



Research Journal of Pharmaceutical, Biological and Chemical Sciences

Study of the Effect of Mobile Phone Radiation on Antibiotic Sensitivity in Micro organisms (*E. coli*)

Arunkumar G*, J Valsalakumari, Padmaja V, Nagajyothy, Anupama Jayaraj, Sajan MK

Government College of Pharmaceutical Sciences, Medical College Campus, Trivandrum, Kerala, India.

ABSTRACT

Mobile phone radiation exposure for long term is harmful to human beings and other living system. The study was based on the effect of mobile phone radiation on the antibiotic sensitivity in Escherichia Coli. The difference in sensitivity of Escherichia Coli that were exposed to mobile phone radiation were studied. The mechanism of resistance of these pathogenic bacteria has to be found out as soon as possible for improved patient care. This study may be repeated with other type of microorganisms both gram +ve and gram -ve with other antibiotics for further investigations. This study has found that such radio frequency radiation exposed *E.Coli* show decreased sensitivity than other non radiated *E.Coli* towards Gentamycin.

Key words: Mobile phone, Radiation, Antibiotic sensitivity, Resistance, Escherichia Coli, Gentamycin

***Corresponding author**

Email:akg911247@gmail.com



INRODUCTION

There have been numerous reports from previous studies about the untoward effects of mobile phone radiation on human health from long term exposure. Number of other studies is still ongoing. This study is based on the hazardous effect of mobile phone radiation on the susceptibility of microorganism. Here the research was carried out to study the effect of mobile phone radiation on the antibiotic sensitivity of *E.Coli*.

MATERIALS AND METHODS

The study was conducted from 17th August to 16th October 2011 in the microbiology laboratory at College of Pharmaceutical Sciences, Medical College Campus, Trivandrum, Kerala.

Radiation was given by using two mobile phones to the culture medium containing *E.Coli*. All procedures were carried out under strict aseptic condition and all apparatus and medium were previously sterilized.

Biochemical tests were also done to confirm that the culture medium was free from contamination.

Standard *E.Coli* cultures were subcultured into two separate boiling tubes containing nutrient broth medium. One tube labeled as test and other one as standard. Both were placed in BOD incubator. After 24hr both was placed in separate vaccine box. Test culture was placed in vaccine box along with two mobile phones; whereas standard culture was placed in vaccine box without mobile phones. Both boxes were kept in closed condition in aseptic area.

Time and duration of calling are shown below; Calls were made to the two phones in the vaccine box from a third phone in hand.

- Every day 10 periods of calls made to each phone.
- One period included 5 complete continuous calls
- After every one period, given five minute interval to avoid the effect of mobile phone heat to *E.Coli*.

Subculture of both test and standard was made at the interval of five days to prevent death of organism due to destruction of medium. After every subculture from previous test and standard, one day incubation was carried out in BOD incubator and afterwards placed in corresponding boxes as done before. Sensitivity test was carried out after 5 days, 15 days, one month and two month of radiation. Compared the zone of inhibition of the test with that of standard.

Three loopful of previous test and standard organism with 30ml of nutrient broth medium were separately subcultured at an interval of five days. For sensitivity testing 30ml melted nutrient agar was used and 3ml of test and standard culture mixed with it separately in test and standard petridish to find zone of inhibition in both. Gentamycin 10 mcg disc was used as the antibiotic [1-5].

RESULTS AND DISCUSSION

The results of antibiotic sensitivity study are shown in table no.1

Table No.1

No: of days of radiation	Test (cm)	Standard (cm)	Difference (mm)
5	2.4	2.9	5
15	2	2.9	9
30	2	2.9	9
60	2	2.9	9

The above readings indicate that *E.Coli* subjected to mobile phone radiation showed change in its sensitivity (produced resistance) towards Gentamycin. After a particular range of resistance, no change in sensitivity was noted, as the duration of radiation was increased. This study was done on *E.Coli* subjected to radiation directly from a nearby mobile phone. This indicate that, the micro organisms in our environment contains mobile tower radio frequency rays may become resistant. The mechanism of resistance has to be determined. This study should be repeat with other type of micro organisms both gram +ve and gram -ve with other antibiotics. This study on a long term basis might prove to be helpful in fighting the menace of antibiotic resistance.

This is the first study about the effect of mobile phone radiation on antibiotic sensitivity in micro organisms. Biochemical test results for *E.Coli* culture free from contamination was done in both Test and Standard culture, results are depicted in table no.2

Table No.2

Catalase	+ve
Oxidase	+ve
Nitrate	+ve
TSI	A by A
Mannitol	Fermenting and motile
Indol	+ve
MR	+ve
VP	-ve
Citrate	-ve
Urease	-ve



CONCLUSION

The study throws light into resistance developed by microorganisms to normally used antibiotics. This research indicates that the organisms achieve resistance not only due to the numerous commonly known reasons, patient noncompliance etc. But also due to invitro exposure of radio frequency waves. Now our world is surrounded by more number of mobile phone towers and this may cause serious health problems. When a healthy individual infected with micro organism which has previously developed resistance from its environment, it may cause failure of response of the individual to the normally used drug or its dose.

On the basis of this study further research should be necessary about the hazardous affects of non-ionizing radio frequency waves to the pathogenic microorganisms as soon as possible. Then only this study will achieve the success in protection of human health.

ACKNOWLEDGEMENT

I am grateful to, Mrs. P.K. Valsala Kumari Associate Prof. of Pharmaceutics, College of Pharmaceutical Sciences, Medical College, Kottayam. Dr. Joyamma Varkey Prof & Head of department of Pharmacology, College of pharmaceutical sciences, Medical college Trivandrum. M.Pharm Pharmaceutics Students, Vimal. V.V, Soumya Baby John.

REFERENCES

- [1] WHO: Electromagnetic fields and public health: Mobile Phones fact sheet N^o 193 June 2011
- [2] Drug action and drug resistance in bacteria by Susumu Mitsuhashi
- [3] Review of Medical Microbiology by E. Jawelz, J.L. Melnick, E.A. Adelberg 14th edition.
- [4] Baiey and Scotts diagnostic microbiology 12th edition , Betty A. Forbes et al
- [5] Topley and Wilsons microbiology and microbial infections , Leslie collier et al, 9th edition, vol:2