The Efficacy of Common Mouthwashes

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Introduction

Have you ever been stuck down the oral care isle of the grocery store unsure of which mouthwash to buy? Have you ever wondered alcohol or no alcohol, plaque fighting or enamel restoring, cheaper brand or name brand? The purpose of mouthwash is to reduce the microbial load within the oral cavity. Therefore, the mouthwash that does this the best is the most effective and the one in which consumers seek. However, such information is not readily displayed on mouthwash labels. Viewing microbial reduction by various mouthwashes on cell culture plates, will help determine the efficacy of common mouthwashes.

Objective

To ease the decision process of the consumer and determine the most effective mouthwash by viewing bacterial reduction on bacterial culture plates.

Materials & Methods

- 8 plates of ready pour Luria Broth agar labeled for each mouthwash
- 10 mL of cell culture media in a 50 mL conical tube
- Spit 3 times in cell culture media and shaken vigorously
- Incubated saliva and cell culture media mixture at 37° C for 6 hours
- Micro-pipetted 100 uL of incubated saliva mixture into each of the 8 agar plates
- Used cell spreader to evenly cover plate with mixture
- Let saliva mixture soak into plates for 1 hour at room temperature
- Immersed 8-6mm filter paper discs in Scope, Act, Listerine Total Care, Listerine Ultraclean, Listerine Cool Mint, Meijer Antiseptic, Crest Pro-Health, and Colgate Total mouthwash.
- Placed each disc in the center of their respective plates
- Incubated plates at 37° C for 24 hours
- Measured zone of reduction for each mouthwash.
- Zone of reduction: The region of substantially reduced cell growth around the paper disc saturated with an antimicrobial agent on the agar surface.
- Measurement of the diameter of the zone of reduction in millimeters includes the diameter of the disc.
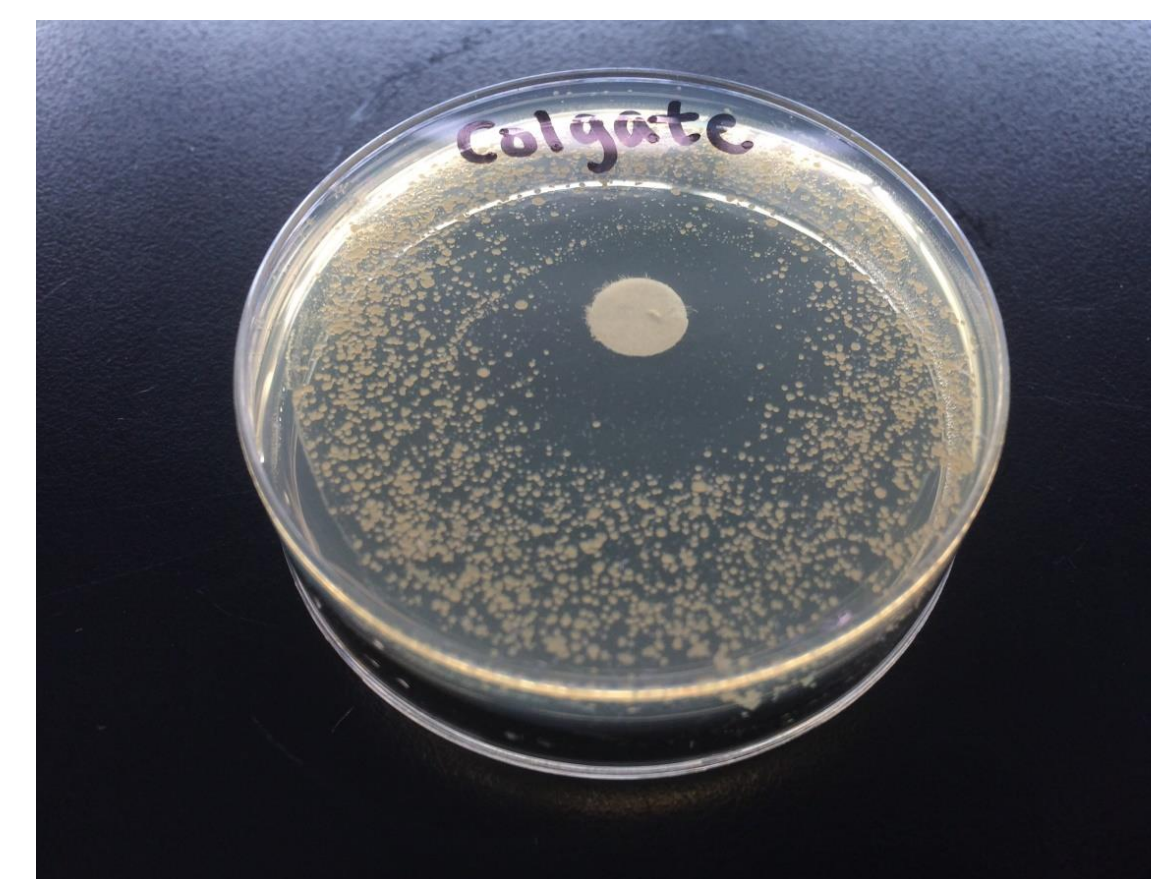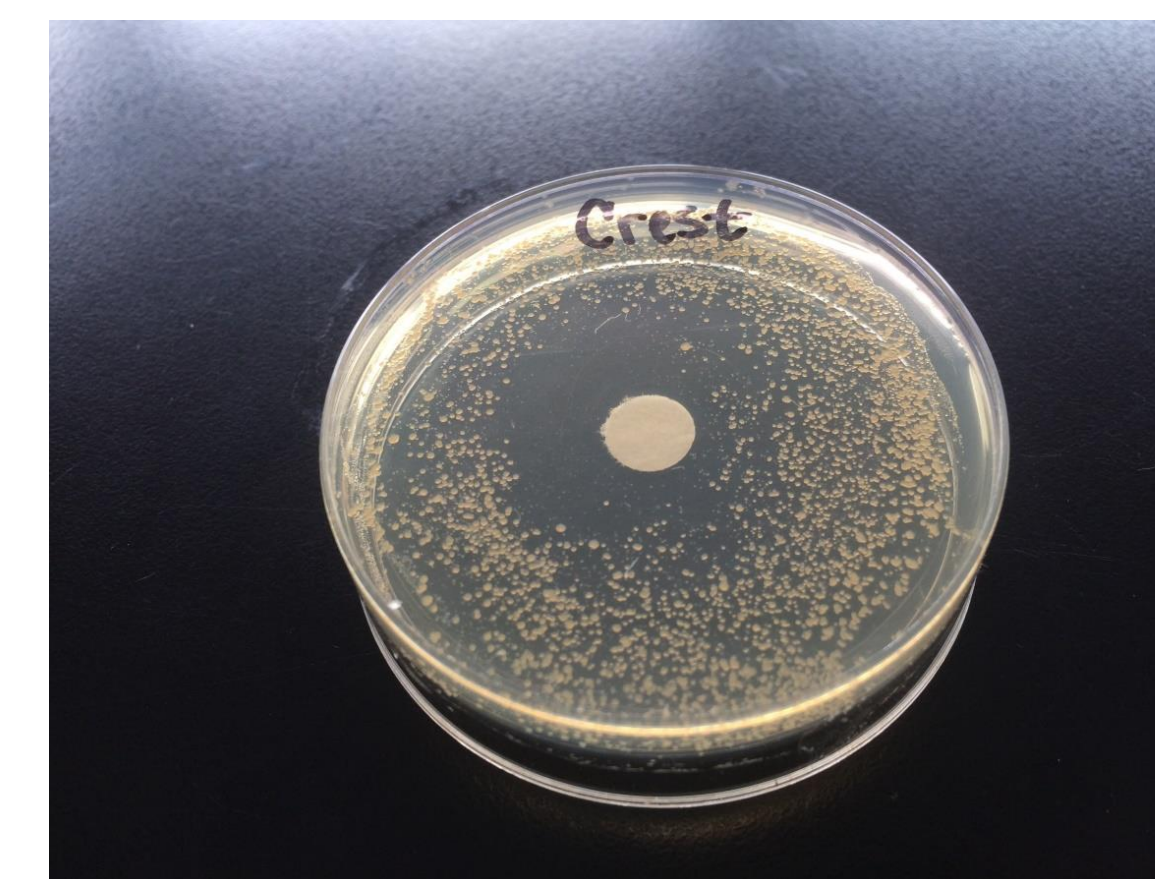

Results

Scope
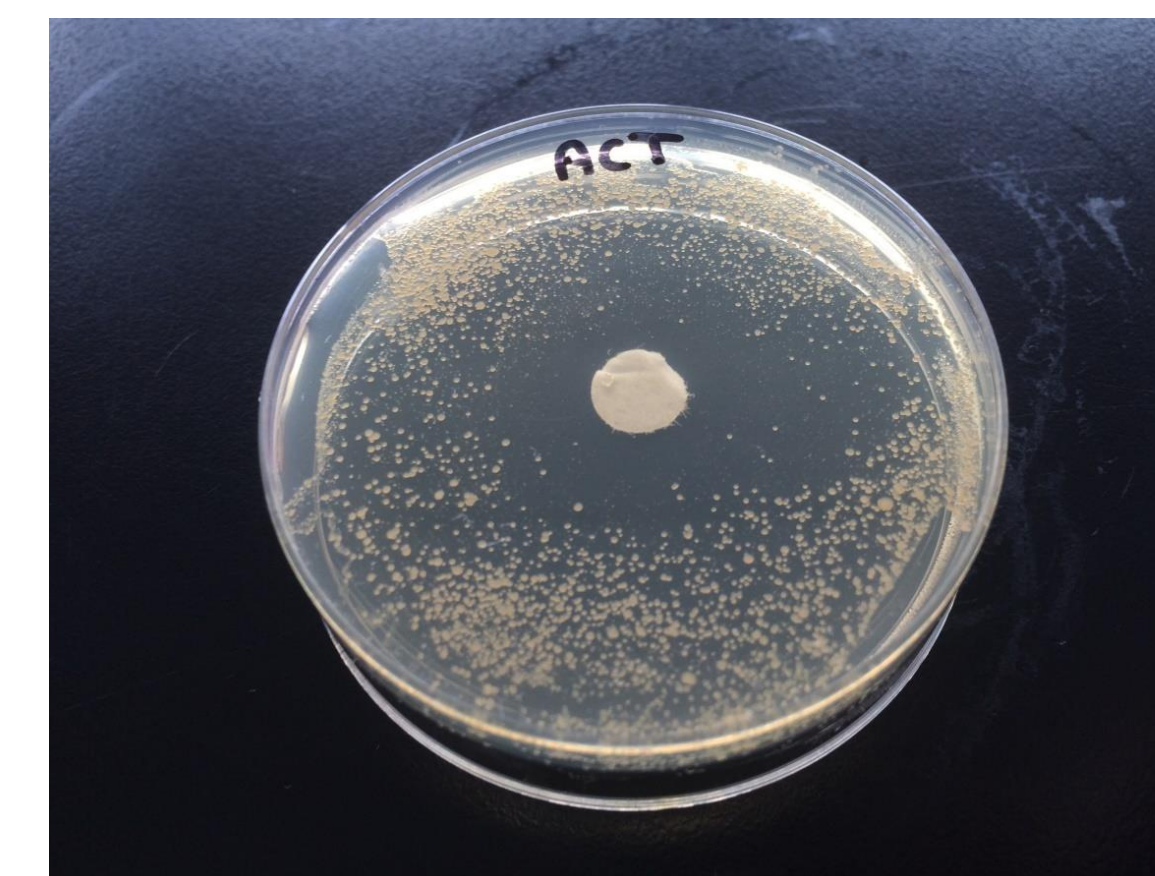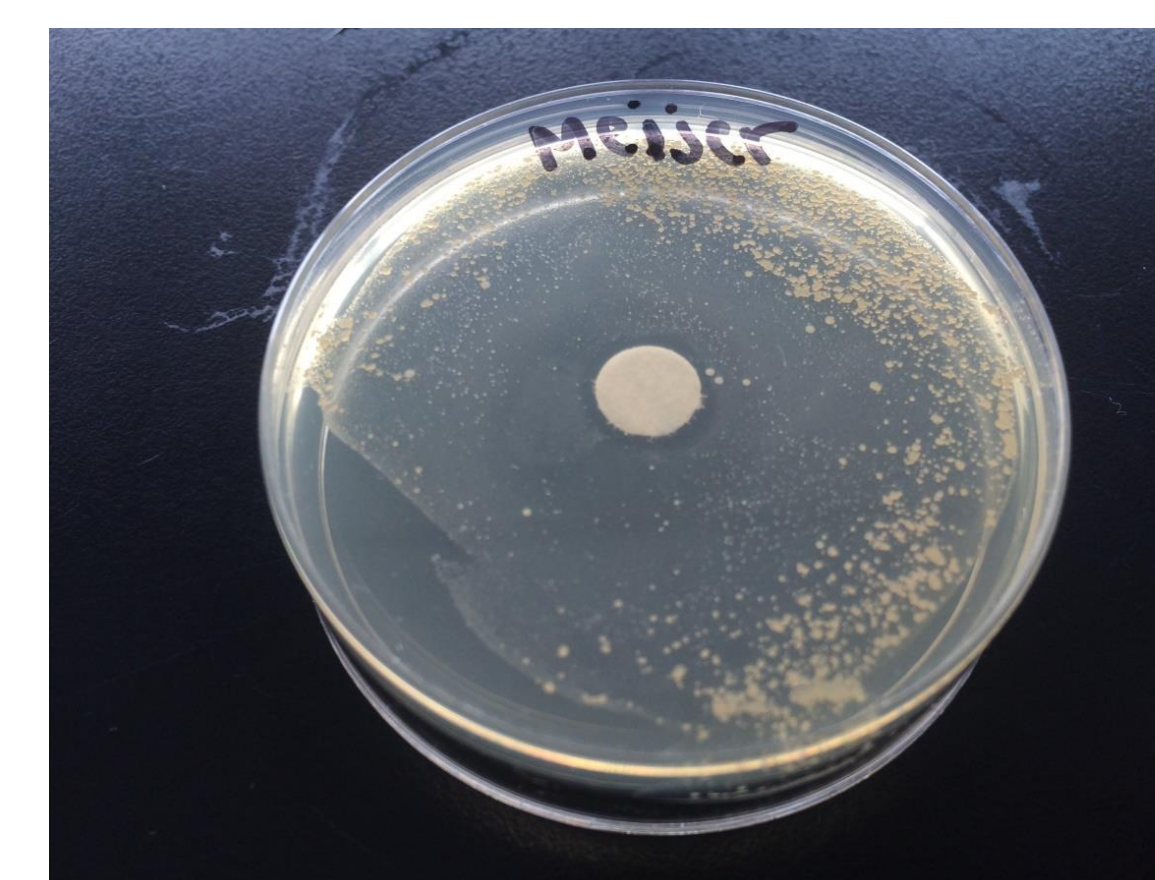

Act Total Care

Colgate Total (alcohol free)
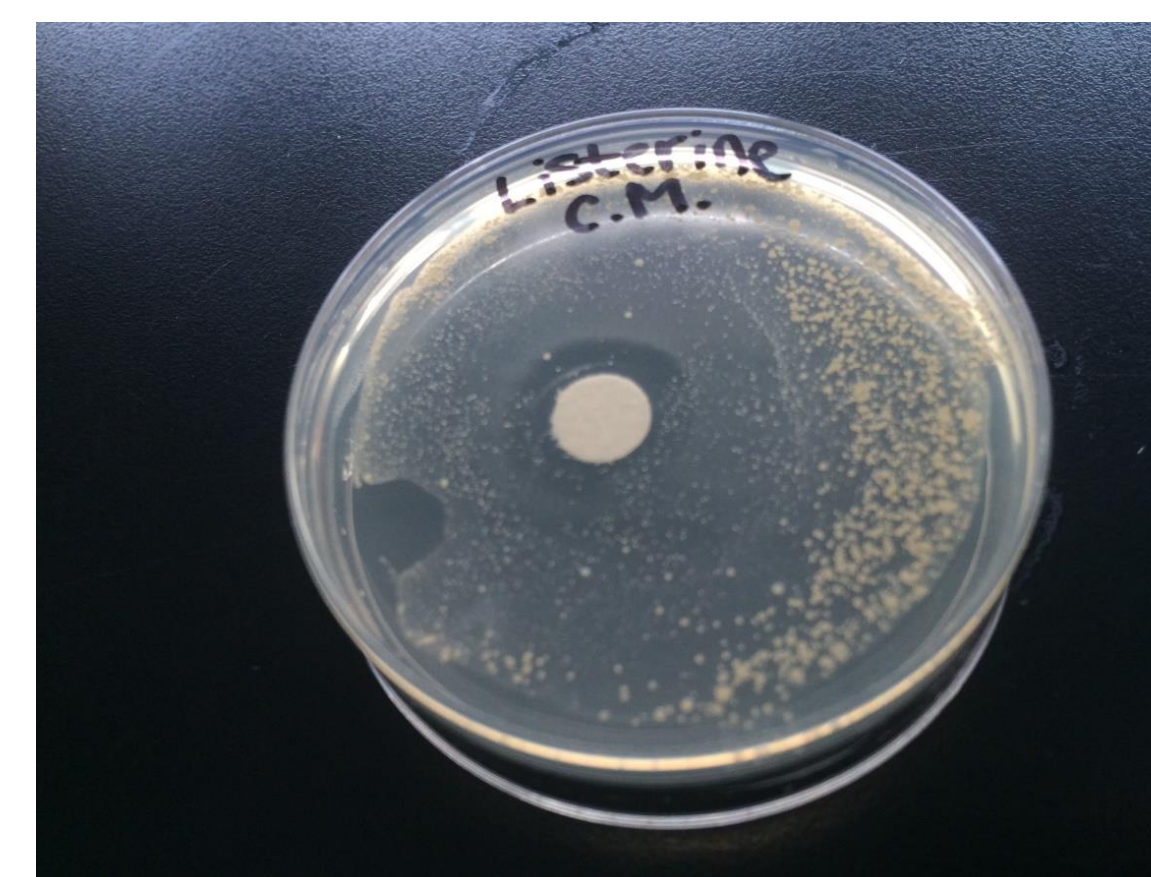

Crest Pro-Health (alcohol free)

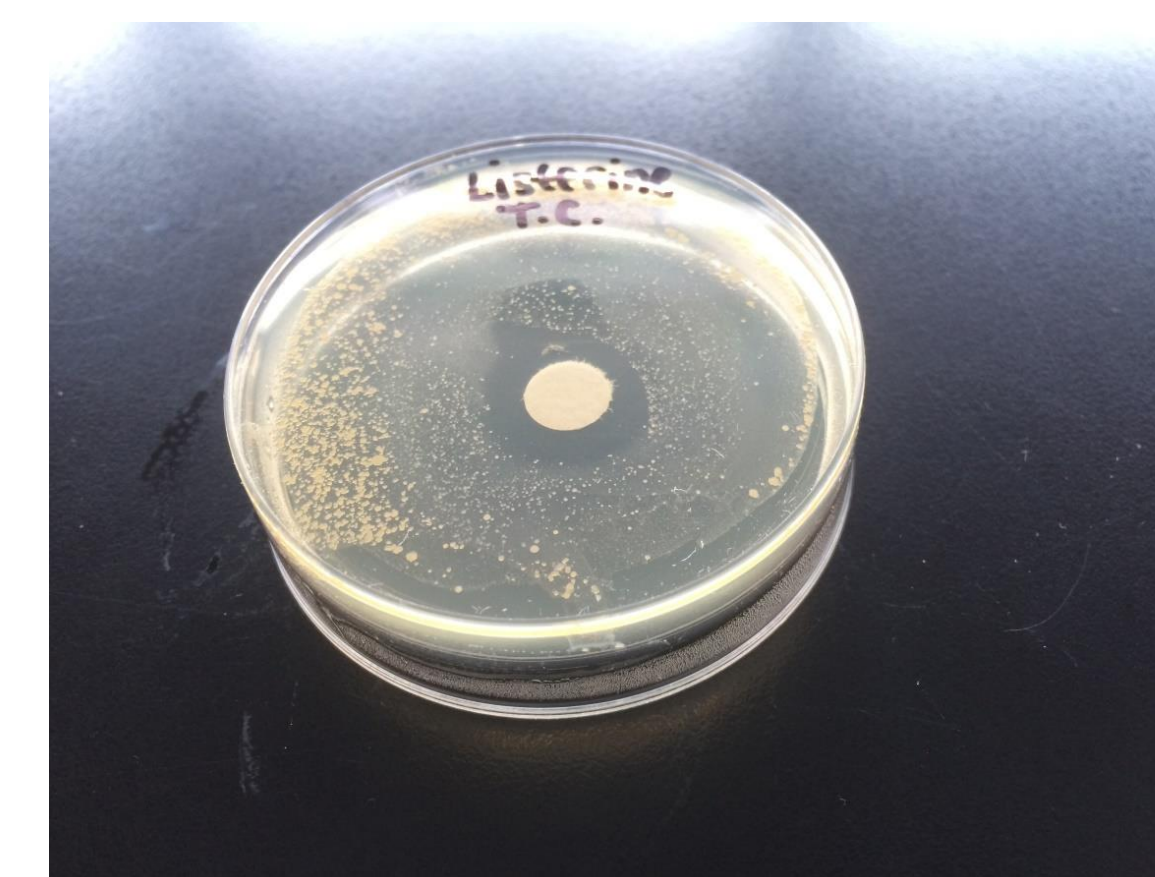Listerine Ultraclean

Meijer Antiseptic

Listerine Cool Mint

Listerine Total Care

Mouthwash	Zone of Reduction (mm)
Scope	11.8
Act Total Care	21.9
Colgate Total	22.3
Crest Pro-Health	25.8
Listerine Ultraclean	32.4
Meijer Antiseptic	35.8
Listerine Cool Mint	36.2
Listerine Total Care	38.2

Mouthwash Ingredients

Mouthwash	Active Ingredients	Alcohol
Scope	Cetylpyridinium Chloride	15%
Act Total Care	Sodium Fluoride (.05%)	11%
Colgate Total	Cetylpyridinium Chloride	None
Crest Pro-Health	Cetylpyridinium Chloride	None
Listerine Ultraclean	Eucalyptol (.092%) Menthol (.042%) Methyl Salicylate (.06%) Thymol (.064%)	21.6%
Meijer Antiseptic	Eucalyptol (.092%) Menthol (.042%) Methyl Salicylate (.06%) Thymol (.064%)	21.6%
Listerine Cool Mint	Eucalyptol (.092%) Menthol (.042%) Methyl Salicylate (.06%) Thymol (.064%)	21.6%
Listerine Total Care	Sodium Fluoride (.02%)	11%

Discussion

Effective mouthwash is determined by how well it reduces the microbial load in the mouth. Because mouthwash is not meant to kill all the bacteria in the mouth, measuring the small area around the disc where no growth is observed would be meaningless. Instead, I measured what I considered to be the zone of reduction, or the area around the paper disc where a substantial reduction in microbial growth occurred. According to the zones of reduction, Listerine Total Care mouthwash is the most effective in reducing the amount of oral bacteria while Scope proved to be the least effective. Although the alcohol free mouthwashes, Crest and Colgate were not the least effective, they were less effective than all the mouthwashes containing the most alcohol, Meijer Antiseptic and the three types of Listerine. Eucalyptol, Menthol, Methyl Salicylate, and Thymol seemed to be an adequate combination of ingredients for effective mouthwash. Cetylpiridinium chloride, on the other hand, was a weak ingredient in reducing the bacterial load. In addition, All three Listerine mouthwashes gave similar results and fell next to one another on the efficacy ranking. Such results point to the power of advertising. While the Listerine mouthwashes are similar in efficacy, they appeal to various consumers due to their different labels. It should be noted that some inconsistency exists. The active ingredient, sodium fluoride is found in the most efficient mouthwash and one of the least effective. It's possible this is due to the difference in alcohol concentrations.

Conclusion

This study found Listerine Total Care to be the most effective mouthwash in reducing the microbial load and Scope to be the least effective.

Acknowledgements