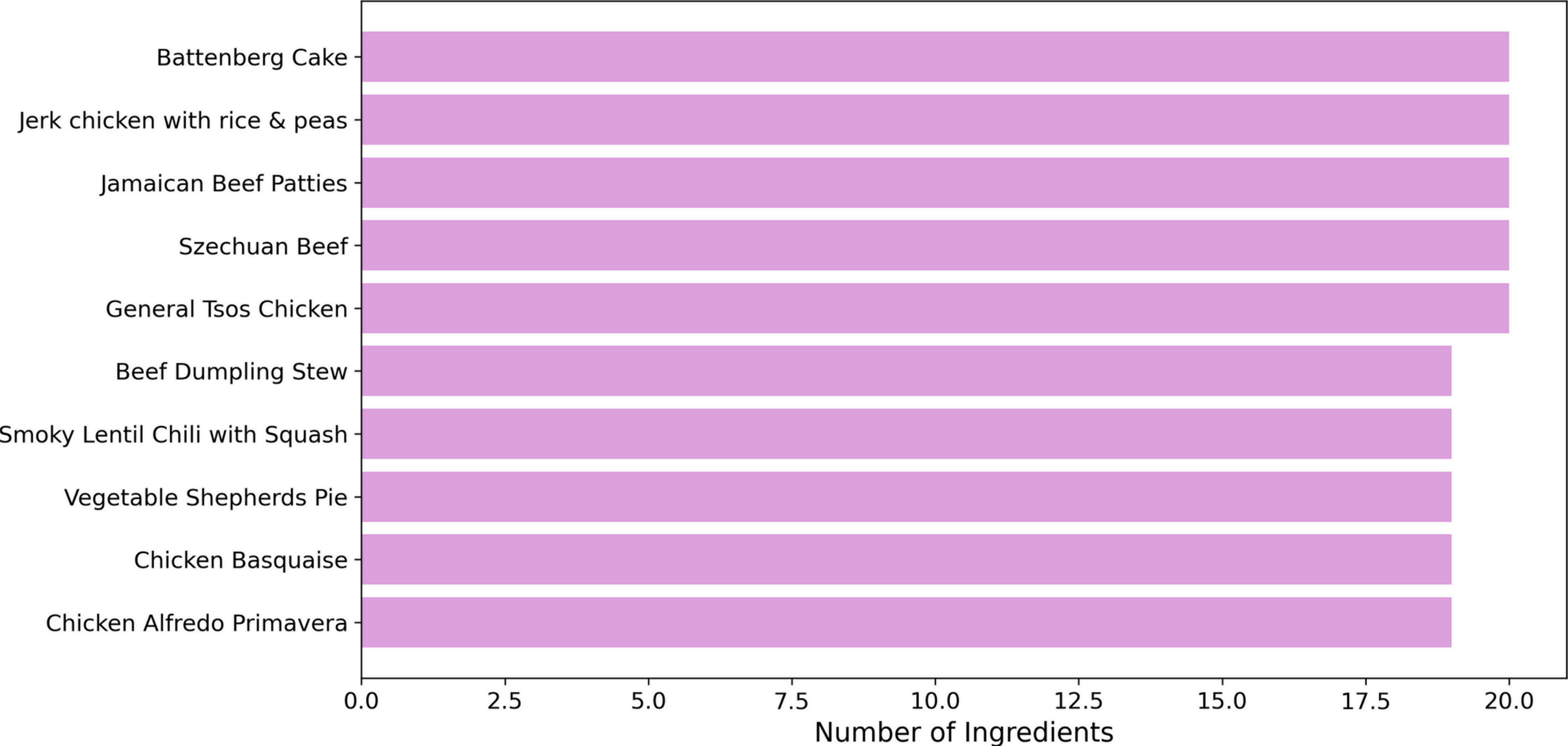
Beef:
Jamaican Beef Patties
Szechuan Beef
Beef Dumpling Stew
Chicken:
Jerk Chicken with Rice & Peas
General Tso's Chicken
Chicken Basquaise
Chicken Alfredo Primavera
Vegetarian:
Smoky Lentil Chili with Squash
Vegetable Shepherd's Pie
Dessert:
Battenberg Cake

chart 4

On average, non-vegetarian meals have about 11.5 ingredients per recipe, while vegetarian meals come in just a bit lower at around 10.5 ingredients. This small difference suggests that meat dishes might be a little more complex, probably because of extra marinades, sauces, and side ingredients that go along with them.
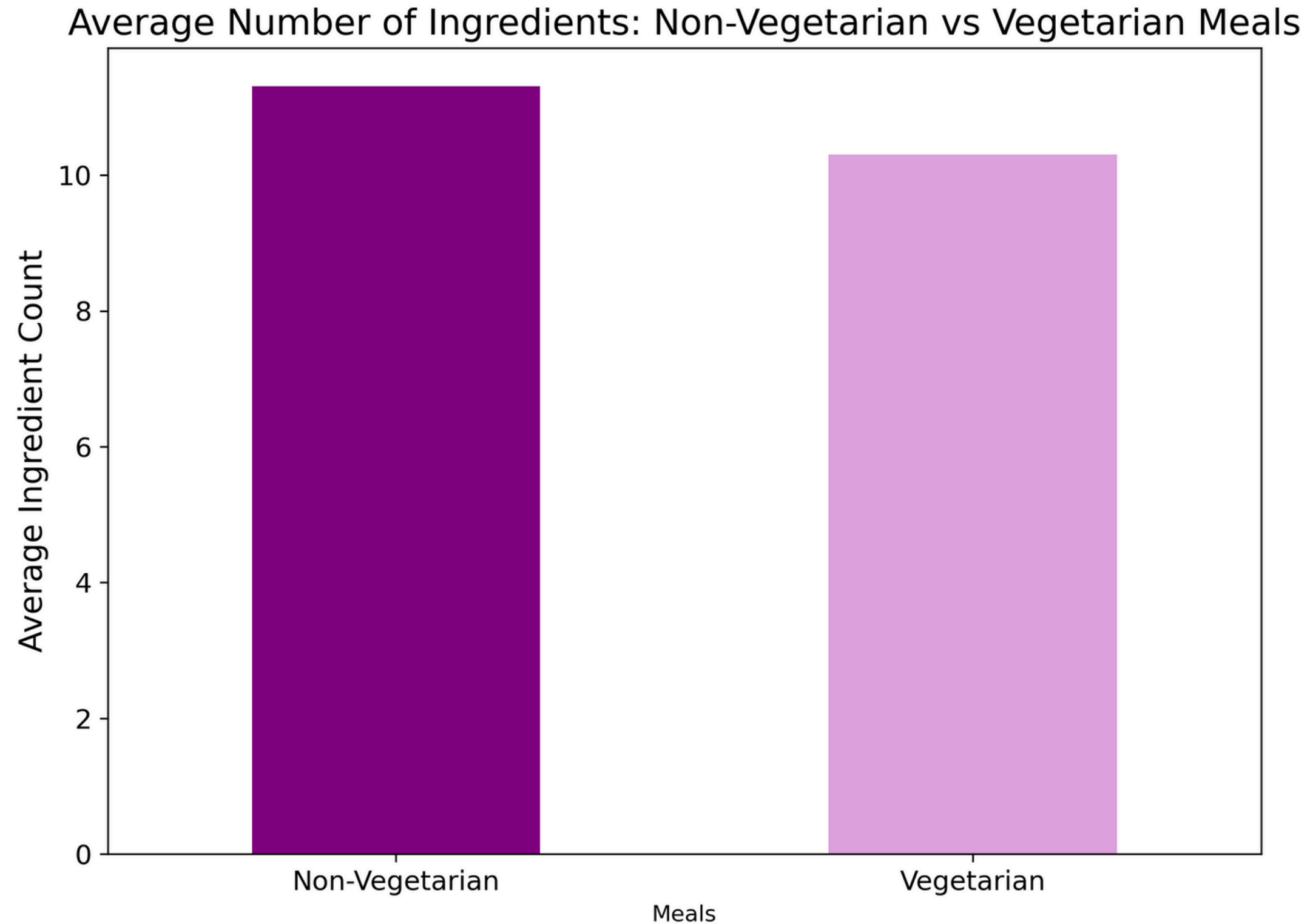

Average Number of Ingredients: Non-Vegetarian vs Vegetarian Meals

chart 5

This chart focuses on dessert recipes, showing butter as the most common ingredient with about 49 uses, followed by eggs, caster sugar, and milk. You'll notice baking staples like sugar, flour, vanilla, and cinnamon show up a lot, which makes sense since desserts usually depend on these. Butter and eggs especially are the go-to ingredients in most sweets.

Top 10 Most Common Ingredients in Desserts
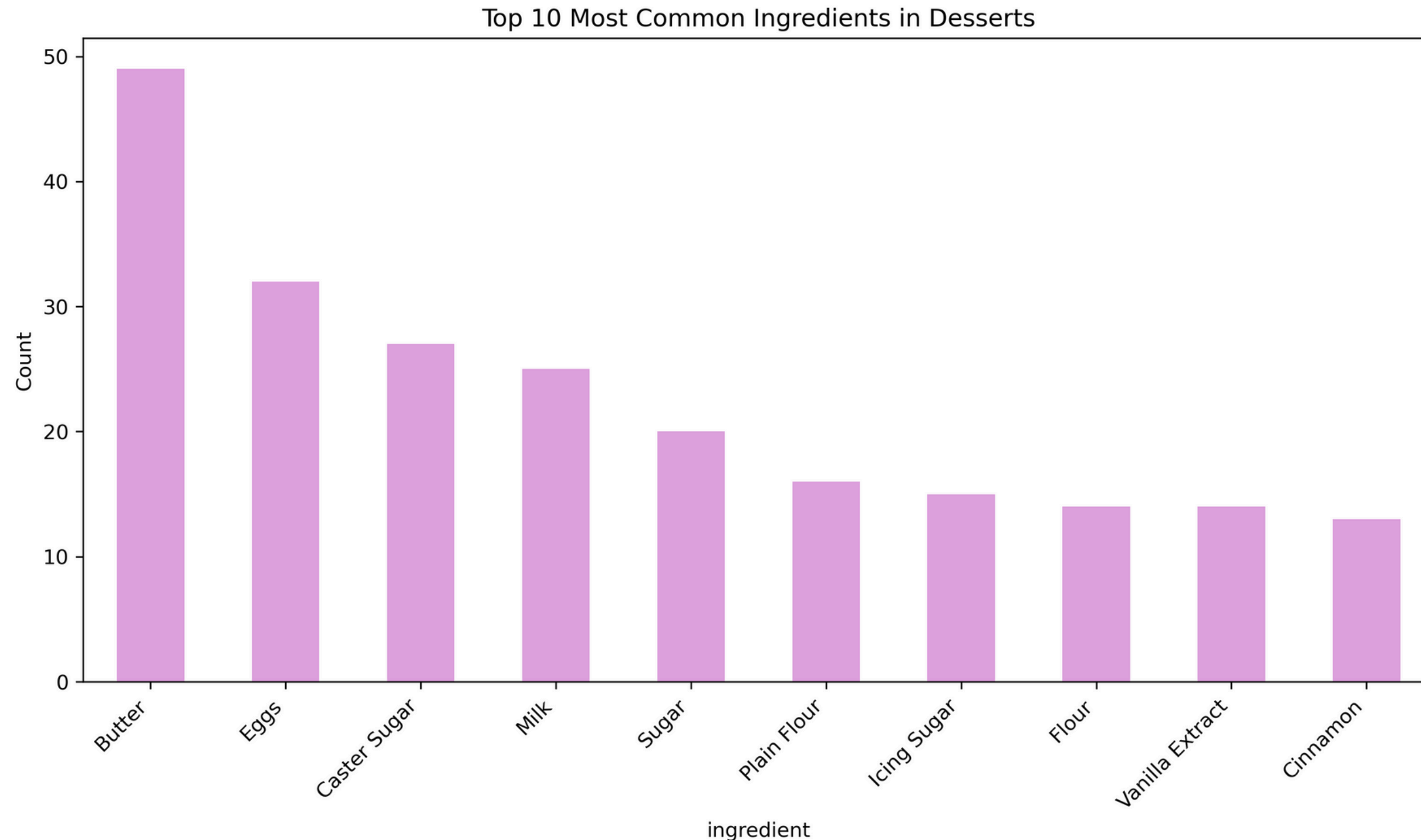
Key Findings

Chart #	Focus	Insight
1	Unique Ingredients by Category	Chicken (240) & Beef (210) had the most ingredient variety
2	Top 10 Most Used Ingredients	Butter, salt, olive oil, garlic, and onions lead in frequency
3	Meals with Most Ingredients	5 meals tied at 20 ingredients (e.g., Jerk Chicken, General Tso's)
4	Avg. Ingredients: Veg vs Non-Veg	Non-veg meals: ~11.5; Veg: ~10.5 — slightly more complex meat recipes
5	Common Ingredients in Desserts	Butter (49), eggs, sugar, and milk were dominant in dessert recipes

API: https://www.themealdb.com/api.php

Next Steps/Improvements

- **Explore nutritional data for these meals.**
- **Analyze cooking times and difficulty levels.**
- **Expand to other cuisine types for broader insights.**