Micro-bacterial contamination on door handles and coliform detection

By: Khadidja Meghoufi

Experiment

1. Sterile cotton-tipped applicators were dipped in sterile 0.1% peptone buffer water and swabs were plated in TSA plates.
2. All door handles were individually swabbed, including the inside and outside door handles, both posterior and anterior sides. The door handles tested were located in the Phoenix College, Dalby Building first floor restrooms.
3. Plates were incubated for 24 hours at 37 degrees C.
4. Colony forming units were counted after 24 hour incubation period.
5. Sampling was repeated 17 times over a ten week period.

Coliform Testing on restroom door handles:

1. Sterile cotton-tipped applicators were dipped in sterile 0.1% peptone buffer water and swabs were used to inoculate TSB.
2. TSB samples were used to inoculate Lactose Lauryl Tryptose Broth (LLTB).
3. After incubation in 45 degrees C for 24 hours, positive results, both growth and gas presence, were recorded.
4. The positive results from step 3 were then used for inoculation into Brilliant Green Lactose Broth (BGLB) and EC broth.
5. Positive results from step 4 were used to streak into a highly selective agar, Eosin Methylene Blue(EMB).
6. Positive results from step 5 were used for further confirmation of coliform presence.

Why it’s important?

• Draw attention to micro-bacterial contamination and importance of proper hand-washing techniques.
• Public health awareness

Colony Forming Units on restroom door handles:

Men’s Inside Anterior - - N/A N/A N/A N/A N/A N/A
Men’s Inside Posterior - - N/A N/A N/A N/A N/A N/A
Men’s Outside Anterior - - N/A N/A N/A N/A N/A N/A
Men’s Outside Posterior - - N/A N/A N/A N/A N/A N/A
Women’s Inside Anterior + + + - - - - -
Women’s Inside Posterior + + + - - - - -
Women’s Outside Anterior + + + - - - - -
Women’s Outside Posterior + + + - - - - -

Coliform Testing Data

Coliform Testing Results

<table>
<thead>
<tr>
<th>Medium</th>
<th>Gas</th>
<th>Acid</th>
<th>Gas</th>
<th>Acid</th>
<th>MRSA</th>
<th>E. coli</th>
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<tbody>
<tr>
<td>Lactose Lauryl</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Brilliant Green Lactose</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>EC Broth</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Eosin Methylene Blue</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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</tr>
</tbody>
</table>

Hypothesis

Previous data has shown that women were more knowledgeable than men in proper hand-washing techniques and were more likely to wash their hands after restroom usage. Due to this, I predict that my experiment would show that women’s restroom handles have, on average, fewer bacterial CFU’s than the men’s restroom door handles. Furthermore, the inside door handles of both men’s and women’s restrooms were expected to have more CFU’s than outside door handles.

Conclusions

• Men’s door handles had more CFU’s than the women’s door handles, as expected.
• Men’s inside door handle had more CFU’s than the outside men’s door handle.
• Women’s outside door handles had fewer CFU’s than the inside women’s door handles, which suggests that the women are more likely to properly washing their hands after restroom usage.
• Out of curiosity, the BGLB gas positive samples were tested on EMB agar and the women’s inside posterior sample came back positive for growth after incubation on 45 degrees C, showing good growth but no fermentation of sugars or acid production suggesting the presence of a gram-negative noncoliform bacterium.
• Detection of coliform came back negative.

References


Why it’s important?

• Draw attention to micro-bacterial contamination and importance of proper hand-washing techniques.

Embarrassment

• Public health awareness

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