www.jmscr.igmpublication.org
Impact Factor 5.84
Index Copernicus Value: 83.27
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v5i5.54

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Effect of Mobile Radiation in Micro Organism

Authors
Ritu Kela (PhD)[1], Nida Khan (M.Tech)[2], Santosh Rai (B.Sc)[3]
Oriya Khan(B.Sc)[4], Abhishek Kumar (B.Sc)[5]
[1]Department of Bio-Chemistry, College of Applied Education and Health Sciences, Meerut, India
Email: *dean@caehs.edu.in*
[2]Department of Bio-Technology, College of Applied Education and Health Sciences, Meerut, India
Email: *nidak.881@gmail.com*
[3]Department of Bioscience, College of Applied Education and Health Sciences, Meerut, India
Email: *santoshriaidx@gmail.com*
[4]Department of Radiology, College of Applied Education and Health Sciences, Meerut, India
Email: *oriyakhan97@gmail.com*
[5]Department of Radiology, College of Applied Education and Health Sciences, Meerut, India
Email: *abhati728@gmail.com*

ABSTRACT
Exposure of mobile phone radiation is harmful to human beings and other living system. This study was based on the effect of mobile phone radiation on the antibiotic sensitivity in different bacteria. This study show that such mobile phone radiation exposed bacteria show decreased sensitivity than other non-radiated bacteria towards antibiotics.
Key Words: *Mobile phone, Radiation, Antibiotic sensitivity, Resistance, Antibiotics.*

Introduction

There are about 4.7 billion mobile phone users in the world. This wide use of mobile technology have often raisedthe questions related to the health implications for humans[1]. Electromagnetic waves in the range of 450-2100 MHz resulting from mobile phones are altering many biological functions in the living organisms. The incredible ability of antimicrobial resistance shown by microbe in last two decades specially by antibiotic superbug and mycobacterium tuberculosis (MTB) is turning to be a big hindrance in modern medicine, requiring alternative and overdose medications, which may be more expensive or highly toxic in nature. There are many studies in the literature about the effect of electromagnetic waves on living organisms[2-8]. The rapid increase in the use of mobile phones in daily life and the decrease in age of using them have focused this interest on mobile phone and their effect on human health[8-12]. In this study, possible mutating effect of radiation emitted by mobile phone have been investigated. Here the research was carried out to study the effect of mobile phone radiation on the antibiotic sensitivity against two bacteria namely *Pseudomonas aeruginosa* and *Streptococcus pyogenes*.

Material and Methodology

Our research work was conducted at College of Applied Education and Health Sciences, Meerut started from 6thJanuary to 1thApril 2017.

Radiation was given by using four mobile phones to the culture medium containing *Pseudomonas aeruginosa* and *Streptococcus pyogenes*. All procedure were carried out under strict aseptic condition and all apparatus and medium were previously sterilized.

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

Standard culture tube of *Pseudomonas aeruginosa* and *Streptococcus pyogenes* cultures were prepared and microorganism were further subcultured into four separate boiling tubes containing nutrient broth medium .Two tubes were labelled as test and two as standard .All were placed in BOD incubator. After 24 hours broth of both bacteria were placed in separate vaccine box along with two mobile phones; whereas standard culture of both bacteria was placed in vaccine box without mobile phones. All boxes were kept in closed condition in aseptic area.

Time and duration of calling are shown below

1) Every day 20 periods of call made to each phone.
2) One period included 3 complete continuous call.
3) After every one period, given five minutes interval to avoid the effect of mobile phone heat to *Pseudomonas aeruginosa* and *Streptococcus pyogenes.*

Subculture of both the test and standard was made at interval of three days to prevent death of organism due to destruction of medium. For sensitivity testing 30ml melted nutrient agar was used and 3ml of test and standard petridish to find the zone of inhibition. Different antibiotics for both the organism were used.[1-5]

RESULT AND DISCUSSION

Table 1 The result of antibiotic sensitivity study of *Pseudomonas aeruginosa* bacteria against Ciprofloxacin

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	23	28.3	5.3
25	19	28	9
50	19	28	9
100	19	28	9

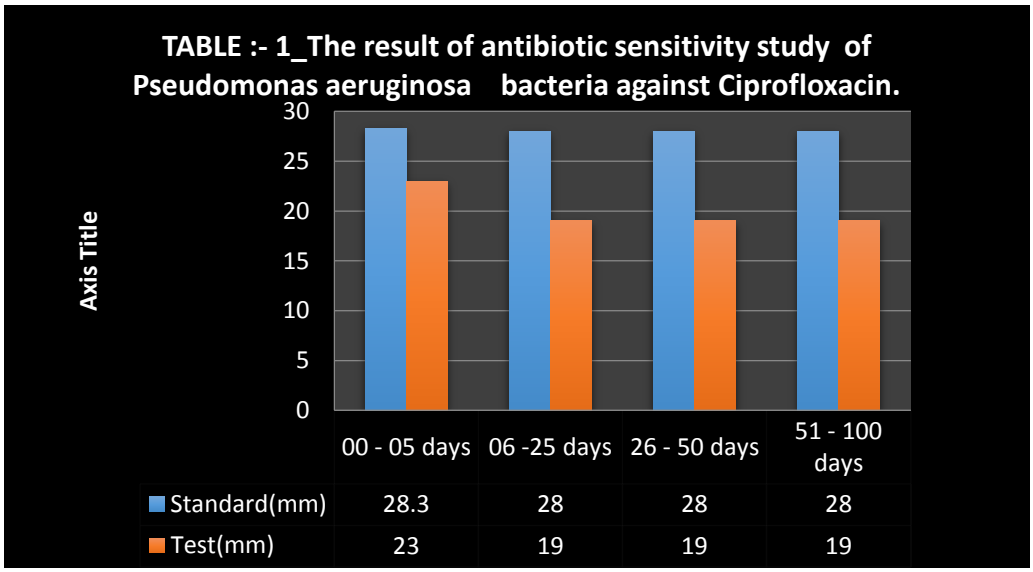


Table 2 . The result of antibiotic sensitivity study of *Pseudomonas aeruginosa* bacteria against Meropenum

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	25	21.6	3.4
25	29	21	8
50	29	21	8
100	29	21	8

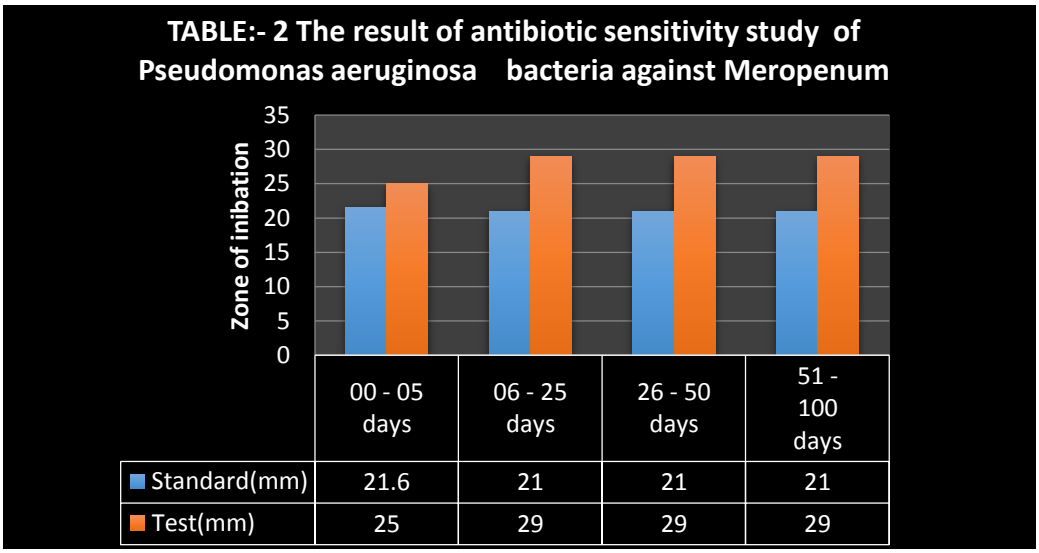


Table 3 The result of antibiotic sensitivity study of *Pseudomonas aeruginosa* bacteria against Azetreonem

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	25	20	5
25	27	20	7
50	27	20	7
100	27	20	7

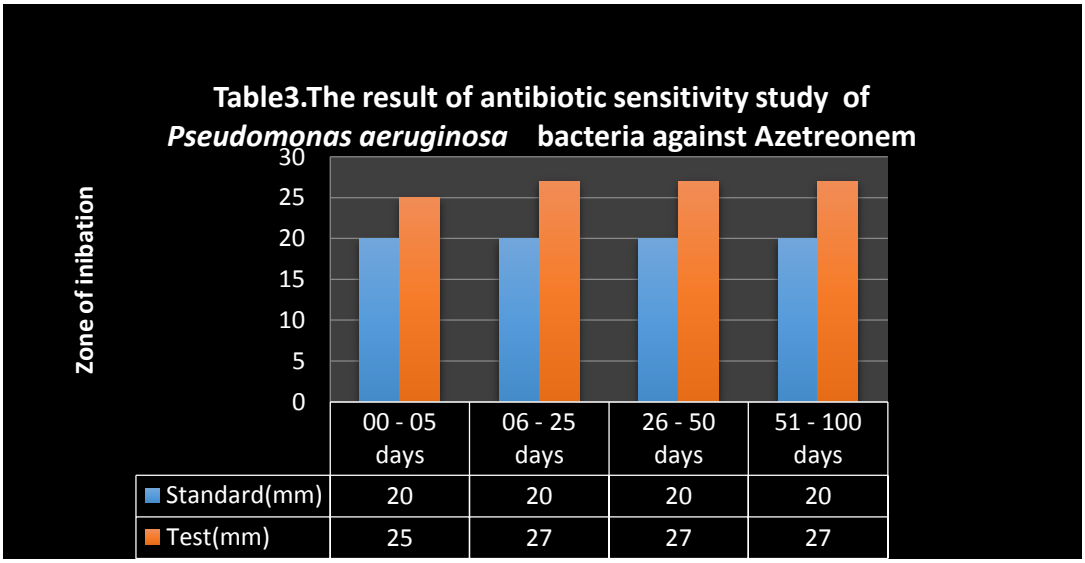


Table 4. The result of antibiotic sensitivity study of *Pseudomonas aeruginosa* bacteria against Gentamicin

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	29	24	5
25	15	24	9
50	15	24	9
100	15	24	9

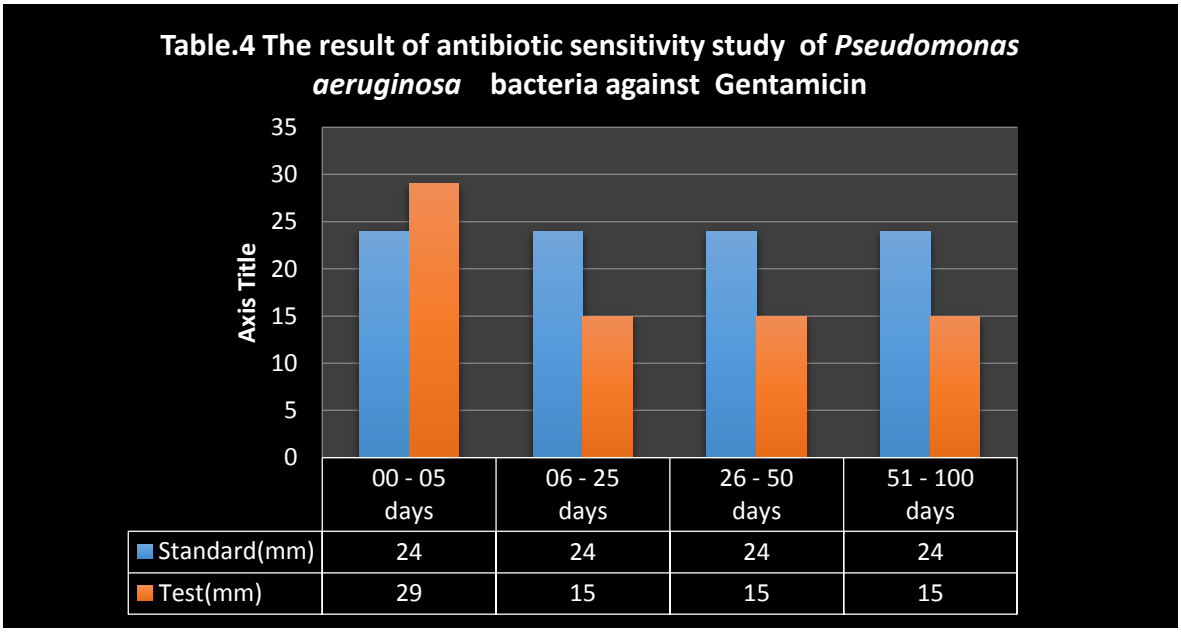


Table 5. The result of antibiotic sensitivity study of *Streptococcus pyogenes* bacteria against Ceftriaxome

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	16	20	6
25	8	20	12
50	8	20	12
100	8	20	12

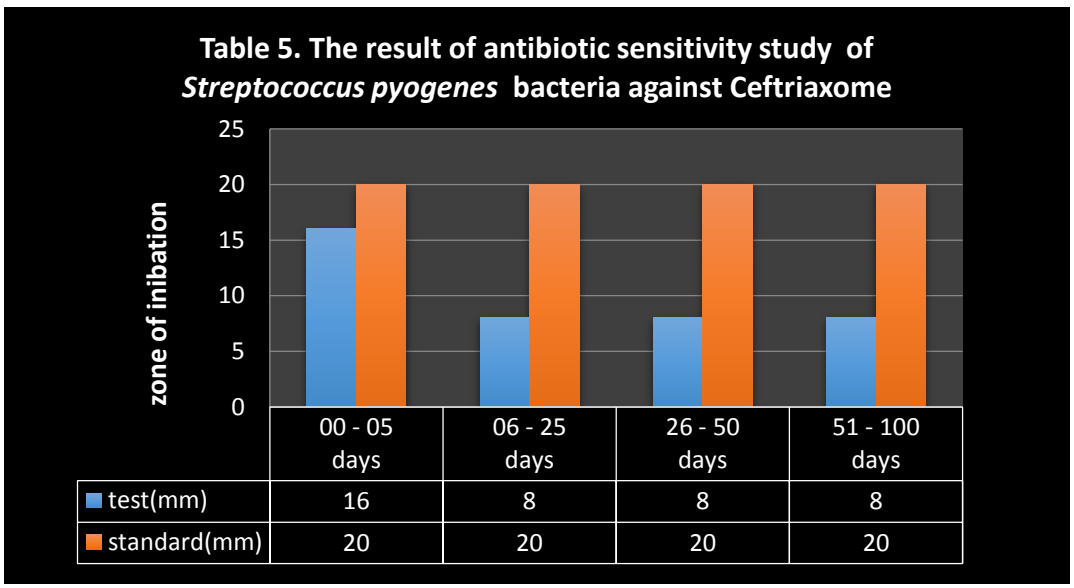


Table 6 The result of antibiotic sensitivity study of *Streptococcus pyogenes* bacteria against Cefuroxime

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	14	22	8
25	16	22	6
50	16	22	6
100	16	22	6

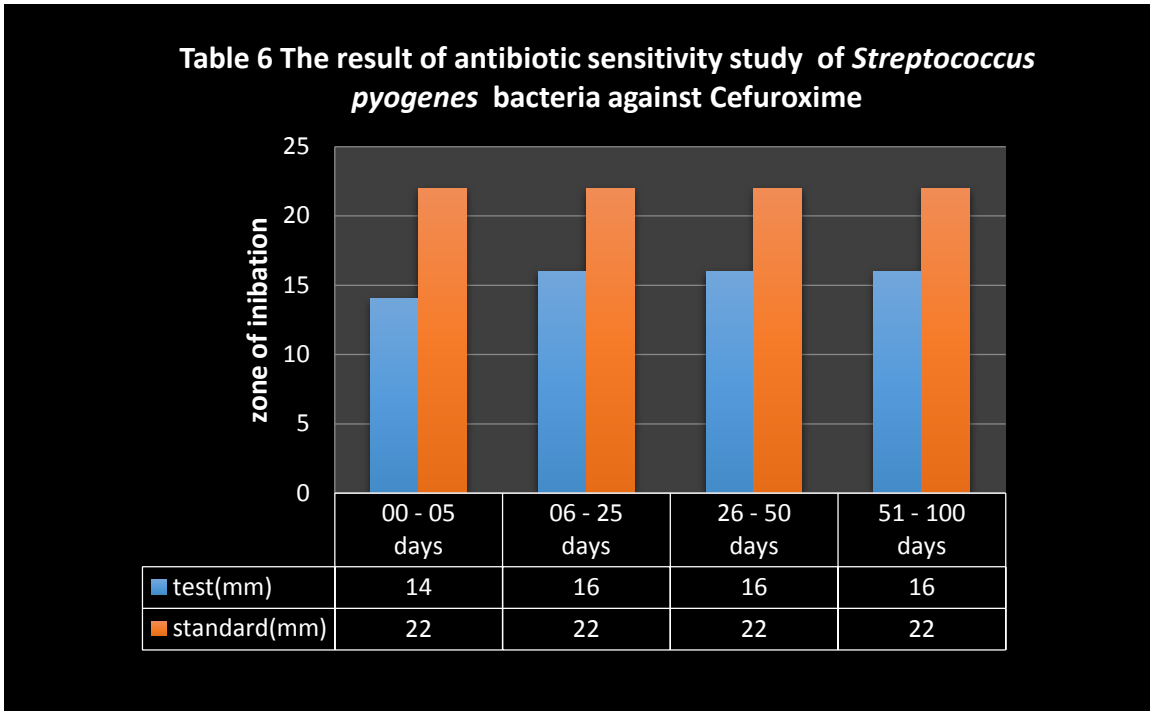


Table 7 The result of antibiotic sensitivity study of *Streptococcus pyogenes* bacteria against Amphicillin

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	14	21	7
25	16	21	5
50	16	21	5
100	16	21	5

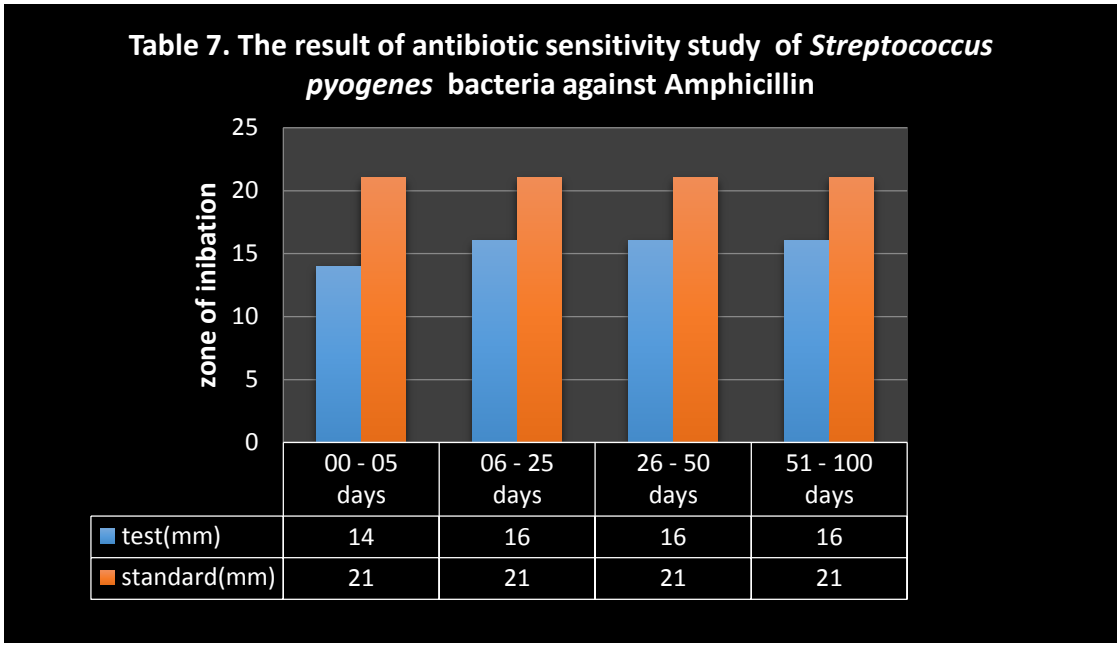
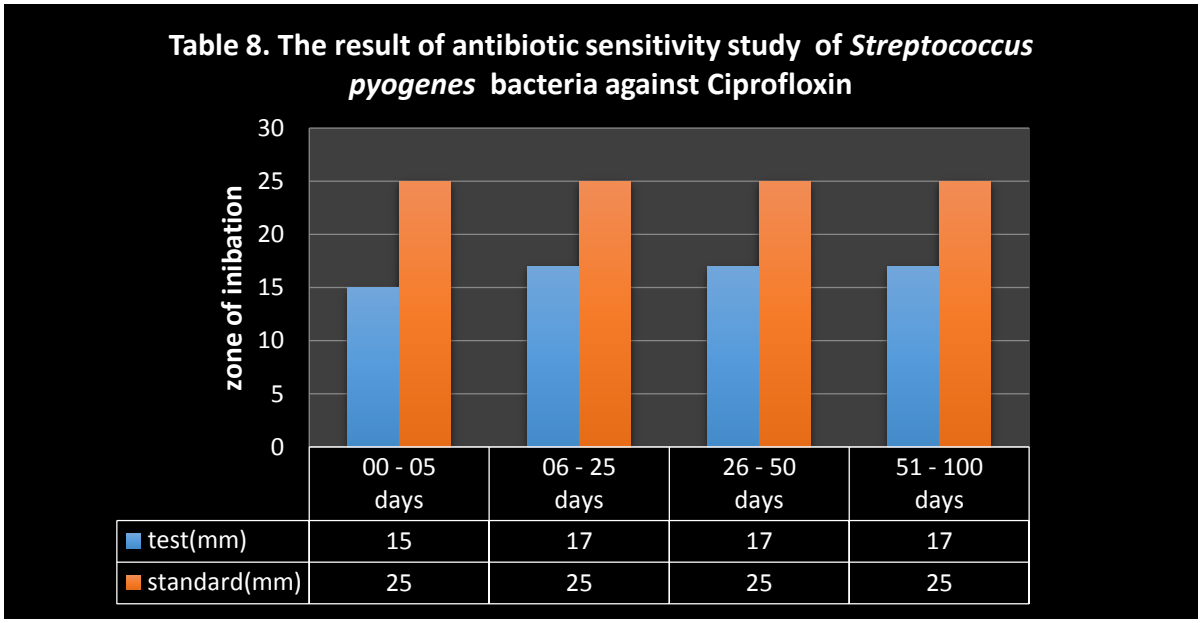


Table 8. The result of antibiotic sensitivity study of *Streptococcus pyogenes* bacteria against Ciprofloxin

No of days of Radiation	Test (mm)	Standard (mm)	Difference
5	15	25	10
25	17	25	8
50	17	25	8
100	17	25	8



The above reading indicate that bacteria subjected to mobile phone radiation showed change in sensitivity toward different antibiotics. After a particular range of resistance, no change in sensitivity was noted, as duration of radiation was increased.

Conclusion

Our research shows that radiation given bacteria show resistance against different antibiotics. More advanced and systematic investigations are needed to find out the overall effect of mobile phone radiation on the microorganisms and sensitivity& resistance noticed by our team during the period of study in order to reveal new & unknown facts. However it is strongly supported by the results that the radiations of mobile phone definitely mutate bacteria or microorganism toshow resistance to antibiotics.

Acknowledgements

This review paper was strongly supported by Dr. S P Deshwal (Ph.D Zoology). We thank our colleagues from College Of Applied Education And Health Sciences who provided insight and expertise that greatly assisted in compiling this review. We thank Dr. S K Garg for assistance and sharing his pearls of wisdom with us during the course of this review paper.

References

1. Dr Abdullah Alorainy "2003" Resent Research On Mobile Phones Effects.
2. Rogacheva S,M., Khuznetsov P.E., Malinina U. A.,Popyhova E . B.,Denisova S,A.,A.U combined effect of electrom-agnetic radiation of extremely high frequencies and chemical compounds on biological objects,toxicol.lett. ,164, 123,2006.
3. Seitz H .,Stinner D.,Eikmann T.,Herr C., Roosli M. Electromagnetic hypersensitivity (ESH)and subjective health complaints associated with electromagnetic feild of mobile phone communciation-a literature rewiew publish between 2000 and 2004,sci.total environ.,349,45,2005.

4. Zotti-Martelli L.,Peccatori M., Maggini V.,Ballardin M., Barale R.,individual responsiveness to induction of micronuclei in human lymphocytes after exposure in vitro 1800 MHZ microwave radiation, Mutatres-Gen.Tox.En.,582,(1-2),42,2005.
5. Lerchl A.latter the effect of pulsed 900-MHz GSM mobile phone radiation on the acrosome reaction,headmorphometry and zona binding of human spermatozoa by FALZONE et al., int J ANDROL, 34,20,2010.
6. Kwon M.S.,Hamalainen H.effect of mobile phone electromagnetic fields; critical evaluation of behavioral and neurophysiological studies. Bio electromagnectics, 32,(4)253,2010.
7. Kesari K.K.,Kumar S.,Behari J effect of radiofrequency electromagnetic wave exposure from cellular phones onthe reproduction pattern in male wistar rats.Appl.Biochem.Biotech.,164(4)546,2011.
8. Sekerci S.,Korkut A. Dangerous toys, kaya press,istanbul,pp.158,2005
9. http://www.xbitlabs.com/news/mobile/display/2010070123184 the number of mobile phone users will exceed five billion by year s end Analysts.htmL
10. http://www.tuba.gov.tr/habergoster.php?haber=bdhaber 09
11. Sekerci S. Biological Effects of Electromagnetic fields safety standards and protection methods,Bogazici University, publications,pp.381,1991
12. Seker S., Cerezci O. Radiation around us and prevention methods,bogazici unversity, pp.350,1997.