# THE ISOLATION OF VARIOUS BACTERIA FROM PUBLIC SURFACES

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**Abstract:** The aim of this research is to identify the microbial growth in selected areas at the Universiti Teknologi MARA Perak Branch Tapah Campus. The bacteria were grown on nutrient agar using the streaking method, and the type of bacterium was determined based on microscopic examination. All of the bacteria were discovered to be gram-positive based on microscopic findings from the five places that were picked. These microscopic findings revealed that although the other three samples produced spirochaetes, streptococci, and streptobacilli-like morphologies, two of the bacteria took the shape of staphylococci.

***Keywords:*** *isolation, bacteria, public, surface*

## INTRODUCTION

Several studies have revealed that hands play a crucial role in the transmission and spread of fecal-oral illnesses and that they can house a variety of harmful bacteria (Best et al, 2004). In a study by Itah et al., it was discovered that a variety of contact surfaces, including door handles, tables, windows, chairs, and other common household furniture, were contaminated with Gram-negative enteric bacteria like Klebsiella species, Escherichia coli species, Citrobacter species, and Gram-positive Staphylococcus aureus (Ital et al, 2004). According to Nadia Debuisson's research (2021), contamination with heterotrophic bacteria, total coliform, and Escherichia coli were primarily found on reusable spoons and forks at university cafeterias. Furthermore, Nawas's (2018) research founds, almost all doorknobs in air-conditioner rooms and restrooms are contaminated with possibly hazardous bacteria. Among the bacteria that are frequently found are Staphylococcus aureus (68.8%), Citrobacter freundii (25%), Enterobacter cloacae (18.8%), Rahnella aquatilis (3.3%) and Shigella sonnei (3.3%). The primary goal of this research is to identify the growth of bacteria in certain locations, such as classrooms and cafes at UiTM Perak, utilising the nutrient agar method as the proper type of media to grow bacteria and the method to identify the bacteria.

## METHODOLOGY

### Sample collection and processing

After moving back and forth across the appropriate surface many times with a sterile cotton swab dampened with sterile water, the swab was immediately placed in a zipper lock bag. To prevent exposing germs to the environment for an extended period of time, this procedure was immediately followed by the streaking plate method. The same steps were replicated in various public spaces, including the cafe faucet, cafe plate, and cafe table.

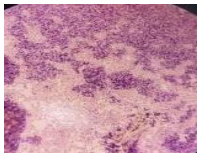
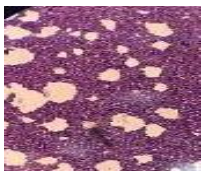
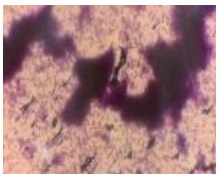
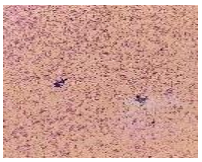
### Isolation and identification

Each plate underwent a 48-hour incubation period at 37°C after the sample from the cotton bud was distributed on the nutrient agar surface. Each isolated colony was selected after incubation for gram staining, and the gram's type and shape form of the bacteria were identified under a 100x magnification microscope.

## FINDINGS

This study highlighted the variety of potential pathogens and presented the striking existence of pathogenic bacteria in public places around UiTM Tapah Campus. Staphylococcus aureus, Shigella sp., Escherichia coli, Salmonella sp. and Clostridium perfringens are common pathogens that may exist on the skin and can cause infectious diarrhea (Hedin et al, 2012).. From the result obtained (Table 1), it shown that most of the samples obtained are gram-positive and have coccus (sphere) shape.

**Table 1**. Isolation of Pathogenic Bacteria Sample Under Microscope

| Sample | Microscopic images | Magnification | Colony Shape | Gram type |
|---|---|---|---|---|
| Classroom Switch |  | 100x | spirochaete | Gram-positive |
| Classroom Doornob |  | 100x | staphylococci | Gram-positive |
| Cafe Faucet |  | 100x | staphylococci | Gram-positive |
| Cafe Plate |  | 100x | streptococci | Gram-positive |
| Cafe Table |  | 100x | streptobacilli | Gram-positive |

Staphylococci were frequently isolated from two samples, the classroom doorknob and café faucet, spirochaetes from the classroom switch, and streptobacilli and streptococci were frequently isolated from the café table and café plate. One or more bacterial growths were present in 80% of the investigated regions. This outcome is quite comparable to Shawk Fakhoury and Tarek Nawas's rate of 93% bacterial contamination in 2018 as stated by Nawas in the year 2018. Moreover, Erik S. Donkor reported in 2020 that staphylococci were the second-most common microbe in the public space.

These bacterial species serve as a reflection of the origin and evolution of the pollution in public spaces. In this study, it's likely that the moment at which the samples were taken had an impact on the quantity of bacteria present. Due to the early morning sampling when most of the class was still being freshly cleaned by the cleaner, the samples from the classroom switch and doorknob had a low colony forming unit (CFU). The antiseptics in the detergent may help to lower the bacterial population in the group. Students were probably not washing their hands or weren't washing them thoroughly when the sample was taken at the café during lunch, which is why there were several types of germs present there. In addition, considering that the café's plate and table were also polluted, it is quite likely that the bad hygiene habits of the staff were to blame. According to a study by, the mere presence of the bacterium should raise concerns about the risk to the general public's health as it relates to food that is primarily spread by direct contact (Eric S Donkor, 2020). Moreover, Staphylococcus sp. in particular can cause a variety of illnesses and infections, including meningitis, septicemia, pneumonia, food poisoning, and infections connected to toxic substances (Eric S Donkor, 2020).

Even if several precautions were already taken, this study may still have limitations because it was completed quickly and inconsistently. It's possible that some bacteria can't grow on the nutritional media that was utilised and won't grow for other unidentified reasons. The research community also gains from the fact that some information about viruses and fungi is left out of this study.

**CONCLUSIONS**

This investigation provides proof that various types of germs are present on all surfaces tested in the classroom and cafe of the UiTM Tapah Campus. According to the findings of the current study, there is a higher chance of contracting serious bacterial infections in the cafeteria than in the classroom. The students should be instructed to properly and frequently wash their hands as well as to supervise the café cleaning. This study can raise awareness of hygiene and create a better, safer campus environment.

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