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# Antibacterial Efficiency of Tetracycline and Ciprofloxacin on Mobile Phone Microflora

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**ABSTRACT**

*Mobile phones are used for a variety of purposes. Mobile phone is not only used for the welfare of humankind but also its misuse has serious effects on our society worldwide. Many of the cell phones carry bacteria known to cause infection in the premature population. More compelling is the transmission of the bacteria from cell phone to hands. In the present study antimicrobial efficacy of standard antibiotics, tetracycline and ciprofloxacin were evaluated against mobile microflora. The bacteria were isolated by cotton swab method. Morphological and cultural characteristics of mobile Isolates were performed according to standard methods. Results showed that both the antibiotics chosen for study exhibits antibacterial activity on all the isolates. Potential zone of inhibition was formed on IS2 (22mm), MS3 (24mm) & MS 1(22mm), MS2 (18mm),MS3 (22mm) with the respect of tetracycline and ciprofloxacin among all the isolates.*

**Key words**: Mobile phone, antimicrobial efficacy, antibiotics, Tetracycline, Ciprofloxacin.

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## INTRODUCTION

Mobile phone is a widely used personal gadget essential in daily life and is usually kept in close contact with the body. It is used for communication by different group of people in every place including laboratory & clinics. The problems are that many mobile users do not have regard for their personal hygiene. They often touch mobile phones by improper hand washing. The constant handling of improper hygiene of the mobile phone harbors microbes especially those associated with the skin and working environment. The specific features of mobile phones having depressions at the area of key pad and other places make it a heaven of loads of microorganisms. Mobile phones can harbour various potential pathogens and become a source of microflora [1]. From the mobile phones different microorganisms can spread to the other places and people [2].

Mobile communications and wireless data transmission play an important role in health care facilities [3].They come in close contact with the body and serve as a ready surface for colonization [4].Meltzer 2003 also reported role of mobile phones in transmission of infection in study conducted. Mobile phones transmitted infections are therefore a constant threat to public [5].Nosocomial infection represents an important cause of morbidity and mortality. To protect from microorganism today a best option is Antibiotic therapy, now [6] different generation antibiotics are present. The use of antibiotics in both medical has results suppression of pathogens [7].

Antibiotics are one of our most important weapons in fighting bacterial infections and have greatly benefited the health-related quality of human life since their introduction [8].Gentamycin, Erythromycin, Tetracycline, and Ampicillin are well established first line antibiotics for infections, and have been shown to possess broad spectrum of activity against Gram-positive and few Gram-negative organisms at concentrations of 10μg/ml [9].The present study was undertaken to investigate the efficacy of antibiotics against microorganisms isolated from mobile phone.

## MATERIALS AND METHODS

**Sample Collection from mobile phone**

The bacteria were isolated by swabbing the surface of mobile phone of a person working in microbiology lab. Sterile cotton swab moistened with sterile saline was rotated in clockwise direction on the mobile phone twice and then isolated immediately on nutrient agar medium. The media were incubated at 37°C for 24 hrs [10].

**Isolation and identification**

Samples were examined for its morphological and biochemical characterization. The initial characterizations of the organisms present in the samples were carried out by direct microscopic examination using staining technique. Biochemical characterization performed by standard methods.

**Antibiotic discs used**

Commercially available antibiotic discs such as Tetracycline and Ciprofloxacin were used.

**Antibacterial activity assay**

A sterile cotton swab was dipped into the cell suspension of the respective isolate inoculated on the entire agar surface of each plate first in a horizontal direction and then in a vertical direction to ensure even distribution of the organisms. Antibiotic discs are placed after 5 min. The inoculated plates were incubated at 37°C for 24-48 hr in an inverted position and the zone of inhibition was recorded [7].

## RESULTS AND DISCUSSION

**Isolation and identification of moblie microflora**

The bacteria were isolated by swabbing on the surface of mobile phone and cultured on nutrient agar medium and incubated at 37°C for 24 hrs and colony morphology were observed and isolates were coded as IS1, IS2, IS3, MS1, MS2, MS3, MS4 & MS5 in Fig 1 and microscopic examination for all isolates (Fig 2) and isolates identification is by biochemical tests was done by standard methods and tabulated in table 1.


**Fig 1 : Morphological characteristics of isolates**

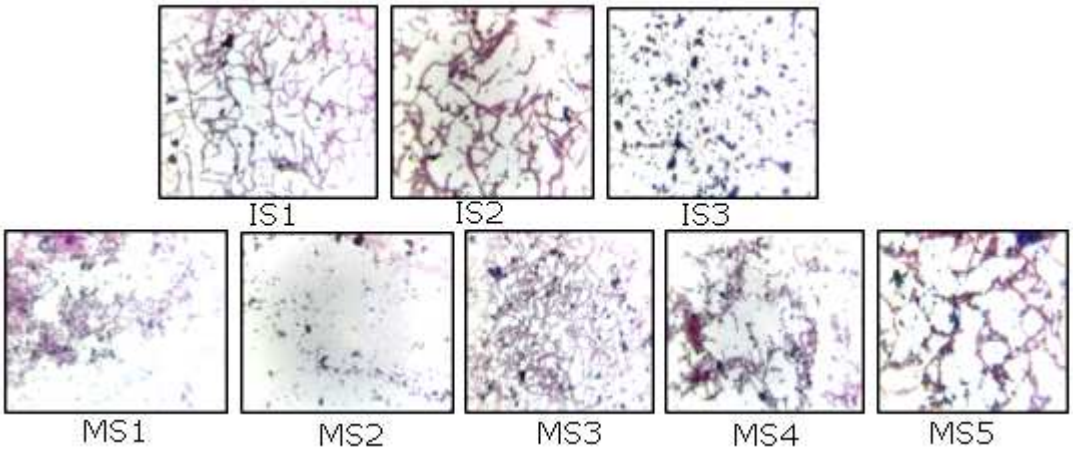


**Fig 2 : Microscopic examination of isolates**

**Table 1: Morphological and biochemical characteristics of mobile isolates**

| | **Morphological tests** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **$IS_1$** | **$IS_2$** | **$IS_3$** | **$MS_1$** | **$MS_2$** | **$MS_3$** | **$MS_4$** | **$MS_5$** |
| **Margin** | smooth | smooth | smooth | Smooth | Smooth | smooth | Smooth | Smooth |
| **Elevation** | Raised | Raised | Raised | Raised | Raised | Raised | Raised | Raised |
| **Pigment** | White | Cream | Cream | White | White | Brown | White | Cream |
| **Opacity** | opaque | opaque | opaque | Opaque | Opaque | opaque | Opaque | Opaque |
| **Gram reaction** | Negative | Negative | Positive | Negative | Negative | Positive | Negative | Negative |
| **Cell shape** | Bacilli | Bacilli | Cocci | Bacilli | Bacilli | Cocci | Bacilli | Bacilli |
| **Biochemical tests** | | | | | | | | |
| **Indole test** | Negative | Negative | Positive | Negative | Negative | Positive | Positive | Positive |
| **MR test** | Negative | Negative | Negative | Positive | Negative | Positive | Negative | Negative |
| **VP test** | Negative | Positive | Positive | Negative | Positive | Negative | Positive | Negative |
| **Citrate** | Positive | Positive | Negative | Positive | Negative | Negative | Positive | Positive |
| **Urease** | Positive | Negative | Negative | Negative | Positive | Positive | Negative | Positive |

## Antibacterial activity assay

Tetracycline and Ciprofloxacin shows potential inhibition activity on all the isolates, which were represented in Figure 3 & Fig 4. Zone of inhibition was represented in Table 2.

**Table 2: Antibacterial activity of Tetracycline and Ciprofloxacin (10mcg/ml)**

| | **Isolates** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antibiotics (10mcg/ml) | $IS_1$ | $IS_2$ | $IS_3$ | $MS_1$ | $MS_2$ | $MS_3$ | $MS_4$ | $MS_5$ |
| Tetracycline | 10 | 10 | 22 | 8 | 10 | 24 | 8 | 12 |
| Ciprofloxacin | 10 | 12 | 12 | 22 | 18 | 22 | 16 | 14 |

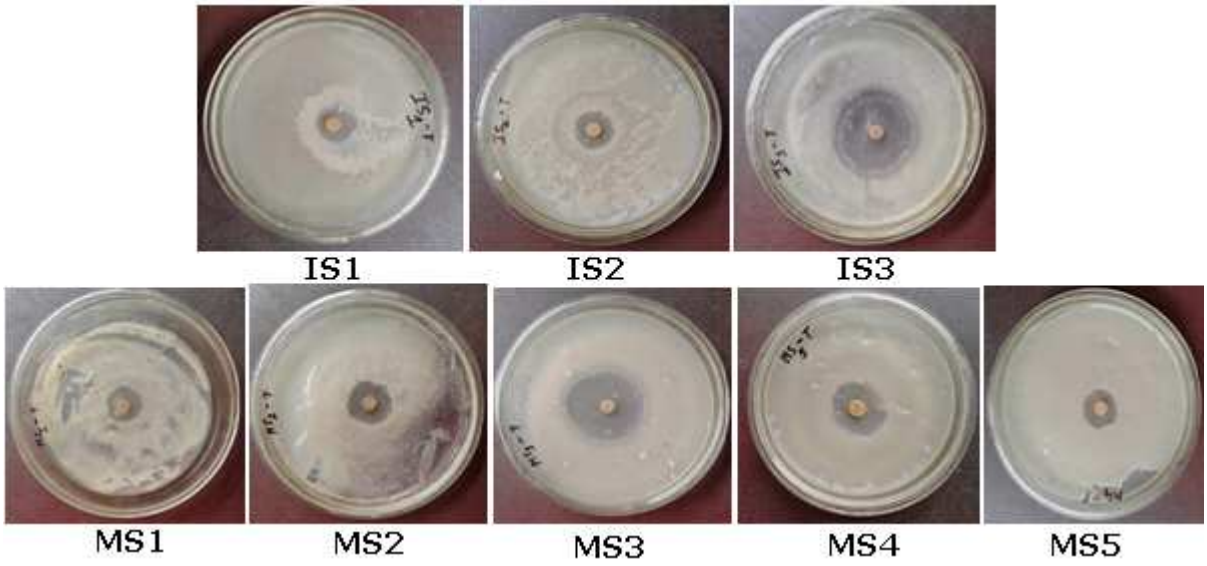


**Fig 3 : Antibacterial activity of Tetracycline on mobile isolates**

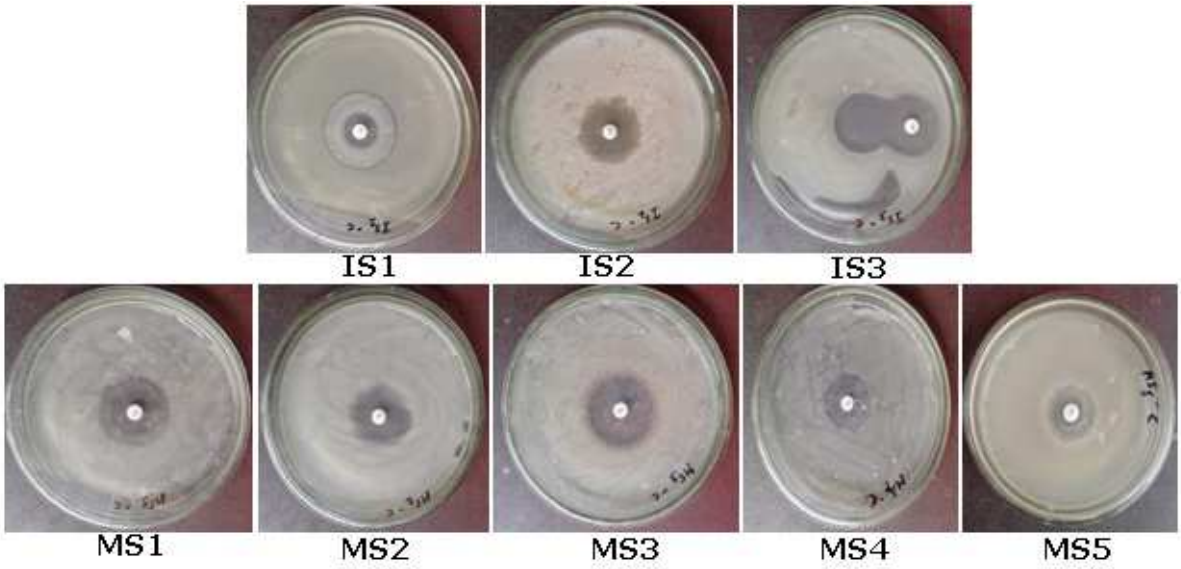


**Fig 4 : Antibacterial activity of Ciprofloxacin on mobile isolates**

Results showed that both the antibiotics chosen for study exhibits antibacterial activity on all the isolates. Potential zone of inhibition was observed on IS3 (22mm), MS3 (24mm) &MS1 (22mm), MS2 (18mm), MS3 (22mm) with the respect of tetracycline and ciprofloxacin among all the isolates.

## CONCLUSION

Microbiological standards in hygiene are necessary for a healthy life. Studies confirm that a variety of microbes were found on mobile phones. As the mobile phones harbor bacteria, in which they are transmitted from one place to other, one person to other person. This leads to the development of microflora on mobile phone surface. Hence the present study concludes that antibiotics are the good replacements for the growth suppression of mobile surface bacteria.

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