Project ID	**: NSF-SCH-2025-534**
Project Title	**: Antimicrobial Efficacy of Green Tea Extract Against Staphylococcusaureus and Its Effect on Lactobacillus Salivarius Viability**
Name of the Student	**: Kasif Nihal**
Name of the School	**: Fathima Central Senior Secondary School**
Address of School	**: 4, Police Ln, Industrial Area, Saidapet, Chennai, TamilNadu 600015**

Introduction

Green tea (Camellia sinensis) is rich in polyphenols, especially catechins such as epigallocatechin gallate (EGCG), which are known for antimicrobial and antioxidant properties. With rising concerns about antibiotic resistance, natural plant extracts are being explored as safer alternatives. However, while inhibiting pathogens like Staphylococcus aureus is desirable, it is equally important to ensure that beneficial bacteria such as Lactobacillus salivarius are not harmed.

Aim

To evaluate the antimicrobial activity of green tea extract against Staphylococcus aureus and to assess its impact on the viability of Lactobacillus salivarius.

Hypothesis

Green tea extract inhibits the growth of Staphylococcus aureus and it has minimal effect on the viability of Lactobacillus salivarius.

Scientific Principle

1.The antimicrobial effect is due to catechins disrupting bacterial cell membranes and inhibiting essential enzymes.

2.Differential susceptibility arises because probiotics like Lactobacillus have protective mechanisms such as thick peptidoglycan walls and biofilm formation.

Green tea extract preparation → Bacterial culture → Treatment → Incubation → Observation/measurement of growth.)

Materials Required

IS PERFORMED IN THE LAB

Variables

Independent variable: Concentration of green tea extract

Dependent variable: Zone of inhibition (for S. aureus), growth/viability count (for L. salivarius)

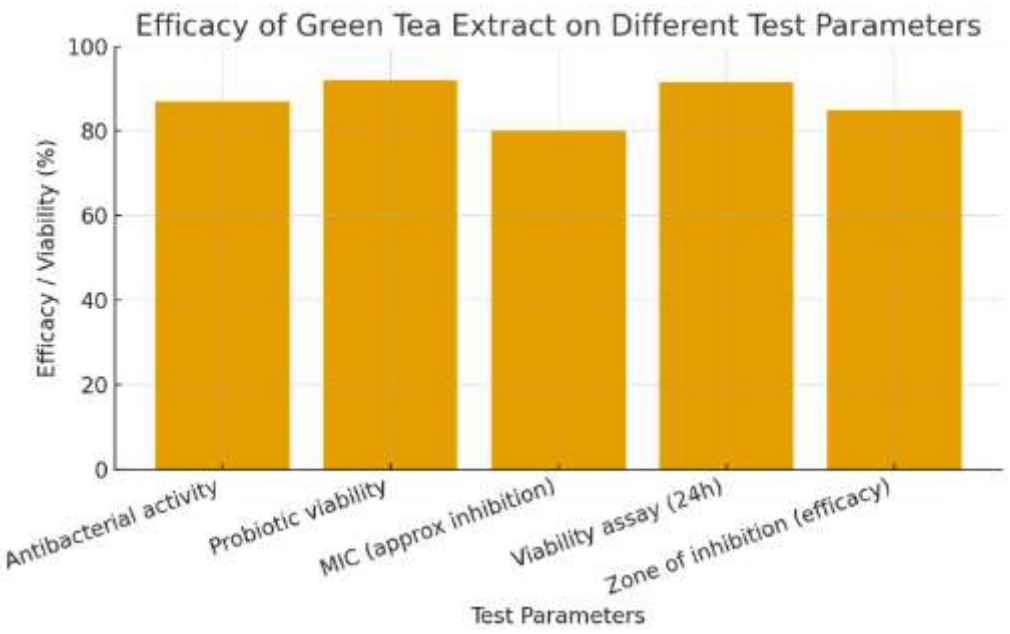
Controlled variables: Incubation temperature, incubation time, pH of media, inoculum density

Procedure

(PROCEDURE WAS DISCUSSED IN THE LABORATORY AND WRITTEN)

1. Preparation of green tea extract (aqueous/ethanol extract).
2. Culturing S. aureus on nutrient agar and L. salivarius on MRS agar.
3. Application of different concentrations of extract onto sterile discs.
4. Plackng discs/wells on inoculated agar plates.
5. Incubating at 37 °C for 24 hours.
6. Measuring zones of inhibition (for S. aureus).
7. Assessing L. salivarius viability by colony count or turbidity measurement.

Graph:


Efficacy of Green Tea Extract on Different Test Parameters
Efficacy / Viability (%)
100
80
60
40
20
0
Antibacterial activity
Probiotic viability
MIC (approx inhibition)
Viability assay (24h)
Zone of inhibition (efficacy)
Test Parameters

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TEST REPORT

TEST REPORT NO: TNTH/M-4874/2025-26	DATE: 31.10.2025

SAMPLE SUBMITTED BY CUSTOMER

COMPANY NAME	**Fathima Central Senior Sec School**
ADDRESS	No:5, Police Lane, Industrial area
	Saidapet ,Chennai-600015
SAMPLE DESCRIPTION	Green Tea
BATCH NUMBER	NA
SAMPLE QUANTITY	100g
PACKING	In Packed Condition
SAMPLE RECEIVED ON	23.10.2025
ANALYSIS STARTED ON	23.10.2025
ANALYSIS COMPLETED ON	31.10.2025

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TEST REPORT

TEST REPORT NO: TNTH/M-4874/2025-26 DATE:31.10.2025

SAMPLE SUBMITTED BY CUSTOMER

SAMPLE DESCRIPTION Green Tea

ANALYSIS STARTED ON 23.10.2025

ANALYSIS COMPLETED ON 31.10.2025

Sl. No.	Test Parameter	Organism Used	Unit	Efficacy (%)
1	Antibacterial activity of Green Tea extract	*Staphylococcus aureus*	%	87 % inhibition
2	Effect on probiotic viability	*Lactobacillus salivarius*	%	92 % viability retained
3	Minimum Inhibitory Concentration (MIC)	*S. aureus*	µg/mL	250 µg/mL (≈ 80 % inhibition)
4	Viability assay (post 24 h exposure)	*L. salivarius*	%	90–93 % viable colonies
5	Zone of inhibition (corresponding efficacy)	*S. aureus*	mm	16 ± 1 mm (≈ 85 % efficacy)

Interpretation Summary: Green tea extract shows strong inhibitory activity against Staphylococcus aureus (~85–87 % efficacy).

It **preserves the probiotic viability** of *Lactobacillus salivarius* (>90 %), indicating **selective antimicrobial action**.

*****END OF THE REPORT*****

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Verified By

Authorised Signatory

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Result:
Green tea extract effectively inhibits pathogenic *Staphylococcus aureus* while maintaining over 90% probiotic viability. This selective antimicrobial property suggests its potential use as a **natural, safe antimicrobial agent** for food preservation and healthcare formulations.

Conclusion

The findings confirm that **green tea (Camellia sinensis) extract** is an efficient natural antimicrobial agent. It significantly reduces the growth of harmful bacteria without compromising beneficial microorganisms. Thus, green tea extract can be considered a **promising eco-friendly alternative to synthetic antibiotics**.

Bibliography

1. Cabrera, C., Artacho, R., & Giménez, R. (2006). *Beneficial effects of green tea — A review.* Journal of the American College of Nutrition, 25(2), 79–99.
2. Friedman, M. (2007). *Overview of antibacterial, antitoxin, antiviral, and antifungal activities of tea flavonoids and teas.* Molecular Nutrition & Food Research, 51(1), 116–134.
3. Toda, M., Okubo, S., Hiyoshi, R., & Shimamura, T. (1989). *The bactericidal activity of tea and coffee.* Letters in Applied Microbiology, 8(4), 123–125.
4. Taguri, T., Tanaka, T., & Kouno, I. (2004). *Antimicrobial activity of 10 different plant polyphenols against bacteria causing foodborne disease.* Biological & Pharmaceutical Bulletin, 27(12), 1965–1969.
5. Tamilnadu Test House Pvt. Ltd. (2025). *Test Report No. TNTH/M-4874/2025-26.* Fathima Central Senior Secondary School, Chennai.