

Investigating the property of *Apium graveolens* as a potential inhibitory agent against *Streptococcus pyogenes*

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Introduction

Streptococcus pyogenes is a common human pathogen that causes a variety of symptoms, from small localized infections to potentially lethal invasive infections. Celery, scientifically known as *Apium graveolens*, has been used in traditional medicine for its alleged health benefits, including its potential antibacterial properties. Studies have shown that many plant extracts can impede bacterial development, and *A. graveolens*, which contains a diverse array of bioactive chemicals, exhibits potential for further exploration. Based on literature, the components of *A. graveolens* stalk that may be used as an inhibitory agent against *S. pyogenes* are apigenin, luteolin, and kaempferol, which are flavonoids.

Objectives

This study aims to investigate the properties of *Apium graveolens* stalk extract as a potential inhibitory agent against *S. pyogenes*. It also sought to answer the following sub-problems:

1. What are the zones of inhibition of the different concentrations of *Apium graveolens* stalk extract against *Streptococcus pyogenes*?
2. What concentration of *Apium graveolens* stalk extract is most effective?

The study investigates the antibacterial properties of *Apium graveolens* on *Streptococcus pyogenes*, focusing on its specific components and factors influencing growth and suppression. The research aims to contribute to the development of natural antibacterial agents by understanding the interaction between the plant extract and bacterial pathogens.

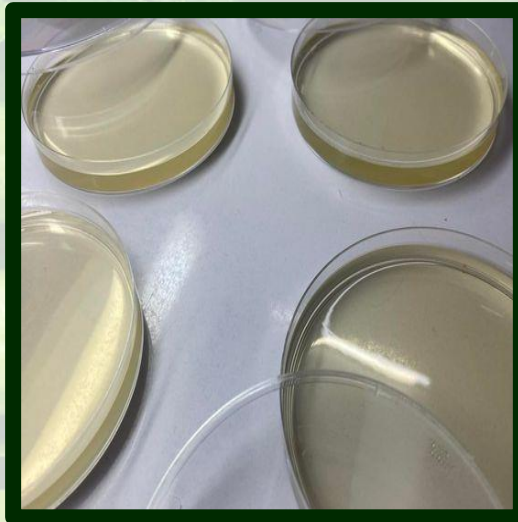
Methodology

**Celery Extract
Preparation**

**Antibiotic
Susceptibility
Testing**

**Instrumentation
and Data
Collection**

**Experimental
Data Analysis**



Results

Table 1 - Antibacterial Action of Celery Stalk's Extract Against *S. pyogenes*

Treatment Concentration	Zone of Inhibition (mm)	Interpretation
50%	11	Resistant
75%	13	Intermediate
100%	15	Susceptible
Control (+) (Penicillin)	20	Susceptible
Control (-) (Distilled Water)	0	Resistant

Table 2 - Antibacterial Action of Celery Stalk's Extract Against *S. pyogenes*

Treatment Concentration	Zone of Inhibition (mm)	Interpretation
50%	14	Susceptible
75%	15	Susceptible
100%	17	Susceptible
Control (+) (Penicillin)	23	Susceptible
Control (-) (Distilled Water)	0	Resistant

Table 3 - Antibacterial Action of Celery Stalk's Extract Against *S. pyogenes*

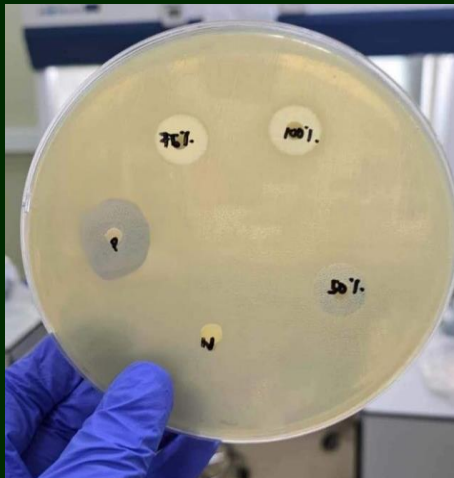
Treatment Concentration	Zone of Inhibition (mm)	Interpretation
50%	13	Intermediate
75%	15	Susceptible
100%	16	Susceptible
Control (+) (Penicillin)	23	Susceptible
Control (-) (Distilled Water)	0	Resistant

Results

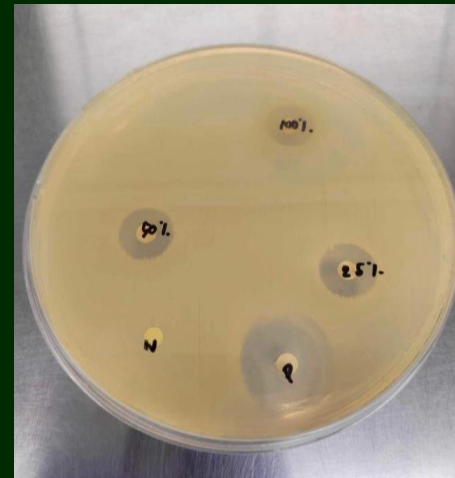
Table 4 - Inhibitory Mean Against *S. pyogenes*

Celery Stalk Extract Mean	Concentration
15.67	100%
14.67	75%
12.67	50%

Trial 1



Trial 2



Trial 3



Results

The means of the different concentrations' zone of inhibitions of *Streptococcus pyogenes* on *Apium graveolens* (celery) stalk extract were 12.67 for 50% concentration, 14.67 for 75%, 15.67 for 100%, and 23 for (+) control penicillin.

The most effective concentration of *A. graveolens* was 100%, which had the mean of 15.67 and was known to be susceptible to *S. pyogenes*.

Conclusion

The study reveals that celery stalks possess antibacterial properties against *Streptococcus pyogenes* due to their flavonoids and phenolic acid compounds, making them an effective inhibitory agent against this bacterial strain.

Recommendations

1. To investigate more on the antimicrobial activity of Celery stalk against other bacterial microorganisms.
2. To use other solvents besides ethanol for extracting phenolic compounds of the celery.
3. To lengthen the duration of submerging the celery stalk to the solvent for more than 24 hours.
4. To investigate more on the effectivity of the celery by using other concentrations.
5. To explore other parts of celery in preventing antibiotic resistance and reducing the risk of complications with *Streptococcus pyogenes* infections.