Human Perception of Acid

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The Experiment

For my experiment, I chose human perception of acid in taste. I selected an assortment of foods, and I tested them with a pH meter to see how much acid was in them. I tested if my family could list the foods from lowest to highest measured pH, just by going off their taste.

My Hypothesis

My hypothesis is that my family will be able to perceive the highest to lowest acid levels in the foods correctly.

My Tools

Here is a list of the tools I used:

Apple cider vinegar

Rice vinegar

Ketchup

Oranges

Lemons

Blueberries

Frozen raspberries

Hummus

Ginger

Pineapple

Apple juice

Lemonade

Onions

A pH meter (BlueLab Combo meter)

First, Here is a Chart of the pH Scale.

I'll be using foods from about 2-7 pH. Scale by: https://aperainst.com/blog/what-is-ph/

THE pH SCALE

Universal Indicator pH Color Chart

Battery acid — Stomach acid — Vinegar — Orange juice — Tomato — Black coffee — Urine — water — Sea water — Baking soda — Indigestion tablet — Ammonia solution — Soapy water — Bleach — Drain cleaner

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Acid   Neutral   Alkali

The Procedure: Part One

After receiving all my tools, I put the non-liquid ingredients in a food processor and made them into a paste. I made sure to clean my food processor between blends. I then took all the foods and tested each one with the pH meter. I made sure to do every test twice, and rinse between each one. I took notes on the pH of the foods as they were tested. Lastly, I added my data to my slides. `

Here are all the samples I tested

Foods Listed From Lowest to Highest pH
(Most to least acidic)

Lemon flesh and Lemonade (Both - 2.8, 2.8)

Rice vinegar (3.0, 3.0)

Apple-cider vinegar (3.0, 3.1)

Ketchup (3.2, 3.2)

Raspberry (3.2, 3.3)

Blueberry (3.6, 3.7)

Apple juice (3.7, 3.7)

Pineapple (3.7, 3.8)

Strawberry (3.8, 3.8)

Orange (4.2, 4.3)
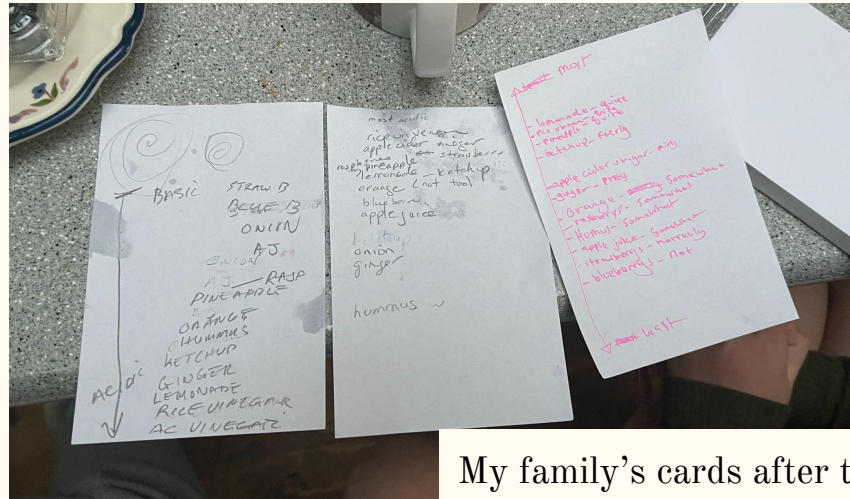
Hummus (4.3, 4.4)

Onion (6.1, 6.2)

Ginger (6.8, 6.9)

Distilled water (6.0, 6.0)

Tap water (9.0, 9.1)

The Procedure: Part Two

Now that I had recorded the pH of the foods, it was time to test my hypothesis. I put the foods (not the pastes) I had tested the pH of in front of my family, and they tasted it. After that, they recorded what they thought was the correct order from most to least acidic.


My family's cards after tasting the foods.

The Results

*This is a spreadsheet of what my family thought the correct order was.*

Foods in correct order	rank	pH	Mom	Dad	Ruby
Lemon flesh and Lemonade	1	2.8	6	3	1
Rice vinegar	2	3	1	2	2
Apple-cider vinegar	3	3	2	1	5
Ketchup	4	3.2	7	5	4
Raspberry	5	3.2	4	9	8
Blueberry	6	3.6	9	12	13
Apple juice	7	3.7	10	10	11
Pineapple	8	3.8	5	8	3
Strawberry	9	3.8	3	13	12
Orange	10	4.3	8	7	7
Hummus	11	4.4	13	6	10
Onion	12	6.2	11	11	9
Ginger	13	6.9	12	4	6
Distilled water		6			
Tap water		9			

Plots - Mom, Dad and Ruby vs. the rank of acidity, (above) and the pH of everything measured (below)
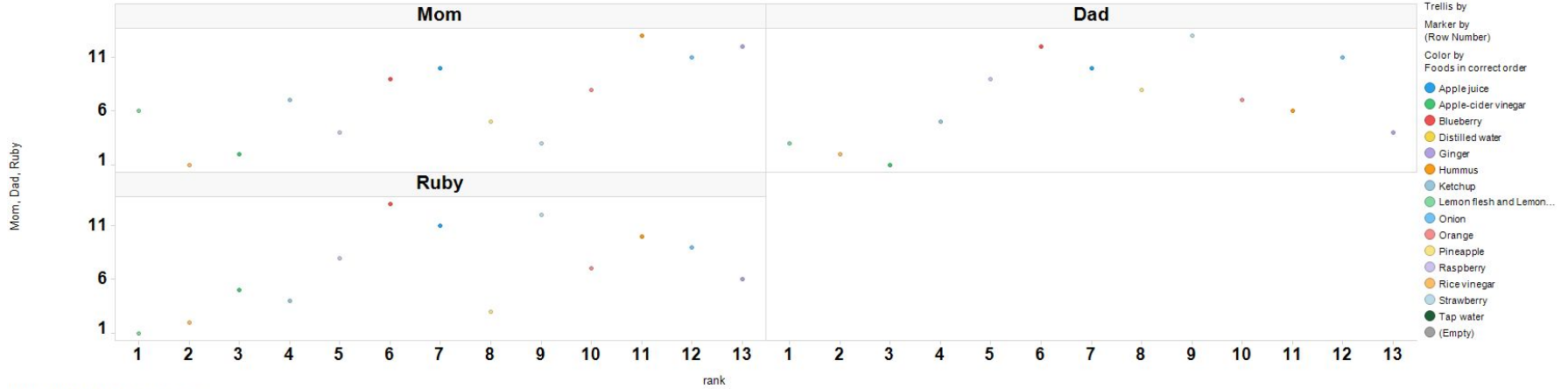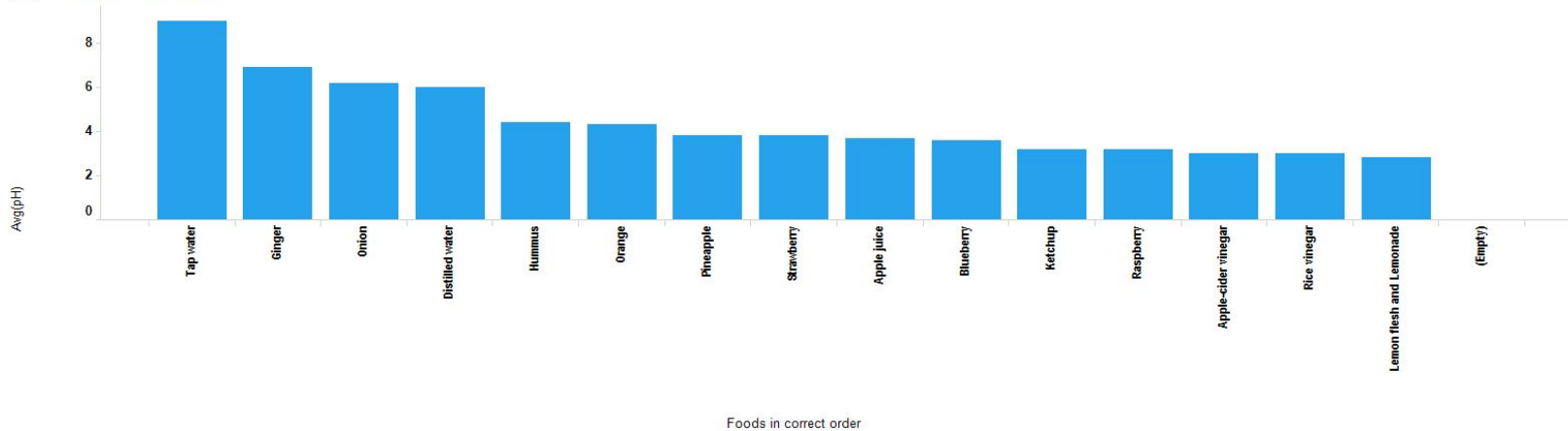
Conclusion

In conclusion, the results were not what I expected, but that was also what made the experiment interesting and fun. I noticed that the strong taste of the ginger and the sweetness of the berries was what made it the most difficult for my family to guess the right order of acidity. Thank you Mom, Dad, and Ruby for doing the tests and helping me with my experiments.

Images
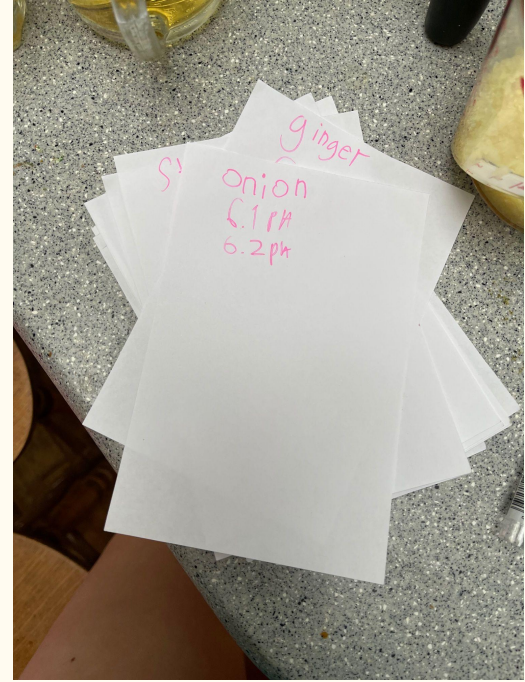
Me blending the foods, (left) me testing the pH, (middle) and my notes on the foods (right)