

# Bacterial Colonization in Computer Keyboards Posses Health Hazard



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**Abstract:** Computer keyboards of a teaching laboratory were examined and bacteria were isolated from computer keyboards. The subsequent tests were done for the bacterial isolates: methyl red, vogus proskaur, citrate utilization, urease and TSI. This study paves the way to look at an inanimate object like computer keyboard as potential reservoir of bacteria.

**Keywords:** Biochemical Analysis, Computer Keyboard, Bacteria

## I. INTRODUCTION

In a latest study conducted in teaching labs, hospitals and homes, it was found that computer keyboards are potential vector for spread of bacteria such as *Staphylococcus* Spp., *E. coli*, *Klebsiella*, *Bacillus* Spp. and *Pseudomonas* Spp. [1]. This lead us to examine the computer keyboards in KARE through microbiology and biochemical tools. We chose the computer keyboards from the computational biology laboratory. Biochemical tests like MR-VP, utilization of citrate, urease and TSI were done for the bacterial isolates. Our research reports the imminent healthiness due to bacteria in computer keyboards to the users.

## II. MATERIALS, METHODS, RESULTS AND DISCUSSION

### A. Isolates of bacteria from the computer keyboards by swab plate method:

Bacteria were isolated from the computer keyboards by swab culture plate method (Figure 1).

### A. Methyl Red test:

Methyl Red-Vogus Proskaur broth was kept in the test tubes, proceeded for autoclaving for about 15 minutes at 121°C and further introduced with bacteria swabbed from the computer keyboards and later kept for incubation. After incubation, 7-8 drops of MR solution was added [2]. Red color development indicated bacterial isolates were methyl Red positive (Figure 2).



Fig. 1. Swabbing of the bacteria from keyboard's surface. Bacterial isolated from 30 different keyboards.

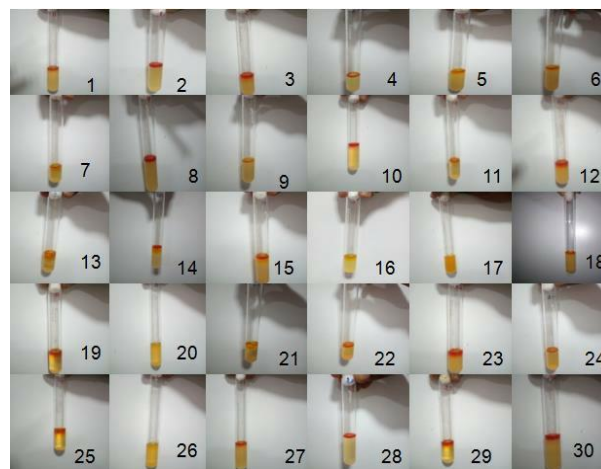


Fig. 2. MR test of the bacteria from 30 different keyboards.

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## B. *Vogus Proskaur test:*

Methyl Red-Vogus Proskaur broth was proceeded for autoclaving for about 15 minutes at 121°C. After autoclaving, the bacteria isolated from the computer keyboard was inoculated into the MR-VP medium and later the test tubes were incubated for a given time period and Barrit's solution was poured and stirred well [3]. The profound rose color pattern indicated that the bacterial isolates were positive for Vogus Proskaur test (Figure 3).

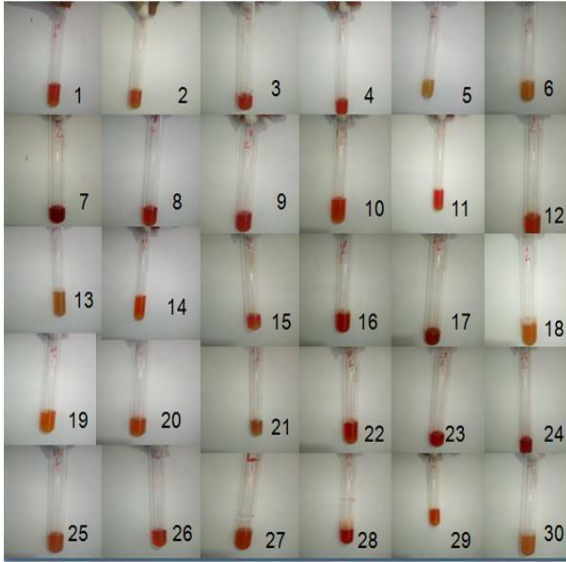


Fig. 3. Vogus Proskaur test for isolated bacteria from 30 different keyboards.

## C. Test for citrate utilization:

The agar containing simmon's citrate was kept in the test tubes and later proceeded for autoclaving for about 15 minutes at 121°C and simmon's citrate slant agar were prepared. The bacteria isolated from computer keyboards were inoculated and kept in incubation [4]. Later, the tubes were examined for hue development. Therefore, the isolates from the keyboards were citrate utilization positive due to the blue color formation (Figure 4).

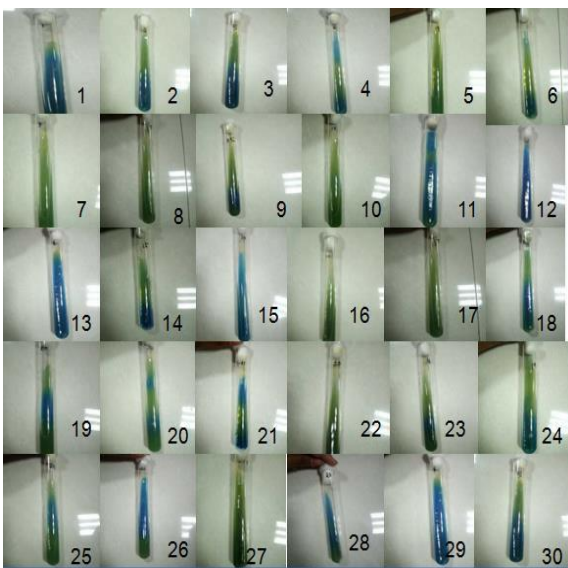


Fig. 4. Citrate utilization test for bacterial isolates from 30 different keyboards.

## D. *Urease test:*

Christensen's urea agar was kept in the test tubes, later proceeded for autoclaving for about 15 minutes at 121°C. The bacteria isolated from computer keyboards were introduced into the agar slants and the test tubes were kept in incubation [5]. Later, Pink color formation was observed and the bacterial isolate from keyboard was Urease positive (Figure 5).



Fig. 5. Test for urease for isolated bacteria from keyboard.

## E. *TSI test:*

TSI agar was kept in the test tubes and later proceeded for autoclaving for about 15 minutes at 121°C and agar slants were prepared and inoculated with bacteria from computer keyboards and kept for incubation [6]. Red colored formation was seen and the bacterial isolate was TSI test positive (Figure 6).



Fig. 6. TSI test for bacterial isolate.

Our study results correlates with the recent findings in a teaching university in Pakistan where it was found that computer keyboards are breeding ground for pathogenic bacteria [7]. More recently, *E. coli* was found abundant on computer keyboard surfaces [8]. Similarly, in 2015, *Pseudomonas species*, *S. aureus*, *S. epidermis*, *E. coli*, *Klebsiella species* and *S. haemolytics* were found to present in computer keyboards [9]. In a study carried out in 2012, it was found that pathogenic bacteria like *Staphylococcus sp.*, *Clostridium sp.*, *Enterococcus sp.*, *Bacillus sp.* had infested the computer keyboards of hospital and library [10].

### III. CONCLUSION

Thus, computer keyboards are breeding grounds of bacteria and it is necessary to follow the basic practices like wiping the computer keyboards with disinfectants to eliminate the spread of pathogenic bacteria from one person to another.

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