

Bacterial Contamination of Air in Lucknow Charbagh Railway Station

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ABSTRACT

A total of 10 samples from 5 different locations (i.e canteen table, staircase railings, ATM, train handle, washroom door knob) in Charbagh railway station during November 2013. These were collected with the help of sterile wet cotton swabs which were inoculated directly on nutrient agar plate in the laminar air flow.

For identification of bacteria, different morphological, biochemical test were used. Total number of bacterial isolates from the contaminated surfaces were: canteen table(3), staircase railings(2), ATM(4), train handle(5), washroom door knob(2). The bacterial species generally found were Staphylococcus aureus, Bacillus cereus, E.coli, Klebsiella, Streptococcus spp., Micrococcus, Pseudomonas aeruginosa, , Enterobacteria. The total number of bacteria identified were 7 out of which 4 are non-pathogenic and 3 are pathogenic. Non- pathogenic those are generally harmless are E.coli, Staphylococcus aureus and Bacillus cereus. And pathogenic bacteria cause various type of infections and are Aeromonas, Pseudomonas aeruginosa, Micrococcus spp., Klebsiella spp. The result indicate that pathogenic and non pathogenic bacterial contamination spread out through air by touching on various surfaces in Charbagh railway station like ATM, washroom door knob, staircase railings etc.

Keywords: *morphological, biochemical test, pathogenic, non-pathogenic.*

1. INTRODUCTION

We all think that a major source of spread of pathogen can be direct person to person transfer via sneeze and coughs, but this is actually a very inefficient way of transferring disease. A more efficient way is transfer of human microbial pathogen to a surface or material that is touched by many other individual in the course of their daily lives and to allow each individual touch to mouth or touch to hand to mouth practice to spread infection.

Thus, in case of railway stations, HTO can be efficient intermediaries for spreading person to person and person to person microbial contamination. These micro organisms can be found on

many common sites in railway station which include canteen table, staircase railing, ATM, train handle and washroom door knob.

The various surfaces in railway station where bacterial contamination is found.

ATM

The automatic teller machine has been widely used due to convenience for financial activity. Anti-bacterial company bio cote conducted a study that revealed that ATMs have almost the same ones that will lead to human illness .the best way to combat the germs found at ATMs is to regularly practice good hygiene, remembering to wash your hands often and avoiding touching your face. Those who are especially cautious might want to use an anti bacterial gel after visiting the ATM, however and be careful about where you place your ATM card, as it is also covered in germs,

The possibility of cross contamination of finger during usage of machine with food borne pathogen such as species of *Aeromonos*, *Bacillus*, *Enterobacter*, *Escherichia*, *Klebsiella* and *Salmonella*. Proper cleaning regimen to sanitize these facilities regularly and public education on their hygiene usage are recommended to reduce the associated risks.

Washroom handle

Micro organisms are found everywhere and constitute a major part of every ecosystem. One of most implicated probable source of infection is door handles of toilet and bathroom. Public toilet and bathroom have large traffic of user who throngs in their own microbial flora and other organisms they have picked elsewhere and deposit them on their door handles /knobs while going into convenience and on their way out.

Professionalism, hardly any focus is given to personal hygiene on social etiquette. The most common bacterial contaminant are *Staphylococcus aureus*, followed by *Klebsiella*, *Pneumonia* and *Escherichia coli*, *Pseudomonas aeruginosa* was also present.

Canteen table

One of the major problems faced at canteens of collagens is contamination caused due to unclean tables. This contamination is due to the pieces of food that are present on the tables .This leads to food poisoning which can contaminate caused by eating food contaminated with bacteria, Food which has become contaminated with harmful bacteria .Food which has become contaminated with harmful bacteria does not always taste bad. Some food poisoning disease are more common than other, For example, disease caused by *Staphylococcus aureus* occur a lot more often than disease caused by *Clostridium botulinium*.

Staircase railing

Staircase railings are often contaminated by bacteria in railway station because they are touched by public while using stairs. When people are sick, they often carry germs on their hands. The best way to avoid picking up germs from handrails is to avoid touching them altogether if you can do so safely when on stairs in railway station.

Train handle

Micro organism are known to survive on inanimate 'touch' surface for extended period of time. The surface of copper and its alloy such as brass and bronze are antimicrobial. They have an inherent ability to kill a wide range of harmful microbes relatively rapidly-often within two hours or less and with a high degree of efficacy.

2. MATERIAL AND METHOD

Ten samples were collected from different location of Charbagh Lucknow railway station.

2.1 Sample collection

Total samples from contaminated surface from Lucknow railway station were collected by using sterile cotton swabs. These swabs were dipped in 9% normal saline for 5 minutes. Nutrient agar plates were used for collection of samples. For each site 2 replicate were prepared and then incubated for 48 hours at 30° to 34° C. Pure culture are prepared by sub culturing 2-3 times in nutrient agar medium and then prepare the nutrient broth of different isolates for further biochemical testing.

2.2 Morphological characteristics

Micro organism may show distinguishing gross morphologies when cultured on different media such as Gram staining of bacteria, Eosin methylene blue agar, Phenylthylalcohol, Hektoen Enteric agar and blood agar.

2.3 Biochemical characterization

Different biochemical test were performed for the biochemical characterization of the cultures. These test include: Urease test, Hydrogen sulphide production test, carbohydrate fermentation test, Indole production test, Citrate utilization test, Catalase test, Oxidase test and nitrate reduction test.

3. RESULT AND DISCUSSION

A Total of 6 samples were collected from different location from the various surfaces that are touched publically.

On the basis of primary characterization, the sample were subjected to morphological and biochemical analysis to confirm the identity bacteria .The total number of colonies isolated were 20 out of which 14 are common from various surface, and out of 10 colonies, 7 were identified properly are *Ecoli*, *Staphylococcus aureus*, *Aeromonas*, *Bacillus cereus*, *Micrococcus*, *Klebsiella*, *P.aeroginosa*.

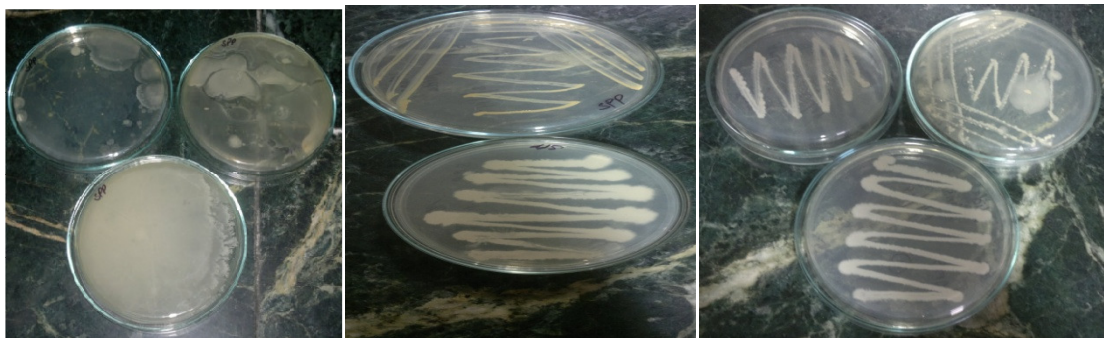


Figure 1: Bacterial culture plates

Table 1: Bacterial analysis of the sample taken from Charbagh Lucknow Railway Station

S.no	Sources of sample	Total number of sample processed	Number samples devoid bacteria	Total number of bacteria isolated	Bacteria identified
1	ATM Machine	2	nil	4	[1]
2	Washroom door knob	2	nil	3	[2]
3	Train handle	2	nil	2	[3]
4	Staircase railing	2	nil	3	[4]
5	Canteen table	2	nil	6	[5]

- [1] *Bacillus cereus*, *Staphylococcus aureus*.
- [2] *Aeromonas*, *Micrococcus*, *Pseudomonas*.
- [3] *Ecoli*, *Staphylococcus*, *Micrococcus*, *Klebsiella*
- [4] *Micrococcus*, *Ecoli*, *Aeromonas*
- [5] *Staphylococcus aureus*, *Aeromonas*.

Table 2: The morphological identification of bacteria based on agar slant culture characteristics of sample taken from contaminated surfaces.

S.No	Agar slant culture characteristics	Probable bacteria
1	White, moist, glistening	<i>E.coli</i>
2	Abundant opaque golden growth	<i>Staphylococcus aureus</i>
3	Abundant, opaque, white waxy growth	<i>Bacillus cereus</i>
4	White regular thin drop growth	<i>Aeromonas</i>
5	Soft, smooth, yellow growth	<i>Micrococcus spp</i>
6	Slimy, white, translucent, raised growth	<i>Klebsiella spp</i>
7	Abundant thin white growth, media turns green	<i>Pseudomonas</i>

Table 3: Biochemical characterization based on 8 biochemical test of samples

S.NO	BIOCHEMICAL TEST	NO OF STRAIN (+)	NUMBER OF STRAIN (-)
1	CATALASE TEST	2	6
2	OXIDASE TEST	1	1
3	HYDROGEN SULHIDE PRODUCTION TEST	1	3
4	NITRATE REDUCTION TEST	3	2
5	INDOLE PRODUCTION TEST	3	2
6	CITRATE TEST	1	2
7	UREASE TEST	2	1

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