



Shampoo Effect on Human Scalp

Mr. Vikas Sharma

ZSCT's Thakur Shyamnarayan Degree College, Mumbai, India

Abstract: *If the human scalp is not completely and frequently cleansed with the proper cleansing agents, such as shampoos, it is vulnerable to microbial build-up. The surfactant is typically the first ingredient added since subsequent ingredients, particularly those that impact viscosity, can make it more challenging to dilute the surfactant. The medicated shampoo was designed to cleanse the scalp, condition the hair and also eliminate fungal and bacterial microbes which can cause scalp disorders and diseases. The multifunctional shampoo was designed to cleanse, condition the hair and principally eliminate fungal and bacterial microbes which can cause scalp disorders and diseases.*

Keywords: Staphylococcus Aureus, Escherichia Coli, Shampoo, Scalp disorders

I. INTRODUCTION

An essential part of personal grooming is the frequent bathing that keeps the scalp and hair clean and healthy. Clean, well-groomed hair is attractive and gives one more confidence. We use some shampoo like Head & shoulder, Clinic plus, Sun silk, then we use two types of bacteria like Staphylococcus Aureus & Escherichia Coli. In addition to the skin's surface, hair is an important tissue component that can interact with bacteria. Characterizing bacterial adhesion, colonisation, and reactions to hair shafts in general can reveal new knowledge about hair function. We investigate the growth kinetics of Gram-positive Staphylococcus aureus and Staphylococcus epidermidis, as well as Gram-negative Pseudomonas aeruginosa and Escherichia coli, in the presence of human hair shafts in this proof-of-concept study. We investigate how these bacteria can attach to and colonise the surfaces of the hair shaft, as well as how this affects the morphology of the surface of the hair. We demonstrate that while P. aeruginosa and E. coli continue to grow at their normal rates, Gram-positive S. aureus and S. epidermidis are inhibited by hair shafts. We investigate how these bacteria can attach to and colonise the surfaces of the hair shaft, as well as how this affects the morphology of the surface of the hair. We demonstrate that while E. coli's growth kinetics are unaffected, hair shafts inhibit the growth of Gram-positive Staphylococcus Aureus. Apart from the skin surface, hair represents a significant tissue component with a capacity of bacterial interactions. New information can be obtained about hair function through the characterization of bacterial adherence, colonization, and responses to hair shafts per se. In this proof-of-principle study, we examine the growth kinetics of Gram-positive Staphylococcus aureus and Staphylococcus epidermidis, and Gram-negative Pseudomonas aeruginosa and Escherichia coli in the presence of human hair shafts. We explore the ability of these bacteria to adhere to and colonize hair shaft surfaces, as well as the resulting impact on the hair's surface morphology. We show that hair shafts inhibit the growth of Gram-positive S. aureus and S. epidermidis, while the growth kinetics of P. aeruginosa and E. coli remain unaffected. Scanning electron microscope analysis and steeping studies show that P. aeruginosa and E. coli to adhere to and colonize on



human hair shafts without significantly affecting the hair shaft's surface morphology. *P. aeruginosa* produced a substantial amount of biofilm on the hair shaft surfaces, while *E. coli* specifically inhabited the edges of the cuticle scales.

II. PROPERTIES

2.1 Escherichia Coli

The coliform bacterium *E. coli* is a facultative anaerobe, Gram-negative, nonsporulating organism. Usually rod-shaped, cells have a capacity of 0.6 to 0.7 m³, are 2.0 m long, and range in diameter from 0.25 to 1.0 m. The bacteria, which grow on MacConkey agar, are gramme negative, rod-shaped, do not form spores, and are either motile with peritrichous flagella or not motile at all (colonies are 2 to 3 mm in diameter and red or colorless) 5. They don't produce enterotoxins and can develop in both aerobic and anaerobic environments.

2.2 Staphylococcus Aureus

A common component of the body's microbiota, *Staphylococcus aureus* is a Gram-positive, spherically shaped bacterium that belongs to the Bacillota and is frequently found in the upper respiratory tract and on the skin. It frequently exhibits catalase and nitrate reduction activity, and because it is a facultative anaerobe, it may grow without oxygen. [1] *S. aureus* is typically a commensal member of the human microbiota, but it has the potential to transform into an opportunistic pathogen. It is a common cause of food poisoning, sinusitis, and various skin and respiratory infections, including abscesses. By creating virulence factors including strong protein toxins and the production of a cell-surface protein that binds and inactivates antibodies, pathogenic strains frequently aid in the spread of diseases.

III. REQUIEMENT

Disinfectant, cotton, hair cap, bunsen burner, match box, cork borer, test tube stand, & shampoo like Head & shoulder, Clinic plus, Sun silk.

Miscellaneous:

1. Test tubes ×15
2. Nutrient-agar sterile plates ×6
3. Sterile cotton swabs × 6
4. Sterile micropipette
5. Alcohol
6. Pipette
7. Sterile wate
8. Shampoo

Bacterial Sample

Pure culture suspension of :- 1. Escherichia Coli (E-Coli)



Staphylococcus Aureus(S-Aureus)

IV. PERPARATION OF NUTRIENT AGAR MEDIA

Suspend 28 g of Nutrient agar powder in 1L of distilled water

Mix and dissolve them completely

Sterilize by autoclaving at 121°C for 15 minutes

Pour the liquid into the petri-dish and wait for the medium to solidify.

V. METHOD\PROCEDURE

1. Clean the floor where you are performing the practical with the help of disinfectant and cotton.
2. On the flame of bunsen burner with the help of match sticks and make sure that the flame is oxidized.
3. Take sterile nutrient agar media plate and place it between your burners.
4. Now, take the suspension culture of E.coli & S-Aureus sterile cotton swab, inserinate the test tube in which the suspension is kept.
5. Insert the cotton swab in the test tube suspension. Now hold NA plate start swabbing gently in stripping way and do ensure you are rotating the swab.
6. Take one E-coli suspension test tube and start swabbing on 3 and plate of NA & same method do for s-aureus to another
7. the swabbing process is done properly, then draw a four quadrant and each quadrant make holes with help of borer cork .
8. Ready a dilution of shampoo in 15 test tube qudarent in 10^{-1} , 10^{-2} , 10^{-3} .
9. Then put in Incubator for normal room temperature on 24 hr.

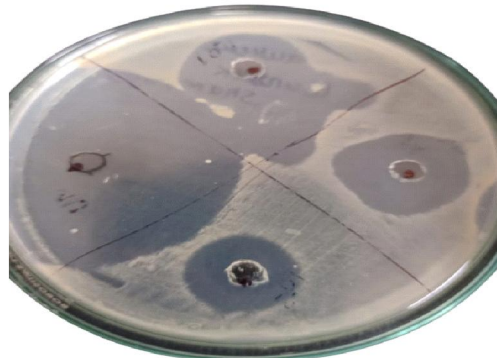
VI. RESULT AND OBSERVATION

S. aureus is sensitive to all other shampoo like Head &Shoulder and Clinic plus & Sunsilk shampoo while. E.coli is only sensitive to clinic plush shampoo .

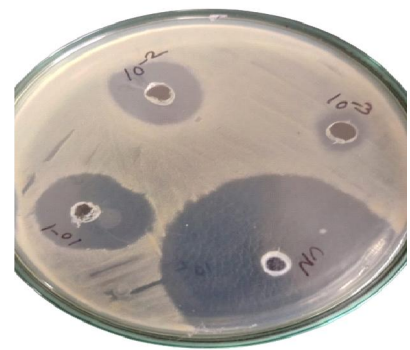
Staphylococcus Aureus(S-Aureus)



A



B.



C.



Escherichia Coli (E-Coli)



VII. CONCLUSION

From this observation it is clear that clinic plus shampoo show more antimicrobial action than Hand & shoulder and sunsilk

REFERENCES

- [1]. Igwebike-Ossi, C. D., Francis, O. O., Boniface, O. (2017). Formulation and Antimicrobial Activity of Triclosan-Based Conditioning Medicated Shampoo. In *International Journal of Applied Chemistry* (Vol. 13, Issue 4).