

# Microwave Radiation Hazards



Prof. O.P.N. Calla addressing the conference (V.P. Sandlas is seen fourth from the left).

Microwave or Electromagnetic Radiation hazards are now reaching alarming proportions; highlighted by numerous studies conducted by scientists from all over the world, including many from India. These studies have demonstrated short term and medium term effects on animals and human beings; children, weak or sick persons, pregnant women and small animals are particularly vulnerable. The Indian Council of Medical Research and the World Health Organization have recommended precautionary approach in relation to the use and control of radiations, particularly from cell phones and related base station towers, and have also suggested adaptation of internationally recommended acceptance standards and rules and regulations to ensure safety of general public.

Radio is just 112 years old; its harmful impacts are now only visible. In May 1895, Sir J.C Bose reported his legendary work at 50 GHz to the Asiatic Society of Bengal at Calcutta and demonstrated that 'electric (radio) waves possessed all the characteristic optical properties of light waves'. Subsequently, Marconi commercially exploited radio for long distance communications. Till recently, continuous exposure to radio waves was localized to areas near broadcasting stations, radars, radio communication terminals, etc. - the related radiations were not adversely affecting public in residential areas, hospitals, schools, etc. The situation has changed significantly during the last few years with the proliferation of cell phones and other devices such as

microwave ovens, TV remotes, cordless phones, WTL, WIFI, WIMAX, Bluetooth, etc. In fact, because of this proliferation, the concept of electromagnetic pollution is getting evolved. It is very easy to understand water, air or noise pollution or contamination. However, electromagnetic pollution is very much esoteric; it is not easily seen, tasted, smelled or felt; but it can be more damaging, some thing like a silent.

Common biological effects of microwave radiation are headache and Migraines; eye irritations and Cataracts; loss of appetite; fatigue and exhaustion; giddiness or dizziness; vomiting sensation; loss of temper and fluctuation in BP; altered concentration and memory loss; anxiety and depression; sleep disruption or Insomnia; reduced REM sleep - altered EEG (brain wave), etc. Serious biological effects are brain tumors, Alzheimer's disease, Parkinson's disease, eye cancer, Epilepsy, Leukemia, stomach pain and digestive disorders; destabilization of the Lymphatic system; disturbances in the nervous system; interruption in the maintenance of hormones; brainwave disturbances in alpha, theta and delta wave signal patterns.

It may be noted that radio frequency energy is absorbed more efficiently at resonance. In adults, the resonance frequency is usually about 35 MHz, if the person is grounded, and about 70 MHz, if insulated from ground. Different human body parts may be resonant from 30 to 3000 MHz. Adult head is resonant at around 400 MHz, while a baby's smaller head resonates near 700 MHz. Therefore, children are more vulnerable from exposures at microwave frequen-

cies. Absorption is also dependent upon polarization.

In microwave oven, cooking is done by the production of heat because of the vibration of water molecules interacting with 2.45 GHz radiation. Because of leakages from door, particularly because of improper maintenance, and frequent openings to check cooking status, excessive radiation can propagate. It is essential to take suitable precautions while using microwave ovens.

There is a strong need to initiate public awareness campaign to educate and guide unsuspecting members of our society, so that they can save themselves and their children from the harmful effects of microwave radiation. It is also essential that Govt. of India tightens control on unlawful radiations emanating from electrical and electronics devices and other instruments. There is an urgent need to incorporate appropriate amendments to the Indian Telegraph Act and other related laws so as to save the environment and make it suitable for healthy living.

#### Excerpts of:

*Inaugural Address by Shri Ved Prakash Sandlas, Principal Advisor, Cogent EMR Solutions Ltd and Distinguished Scientist & Ex Chief Controller R & D, DRDO*

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