



Advantages and Disadvantages of Radio Frequency

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RF, Electromagnetic Radiation, Energy, Frequency

Dr. Mahendra Kumar

Assistant Professor , Department Of Physics University Of Lucknow, Lucknow , India – 226007

ABSTRACT

The effect of radio frequency in the modern world is beyond expectation, yet not beyond criticism. Biological effects that result from heating of tissue by RF energy are often referred to as "thermal" effects. It has been known for many years that exposure to very high levels of RF radiation can be harmful due to the ability of RF energy to rapidly heat biological tissue. This Paper tries to describe negative aspects of electromagnetic radiation.

INTRODUCTION

Heightened awareness of the expanding use of RF technology has led some people to speculate that "electromagnetic pollution" is causing significant risks to human health from environmental RF electromagnetic fields. In the recent time the radio frequency has turned out to be of immense importance both for its enormous utility and its adverse effects on living world. Many of the recent inventions and research works are heavily dependent on radio frequency also called electromagnetic radiation [1].

Facts About Radio Frequency (RF):

Electromagnetic radiation is a form of energy emitted and absorbed by charged particles which exhibits wave-like behaviour as if travels through space. Radio frequency is a rate of oscillation in the range of about 30 KHz to 300GHz which corresponds to the frequency of electrical signals normally produced to detect radio waves [2]. In order to receive radio signals an antenna is used, since antenna picks up thousands of radio signals at a time, a radio tuner is necessary to tune it to a particular frequency. This is done by a resonator which can amplify oscillations within a particular frequency band. Electrical currents that oscillate at RF have the special property that they can ionize air creating a conductive path through it. Exploiting this property by high frequency units, arc welding is done. Radio frequency radiation is also known as electromagnetic radiation.

Radio spectrum refers to the part of electromagnetic spectrum corresponding to radio frequencies. Different parts of the radio spectrum are used for different radio transmission technologies and applications. Radio spectrum is government regulated in developed countries and in some cases is sold or licensed to operators of private radio transmission systems, e.g., cellular telephone operators or broadcast television stations. A band is a small section of the spectrum of radio communication frequencies [3].

A noteworthy property is that above 300 GHz, the absorption of electromagnetic radiation by Earth's atmosphere is so great that the atmosphere is effectively opaque for passage of signals through it until it becomes transparent again in the infrared and optical frequency ranges.

PRODUCTION OF RADIO FREQUENCY:

The radio frequency is emitted from various sources. The present civic life is full of electrical and electronic products like mobile phones, microwave oven, stabilizers, electric

shavers, household remote controls, radars and transmission towers which emit invisible electromagnetic radiation.

VARIOUS USES OF RADIO FREQUENCY:

The radio frequency radiation, i.e. electromagnetic energy is used for multimode of purposes. Over the last century its use in communication industries has been overwhelming, particularly in radio transmission, television transmission, cellular phones and medical treatment. While the cellular services has become an inseparable part of our modern life, the instrument like Diathermy has turned out to be an unavoidable medical instrument for surgery. Radio frequency energy is normally used in medical treatments for minimally invasive surgeries. Using radio frequency bloodless operations (cutting and coagulation) are done including the treatment of sleep apnea [4]. Magnetic resonance imaging (MRI) uses radio frequency waves to generate images of the human body. Various sensors used at different walks of life are almost inseparably connected with our everyday life and research.

In the domestic arena, microwave ovens have become a part and parcel of the civil life. The remote control systems, televisions and FM radio are three of the most popular uses of high frequency EM wave.

GROWING PERILS:

The uncontrolled use of radio frequency radiation in the form of mobile telecommunications, television, transmitters, FM Radio Stations, household remote control systems has provided the modern civilization with a great peril looming large on human and plant lives mainly by its non-ionizing radiation. The mushrooming mobile industries in every corner of the globe with radiating steel towers have forced the general public to the continuous exposure of radio frequency radiation leading thereby to the undesirable permanent effects of radio frequency has been established beyond doubt as a significant cause of cancers of many types. Not for the services of human civilization, the radio frequency energy is being abused to torture convicts, damage enemy potentials and change psychic state of enemy personnel.

We can classify the RF susceptible groups as follows:

(A) CHILDREN:

Various studies have shown that the pre-adolescent children are more susceptible to the RF-radiation than the older ones because used in mobile telephony creates head resonance, i.e. creates an object of the size of child's head.

The developing nervous system and associated brain were activity in a child are more vulnerable to RF aggression by its pulse. The mitotic activity in cells of developing children area subjected to genetic damage. Experts say that pre-adolescent children are susceptible to electromagnetic radiation due to their thinner skull and rapid growth rate.

(b) PREGNANT WOMAN:

A pregnant woman and her foetus are vulnerable to electromagnetic radiations as these radiations continuously read with the developing embryo and developing cells of the foetus. Though not conclusively inferred, it is said that deformation of the foetus in the womb of a woman can happen due to excessive use of cell phones and electrical gadgets like microwave ovens and remote control systems. Intensive research works are going in this direction in Europe and America.

(c) PATIENTS WITH PACE-MAKERS:

The radio frequency has been observed to affect adversely the implanted pacemakers. The chance is very high that the electromagnetic radiation makes the pacemaker malfunction and even stop functioning.

(d) THE ELDERLY:

As the human brain is the most vulnerable portion for radio frequency radiation, the entire nervous system of the elderly easily fall prey to this radiated energy resulting in neurological effects such as Alzheimer, increase in ornithine de carboxylic activity, disorder of enzymes and free radicals that decrease the brain metabolism.

(e) THE SMALL BIRDS:

Ornithologists have pointed out that entire biological system of the small birds like sparrows are being grossly affected by radio frequency radiations so much so that the reproductive power of such game genre is being lost, expectedly leading to extinction in the long run. The small birds like sparrows are fleeing from the areas covered by RF transmission towers.

(f) THE FLORA AND FAUNA:

The botanists have started observing some peculiar metabolic changes in the flora and fauna in the recent times. They are attributing this to 'global warming and more emphatically on radio frequency radiation. The changes in the leaves, peculiar spots on the stems and leaves are thought to be special effects of this radiation. The medicinal plants exposed to RF radiation are now under the danger of imbecility and erroneous results.

(g) THE INSECTS

The small insects like bee, which have brains are supposed to have been adversely affected by the RF radiations. It is true that not many studies are there but the few studies so far made amply supports the above view.

OUR STUDIES:

Extensive studies have been one to relate occurrence of cancer due to RF radiation. Doctors from the United Kingdom issued warning urging children under 16 not to use cell phones to reduce exposures to RF radiation. Over 100 physicians and scientists at Harvard and Boston University Schools of Public Health have called cellular tower a radiation hazard. Thirty three delegate physicians from 7 countries have declared cell phone towers a public health emergency. The researchers have opined that RFR is wreaking havoc with normal biological cell functions. RF alters tissue physiology, says Dr. George Carlo, an Epide-

miologist who found genetic damage in a \$28 million research programme paid for by the industry, in 1998 the Vienna resolution signed by 16 of the world's leading bio electromagnetic researchers provided a consensus statement that there is scientific agreement that biological effects from low intensity RF exposure are established. The World Health Organization has reported- 'Many epidemiological studies have addressed possible links between exposure to RF fields and excess risk of cancer.' At present the greatest polluting element in the earth's environment is the proliferation of electromagnetic fields. The incidence of Brain Cancer is up by 25% since 1973 in USA.

Forming a team of experts including physician, environmentalist and electronic engineers were conducted a survey of changing situations. The skin-disorder of green coconuts exposed to direct RFR are much more than those where this radiation are much more than those this radiation is less. Before induction of cell-phone towers in the villages there was no such skin disorder. Some effect of RF radiation on rural and urban population can be summarized below:

- The number of sparrows in the city Lucknow has declined alarmingly adding cause to ecological balance.
- The number of suicides and mental disorders is increasing in the areas covered under cell phone network.
- The occurrence of lighting is on increase in the areas covered by RF towers.
- The size and shapes of certain fruits like tomatoes in the vicinity of towers have undergone deformation.
- Medicinal plants having metabolic changes in the areas of cellphone networks.
- The skin disorder of green coconuts are exposed to direct RF radiation are much more than those where the radiation is less.

FUTURE THREAT:

It is to be accepted that the medical treatment and the communication system prevalent today's world depends heavily on the use of RF radiation. It is difficult to accept life without television and radio. More difficult is to think of aviation without radar communication. Yet the hazards of this modern technology cannot be ignored. We can only think of imposing stringent controls over the use of this formidable blessing of science. The process of controlling has already been started in the developed countries. Use of mobile phones by under-sixteen's has been banned by law in U.K. Awareness's campaigns have been intensified in USA, Europe and Australia but insignificant efforts are visible in the countries like India, Pakistan, Bangladesh, Africa and Latin America. Failure to control this will lead to extinction of many living species, flora and fauna and crippling of human civilization in near future due to ecological imbalance.

Conclusion

By recent study on the possible biological and health effects of low-intensity, high frequency electromagnetic fields, from the viewpoint of the region's scientists and experts electromagnetic fields, which are called radiofrequency (RF) fields, are those used for radio and TV communication, mobile voice and data communication and wireless data networks. And now lastly we can say that exposure of electromagnetic radiation should be minimized.

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