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Central European Journal of Experimental Biology, 2013, 2 (1):7-11
(http://scholarsresearchlibrary.com/archive.html)

ISSN: 2278–7364

Antibacterial activity of *Crossandra infundibuliformis* and *Jasminum sambac* against cell phone bacteria

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ABSTRACT

The present study describes the antimicrobial activity of floral extracts of Crossandra infundibuliformis and Jasminum sambac against cell phone bacteria. The cell phone is a basic tool of technology in our modern lifestyle. It harbors a good breeding ground for various micro organisms. It is an exogenous source of nosocomial infections. The cell phone serves as a mechanical vector for the transmission of various potential pathogens. The mixed aerobic bacteria present on the surface of cell phone were isolated. The antimicrobial activity of aqueous extracts of inflorescence of Crossandra infundibuliformis and Jasminum sambac were assessed against the isolated cell phone bacteria. The floral extract demonstrated antimicrobial activity and decreased the count of cell phone bacteria on the surface of the handset. Antimicrobial wet wipes were prepared from cellulosic paper and floral extracts and they demonstrated high efficacy in reducing cell phone bacteria.

Keywords: Cell phone bacteria, antibacterial, *Crossandra infundibuliformis*, *Jasminum sambac*

INTRODUCTION

The recent advances in technology have made the use of Cellular phones (Cell phones or mobile phones) indispensible for daily life. These gadgets are however seldom cleaned or disinfected and are often handled extensively. These cells phones harbor various potential pathogens and have become an exogenous source of nosocomial infection among hospitalized patients and also a potential hazard for transfer of bacteria [1]. The cell phone bacteria come directly in contact with the body and can colonize skin surfaces leading to opportunistic infections [2]. Studies revealed that a number of bacteria are including β-lactamase producing *Escherichia coli*, Methicillin Resistant *Staphylococcus aureus* (MRSA), *Klebsiella* spp. and bacteroides were present on the surface of cell phones [3,4].

MATERIALS AND METHODS

Plant material

Fresh flowers of *Crossandra infundibuliformis* and *Jasminum sambac* were collected from the local market.

Isolation of cell phone bacteria

The study was carried out from June 2010 to March 2011 at the Dept. of Biotechnology, Modern College, Pune, India. Mobile phones of six undergraduate students selected randomly were used for study. The consent of the students was taken and the students were informed prior to isolation of the cell phone bacteria. The bacteria were isolated by swabbing four parts of the cell phone viz. Ear piece (EP), Key pad (KP), Screen (SC) and Mouth piece (MP). Sterile cotton swab moistened with sterile saline was rotated in clockwise direction on the four parts of the cell phones twice and then isolated immediately on Nutrient agar medium (Himedia) for total aerobic bacteria and on Mannitol Salt agar (Himedia) for *Staphylococcus* spp. The media were incubated at 37 °C for 24 – 48 h. The total viable count was recorded as Colony forming units per ml (CFU/ml). All the experiments were performed in triplicate and the result was expressed as average of three readings.

Preparation of extract and assessment of antibacterial activity

The floral extracts were prepared by crushing 10 g of fresh flowers in 100 ml chilled distilled water containing 10 % ethanol. The extract was filtered and used as floral extract. The antibacterial activity of the extracts was assessed against the isolated mixed aerobic cell phone bacteria by agar well diffusion assay as described by Thombre et al. (2012).

Preparation of antibacterial wet wipes

Soft cellulosic tissue paper (Paper Kraft Mfg., India) was used for preparation of antibacterial wet wipes. The tissue paper was dipped in the floral extract for 5 minutes and the excess extract was decanted gently. The wet wipes were maintained aseptically in a sterile petri dish at 10°C till further use.

Application of wet wipes

The efficiency of the wet wipes against cell phone bacteria was studied. The subjects were asked to clean their cell phones with the wet wipes twice a day. Swabs of the cell phone after cleaning the four parts of the mobile phone were taken and the total count of bacteria on nutrient agar and mannitol salt agar was estimated as mentioned above.

RESULTS

Isolation of cell phone bacteria

The cell phone bacteria were isolated on nutrient agar and mannitol salt agar. The total viable bacteria isolated from the cell phones are illustrated in Fig. 1.

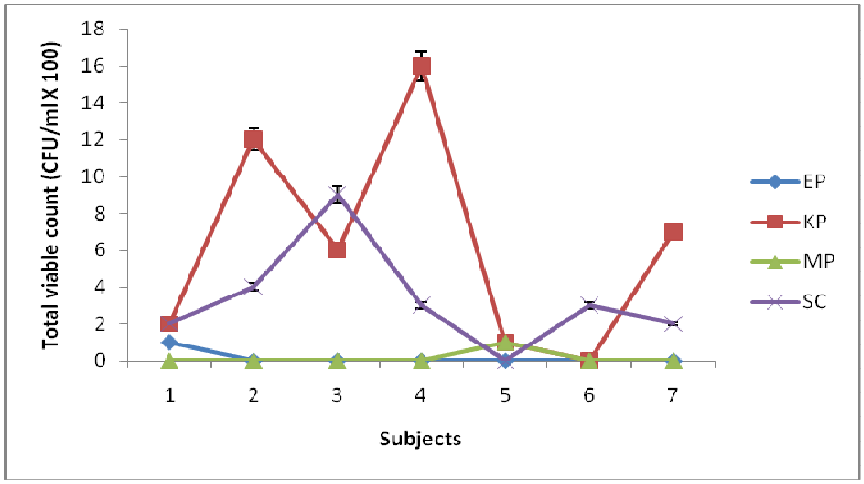


Fig. 1: Total viable count of cell phone bacteria of seven subjects isolated from Ear piece (EP), Key pad (KP), Mouth piece (MP) and Screen (SC) on nutrient agar.

It was observed from Fig. 1. That the key pad of the cell phone had maximum cell count followed by screen, mouth piece and ear piece. As the keypad of the cell phone is used frequently, the bacteria from finger tips are transferred on the key pad, hence the count obtained is greater. The occurrences of *Staphylococci* on the various parts of the cell phone were studied and the results are presented in Fig. 2.

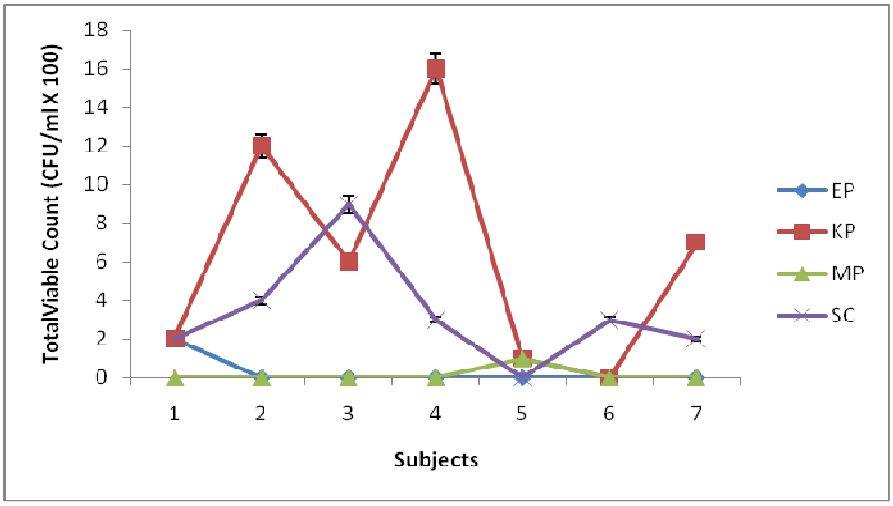


Fig. 2: Total count of *Staphlococci* of seven subjects isolated from Ear piece (EP), Key pad (KP), Mouth piece (MP) and Screen (SC) on mannitol salt agar.

The occurrence of *Staphylococci* was observed on mannitol salt agar, a selective media for isolation of gram positive *Staphylococci*. The viable count of *Staphylococci* was higher in keypad and least on the ear piece.

Preparation of extract and assessment of antibacterial activity

Aqueous extract of *Crossandra infundibuliformis* and *Jasminum sambac* were used for assessing the antibacterial activity against *E. coli*, *S. aureus*, *Bacillus subtilis* and *mixed aerobic cell phone bacteria* by the agar well diffusion assay. The results are presented in Fig. 3.

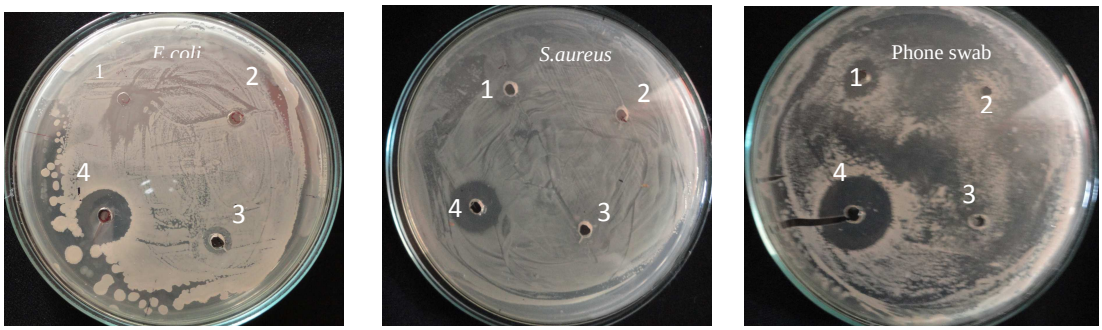
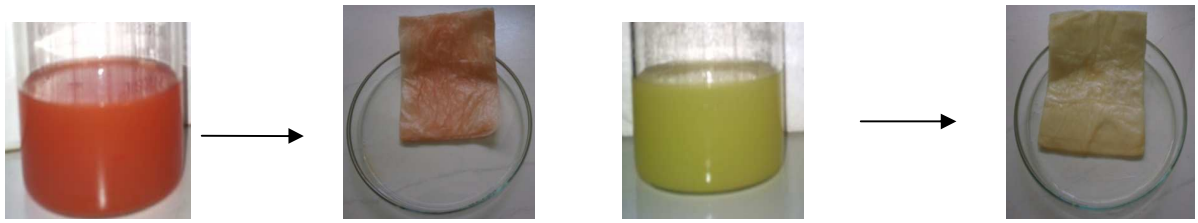


Fig. 3: Antibacterial activity of floral extract against *E. coli*, *S. aureus* and *mixed aerobic cell phone bacteria*. 1-*Crossandra infundibuliformis* flower extract; 2-*Jasminum sambac* flower extract; 3-Distilled water; 4- Hydrochloric acid (1 % as positive control)

The extracts demonstrated good antibacterial activity against cell phone bacteria and gram positive bacteria. The floral extract can thus be used for reducing the bacteria present on cell phone surface by a suitable methods.

Preparation of antibacterial wet wipes

As the extracts cannot be directly used on the surface of bacteria, we developed a method of preparation of wet wipes containing the floral extract for effective use against the cell phone bacteria .The antibacterial wet wipes were prepared by the dip-dry method in the laboratory are illustrated in Fig. 4.



a) b)

Fig. 4: Preparation of antibacterial wet wipes. a) Extract of *Crossandra infundibuliformis*, and wet wipes prepared in extract, *b)* Extract *Jasminum sambac* and wet wipes prepared in extract.

The wet wipes were stored in a sterile petri dish at 10 °C. The wet wipes were stable upto 30 days at 10 °C after which the texture was affected to moisture.

Application of wet wipes

The wet wipes were used for cleaning the different parts of the cell phones as illustrated in Fig. 5.

Fig 5: Application of antibacterial wet wipes for cleaning different parts of cell phone

It was observed that the total count of cell phone bacteria decreases by 60 % on treatment with the wet wipes. Antibacterial wet wipes made from floral extracts can thus be an eco-friendly solution for control of cell phone bacteria.

CONCLUSION

Cell phone bacteria were isolated from various parts of cell phones. The antibacterial activity of two common floral extracts was assessed against cell phone bacteria. A potential product, in the form of an antibacterial wet wipe was prepared using the floral extracts to control the growth of bacteria on surfaces of cell phones. The antibacterial wipes were used effectively to limit the growth of the bacteria.

Acknowledgements

We thank the Principal of Modern College, Pune-5, Dr.R.Zunjarrao for providing facilities for performing the experiments. We also acknowledge and thank the students who volunteered and allowed us to use their cell phones for this study.

REFERENCES

[1] F.Ulger, S.Esen, A.Dilek, K.Yanik, M.Gunaydin & H.Leblebicioglu. *Annals of Clinical Microbiology and Antimicrobials*, **2009**, *8* (1), 7.
[2] P.Srikanth, E.Rajaram, S.Sudharsanam, A.Lakshmanan, U.S.S.Mariappan & K.Jagannathan. *Journal of Infection Prevention*, **2010**, *11* (3), 87-90.
[3] M.S.Tekerekoglu, Y.Duman, A.Serindag, S.S.Cuglan, H.Kaysadu, E.Tunc & Y.Yakupogullari. *American journal of infection control*, **2011**, *39* (5), 383-385.
[4] Al-Mudares, K. Al-Darzi Waleed, G. Mansour Mervat, M.Faeq. *Student Pulse* **2012**, 4(08).
[5] Borer, A., Gilad, J., Smolyakov, R., Eskira, S., Peled, N., Porat, N., Schlaeffer, F. *Infect. Dis.* **2005**, *11* (7), 1160-1161.
[6] R.Brady, A.Wasson, I.Stirling, C.McAllister & N.Damani. *The Journal of hospital infection* **2006**, *62* (1), 123-125.
[7] J.G.Goldblatt, I.Krief, T.Klonsky, D.Haller, V.Milloul, D.M.Sixsmith, I.Potasman. *Infection control and hospital epidemiology* **2007**, *28* (4), 500-503.
[8] J.Jayalakshmi, B.Appalaraju, & S.Usha. *Journal of the Association of Physicians of India* **2008**, *56*, 388-389.
[9] O.Karabay, E.Koçoglu, & M.Tahtaci. *J. Infect Dev Ctries* **2007**, *1*, 72-73.
[10] G.Sepehri, N.Talebizadeh, A.Mirzazadeh, T.R.Mir-shekari & E.Sepehri. *American Journal of Applied Sciences* **2009**, *6* (5), 806-810.
[11] R.Thombre, R. Jagtap, N.Patil. *International Journal of Pharma and Biosciences* **2013**, 4(1), 389 – 396.
[12] R.Thombre, S.Mehta, J.Mohite, P.Jaisinghani. *Inernational Journel of Pharma and Biosciences* **2013**, 4(1), 184-192.