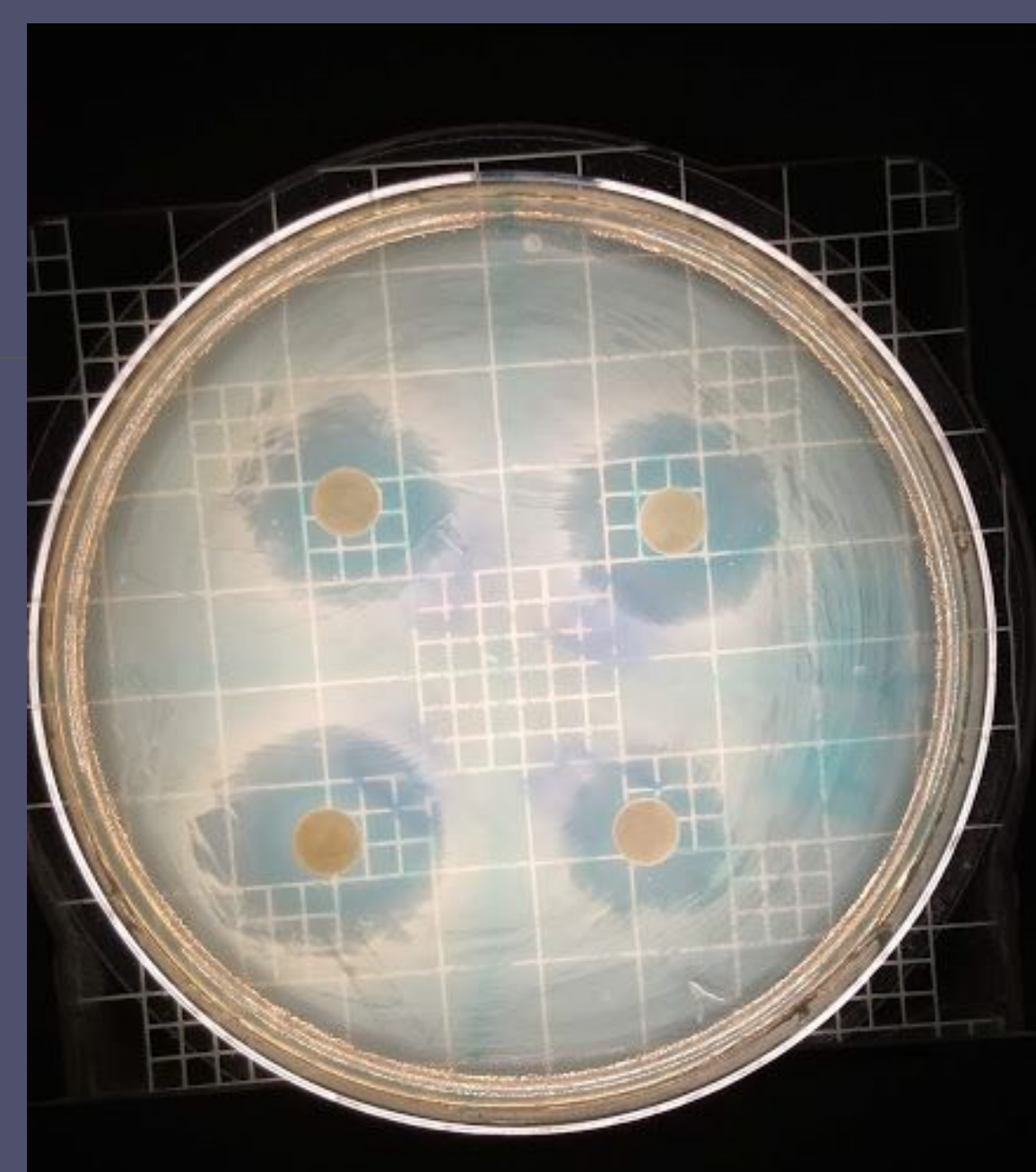


# THE INFLUENCE OF FRUIT JUICES ON THE EFFECTIVENESS OF AMOXICILLIN

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## Results

- Means of diameter of zones of inhibition were significantly different ( $F = 10.14$ ,  $df = 3, 27$ ,  $p < .0001$ ).
- As shown in Figure 1, there was a significant difference ( $p < .05$ ) between the diameter of zone of inhibition of water and each of the different juices.
- There was no significant difference between the diameter of zone of inhibition amongst the juices.
- Measured the diameter of the zone of inhibition and performed a one-way ANOVA and a Tukey test later to determine if the diameters of the zones of inhibition for the beverage solutions were significantly different from each other.

## Introduction

- This experiment evaluated whether apple juice, cranberry juice, & orange juice influence the effectiveness of amoxicillin against *E.coli*.
- The objective of this experiment was to identify fruit juices that maximized the effectiveness of antibiotics like amoxicillin when consumed simultaneously.
- Our project addresses the UN Sustainability Goal of Good Health and Wellbeing by offering methods of minimizing the difference between medication efficiency and efficacy.
- Our project involved four stimulus conditions that were altered to test the impact they had on antibiotics like amoxicillin.

## Abstract

Recent studies have shown that the simultaneous consumption of grapefruit juice and amoxicillin can cause adverse food-drug interactions. This study investigated whether or not this was true for the consumption of apple juice, cranberry juice, and orange juice when amoxicillin was taken to fight against *Escherichia coli*. It measured the effectiveness of the antibiotic behavior of amoxicillin and the extent to which this was capable of being affected by natural substances. Colonies of *E.coli* were evenly spread onto 20 Petri dishes; sterile paper disks were submerged in four amoxicillin-juice solutions and placed in the plates. After 24 hours of incubation at a temperature of 37°C, the plates were examined for a zone of inhibition around the paper disks. The results indicated that the simultaneous consumption of the different juices and amoxicillin caused a significant difference ( $p < 0.05$ ) in the effectiveness of amoxicillin when fighting against *E.coli*. This allowed us to determine that *E.coli* is more susceptible to the action of the antimicrobial agent under certain conditions, which allows the results to be applied further in the future and the physician to choose a more effective course of treatment in relatively less time. However, further research on the effects of the freshness and concentration of juices is necessary to gauge if these findings are applicable to all forms of a fruit. This will contribute towards our progress in reaching the UN Sustainability Goal of Good Health and Well-Being, by ensuring a marginalized difference between medication efficacy and effectiveness.

## Methods

- Four solutions of a 1:1 concentration were prepared by combining 1.66M amoxicillin and either apple juice, cranberry juice, orange juice, or water.
- The water solution served as a control solution, but the others were the experimental groups, allowing us to offer a standardized means of controlling the medication efficiency and efficacy.
- We performed a Kirby-Bauer test using 20 sterile paper disks that were submerged in 2 ml of each solution and placed in different agar plates with 50  $\mu$ l of evenly spread *E.coli*.
- They were stored in an incubator for 24 hours at 37°C and the diameters of the zones of inhibition were measured.
- We performed an ANOVA and a Tukey test to determine a significant difference between the means.

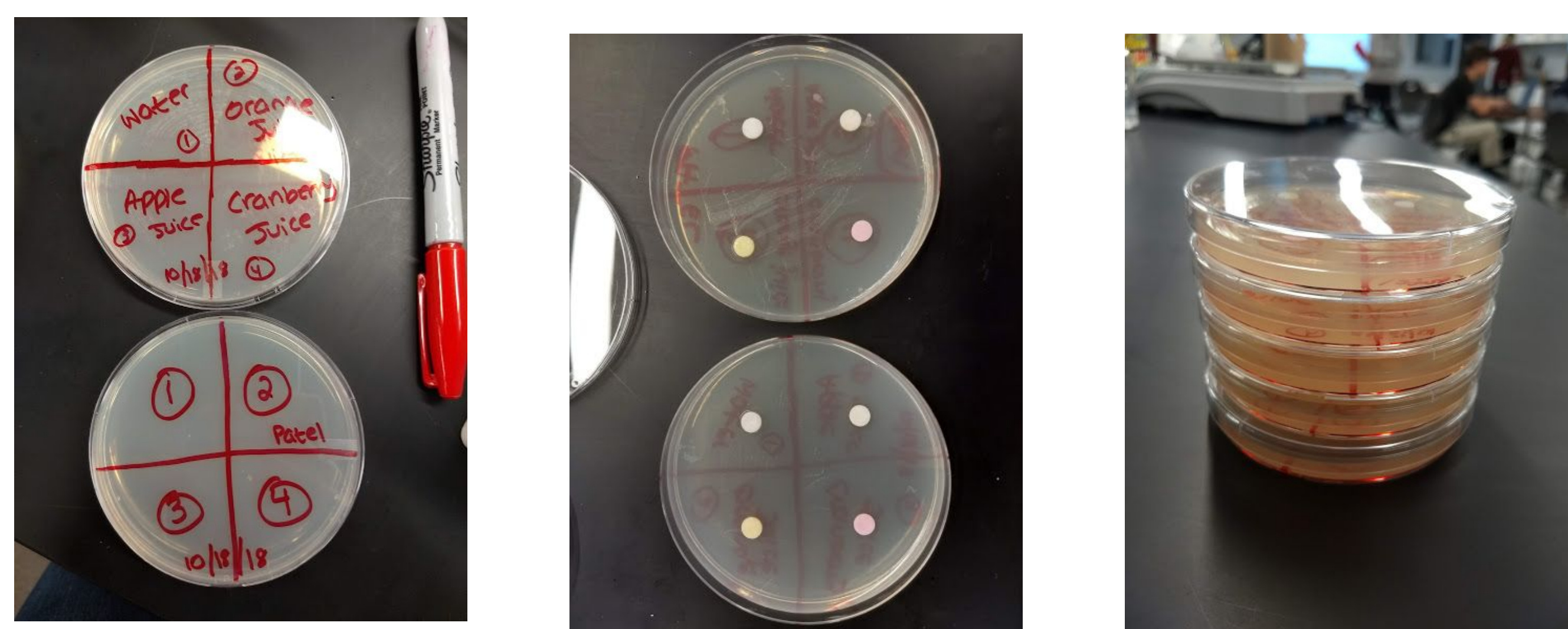


Figure 2: The three images pictured above demonstrate how the experiment was structured and split into four quadrants, as well as the resultant process used with the sterile paper disks and their appropriate placement on the plates and in their centers to avoid contamination and a clear split of the data analyses being used.

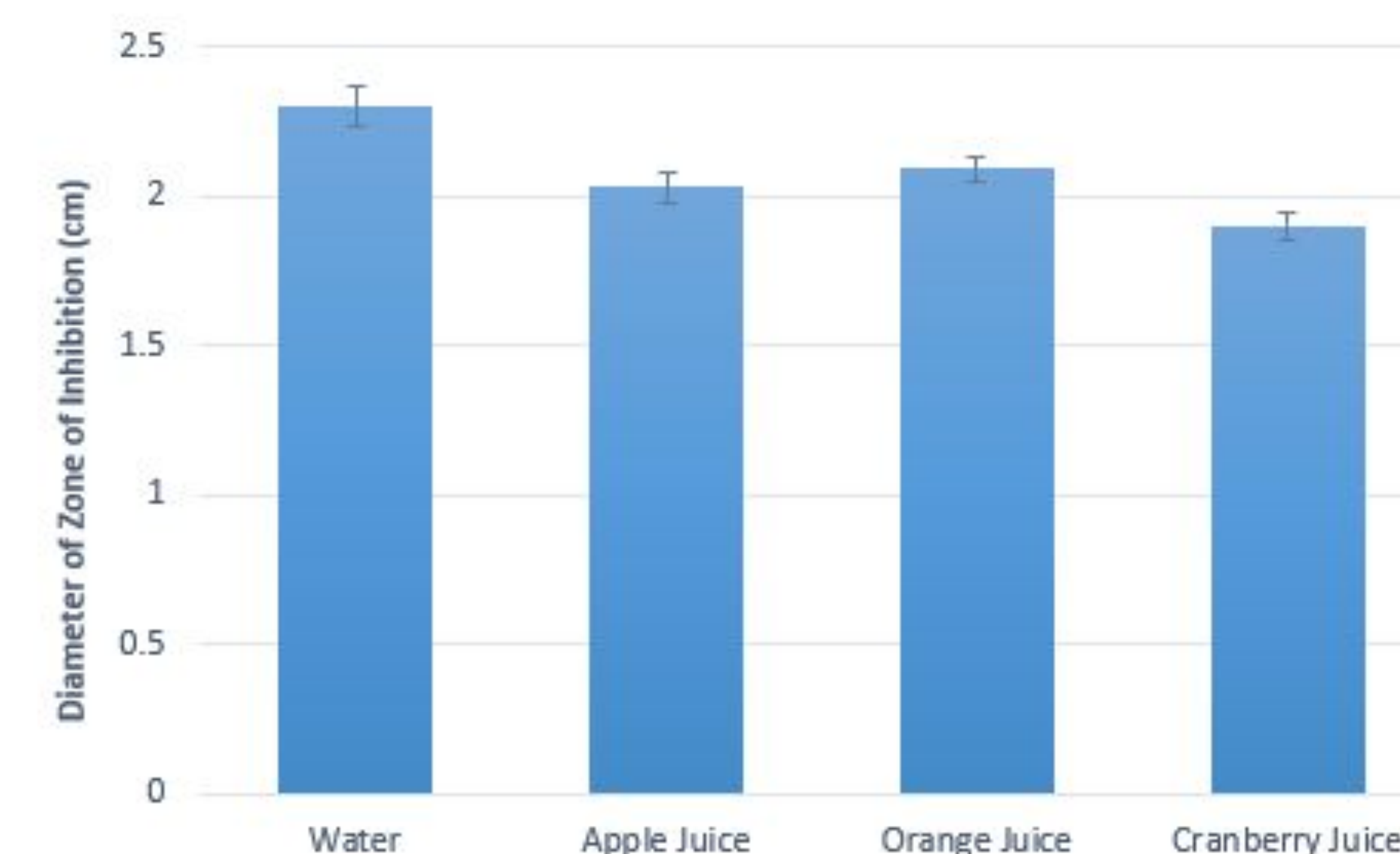


Figure 1. The diameter of the zone of inhibition after a Kirby-Bauer test. Four beverages were combined in a 1:1 concentration with amoxicillin. Twenty disks were submerged in 2 ml of each solution and placed in different agar plates with 50  $\mu$ l of *E.coli* evenly spread in them. They were stored in an incubator for 24 hours. Error bars represent standard error.

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