

Bacterial Growth on the Surface of used Mobile Phone

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Abstract: *This paper is aimed to examine the presence of pathogenic bacterial growth on the surface of mobile phone. The study was determined about the contamination rate of the health workers operating their mobile phone at the time of work without maintaining hygiene or hand wash which could promote the growth of the microorganism present on hand and easy transfer to the surface of their mobile phone.*

Keywords: Mobile phones, Ethyl alcohol, Incubator, Agar Powered and Petri dish

1. Introduction

In today's scenario mobile phones have become one of the most essential accessories of people presenting in every form of society. In addition to the oral conversation on a telephone, it can also be used for other services such as SMS for text messaging, email and MMS for sending and receiving photos and videos. With variety of services and many functional uses of the mobile phone, it became very easy to overlook the health hazard it poses to its users. The persistent handling of the mobile phones by the users in hospitals including patients, visitors and health care workers, makes it prone to easy growth and transfer of microorganisms as well as hospital associated infections. This is especially so with the skin due to the moisture and optimum temperature of human body especially our palm and other parts of the body [1]. Microbes played a very vital role in maintaining the hygiene of a healthy human life. People believe that microbes are present only at the infectious places like garbage heap, hospitals and clinics and they have false belief of security in other places. Lack of awareness about where the germs could occur and be the cause of health problems. In fact hand contact with the other objects is the major cause of the spread of 80% of infections [2]. Presence of Bacteria can be seen almost everywhere in air, soil, water, food and in plants and animals including humans. It is generally accepted that non-living objects can also carry microorganisms originating from the surrounding environment. Mainly Gram positive cocci (*Staphylococcus*, *Micrococcus*), but also spore-forming rods (*Bacillus* spp.) or Gram-negative bacteria, can be transmitted or spread through devices like mobile phones [3]. These microorganisms have a potential to be transferred to food or human body where the growth of bacteria can be favor. Moreover, formation of biofilm by one bacterial agent can affect the existence of other pathogens on the same surface. Mobile phone usage has a private character as being used in the close proximity of the body parts like the face, ears, nose, lips, and hands which are the most common entrances of infections. Transferred microorganisms can be suppressed in human with immune system or it may cause opportunistic infections and mild to chronic disease [4]. Although mobile phones are habitually kept in bags or pockets they are frequently handled and held close to the face [5]. Mobile phones can cause infectious diseases by

their regular contact with hands [6]. They have been also stated to be a source of microorganisms [7]. In several areas of the world mobile phone usage has increased intensely, hence the percentage of presence of bacteria is likely to be very high in hospitals, abattoirs, market places and places-of-convenience. This could enhance the pathogen transmission and strengthened the difficulty of interrupting disease spread [8]. With the increased in the evidences that contaminated fomites or surfaces play a key role in the spread of bacterial infections with antimicrobial resistance [9]. Antimicrobial resistance is a universal phenomenon that has resulted in high morbidity and mortality as a result of treatment failures and increased the health care costs [10].

2. Material and Method

Material: Highly pure Ethanol (99.9%) of density 0.790g/cm³ obtained from the MERCK were used for preparing samples in different concentration. Distilled water from laboratory was collected. The laboratory work was carried out at the biology division of Sherlock Institute of Forensic Science laboratory Delhi, India.

Method: Samples were collected from the surface of 25 mobile phone, aseptically with sterile swabs moistened with ethanol and by rolling over the exposed surfaces of the mobile phones. Maximum swabs were taken from the buttons of the keypad; screen, mouthpiece, earpiece, sides and back of the mobile phones were properly swabbed since these areas are the most frequent spots of contact with the fingers.

Media Preparation and Isolation of Bacteria

Nutrient agar powder was reconstituted and sterilized according to the manufacturer's instruction. The molten agar was allowed to cool and poured onto sterile petri-dishes. They were allowed to set and stored in the refrigerator for subsequent uses. Sample was collected from the upper and lower region of each mobile phone with a sterile swab stick. The samples were inoculated onto agar plates and streaked out with sterile wire-loop. These were incubated aerobically at 37^oc for 48 – 72 hours and examined for growth.

Quality control

Each sterile swab sticks were inoculated onto nutrient agar plates and prepared agar plates were incubated overnight to check sterility.

3. Results and Discussion

Discussion

Before sanitizing the huge amount of bacterial growth on mobile phones as shown in Figure 1.



Figure 1: Before sanitizer bacterial growth on mobile phones

Discussion: The pure ethanol (99.9%) swab taken from mobile phones no bacterial growth observed as shown in Figure 2.

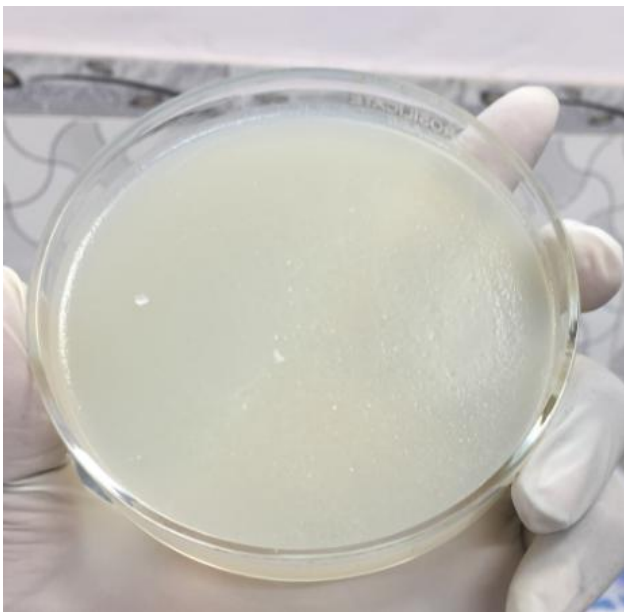


Figure 2: After sanitizer of pure ethanol no Bacterial growth (Fig-2)

Discussion: As we diluted the ethanol (70ml) with distilled water (30ml), the ethanol percentage decreases the bacterial growth is observed as shown in Figure3.

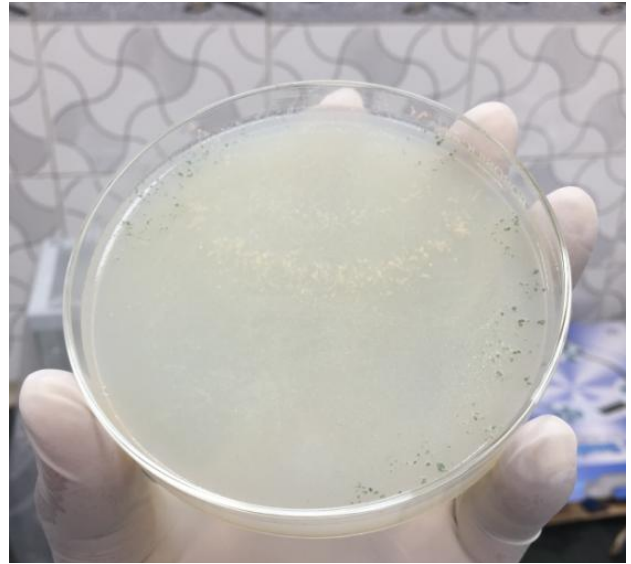


Figure 3: Less colony of bacterial growth in 30% diluted ethanol (Fig-3)

Discussion: As we diluted the ethanol (50ml) with distilled water (50ml), as the ethanol percentage decreases the bacterial growth is increases in large amount as shown in Figure 4.

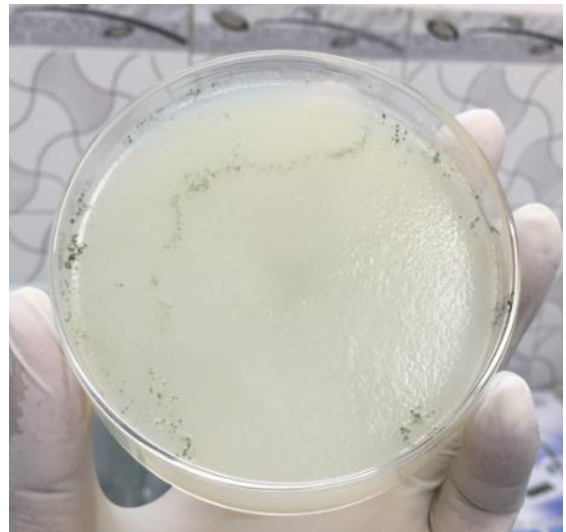
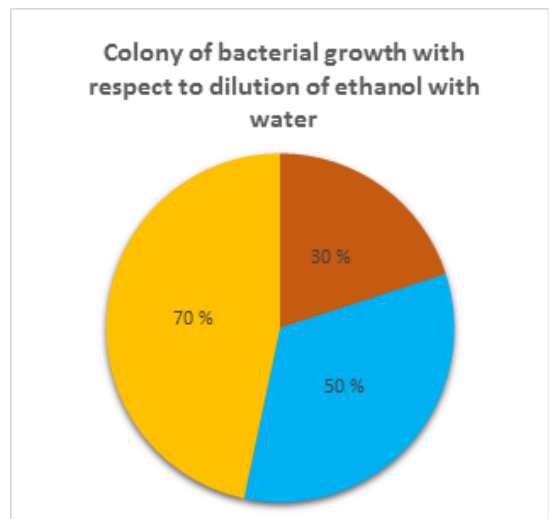


Figure 4: Large colony of bacterial growth in 50% diluted ethanol (Fig-4)



Discussion: As we diluted ethanol with normal saline, by decreasing the ethanol percentage, the bacterial growth increases.

4. Conclusion

All mobile phone samples were infected with various types of bacteria which are highly resistance to commonly used antibiotics. This concluded that microorganisms can inhabitants the mobile phones and be the source of various types of infectious diseases. So, regular cleaning of mobile phones with disinfectants or hand cleaning detergents as well as frequent hand-washing should be encouraged as a means of restricting any potential disease transmission.

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