



# SCIENCE EDUCATION PANEL SYMPOSIUM FOR INVITED TEACHERS

## SYNTHESIS OF NATURAL PRODUCTS TODAY AND THE CHALLENGES OF TOMORROW

Prof. Tushar Kanti Chakraborty

*Professor, Dept. of Organic Chemistry, IISc, Bengaluru.*

Synthesis of structurally complex and biologically active natural products remains as fascinating and challenging as ever. Chemical synthesis of natural products allows us to carry out structural modifications of molecules to improve their selectivity, potency and pharmacological properties that have made tremendous inroads in the drug discovery today. Semisynthesis of molecules having improved physiological properties is another niche area of synthetic organic chemistry. While modern chemical biology approaches like polypharmacology for repurposing the already approved drugs or synthetic biology to make useful molecules by engineered bacteria/ yeast are gaining strong footholds, synthetic organic chemists are also gearing up to meet the challenges of present age of scalability by equipping themselves with diverse skills. Discovery of new smart reactions and simplification of target molecules are some of the hallmarks of modern organic synthesis facilitating new drug discovery.

14:00

Cyclooligomerization – a simple way to make complex structures – has been an area of intense research interests in our group. Beside its application in the synthesis of some symmetric cyclic natural products, we have extensively utilized this approach in developing many amide-linked designer cyclic molecules for diverse biological activities. Details of some of our recent works will be presented.

## LIFE IN THE VICINITY OF OPERATING NUCLEAR POWER PLANTS – POSSIBLE IMPACT ON ENVI- RONMENT, BIODIVERSITY, AGRICULTURE AND HUMAN HEALTH

Prof. Shree Kumar Apte

*Emeritus Professor-HBNI, J C Bose National Fellow-DST, and  
Raja Ramanna Fellow-DAE BARC, Mumbai.*

Nuclear energy is an efficient, powerful and clean resource that will last the energy needs of our planet way beyond the fossil fuels. Unlike plants based on fossil fuels, the nuclear power plants (NPPs) do not release ash, dust or green house gases and do not cause environmental pollution in the conventional sense. The only way NPPs can possibly impact the environment is either by (i) marginal increase in the background radiation levels around NPPs, or (ii) release of large volumes of thermal effluents, used as coolant in reactor condensers, into the nearby water bodies. The background radiation levels prevalent around NPPs are (a) very low (b) considered safe by the regulatory agencies, and (c) continuously displayed for the information of general public and therefore easy to verify. Thermal effluent discharges from NPPs are strictly regulated by the Ministry of Environment, Forests and Climate Change, and Central and State Pollution Control Boards in our country. Yet, every now and then, press and media talk about the possible adverse impact of operating NPPs on microbial, plant and human life, fisheries and agriculture, and biodiversity and environment. Studies spread over the last 50–60 years have generated a wealth of information about various aspects of creatures (microbes, plants, animals and humans) living in the vicinity of operating nuclear power plants in India. This presentation will address the question 'Does operation of nuclear power plants adversely impact human health, agriculture and biodiversity?'

15:00

## INDIAN PLANETARY MISSIONS : CHALLENGES AND SCIENCE

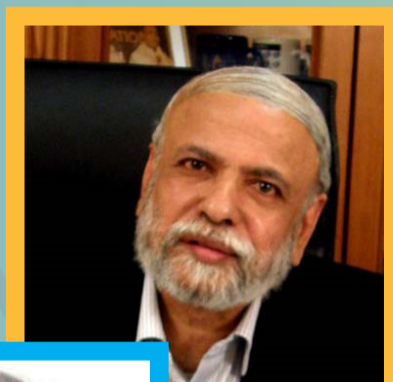
Dr Anil Bhardwaj

*Director, Physical Research Laboratory, Ahmedabad.*

India has embarked on the planetary exploration missions starting with the Chandrayaan-1 orbiter mission, which was launched in 2008. The Chandrayaan-1 had 11 experiments on board, including a Moon Impact Probe (MIP), which had a free-fall after separating from the mother spacecraft and crash-landed on the Moon in polar region. This was followed by a mission to Mars, the Mars Orbiter Mission (MOM), launched in November 2013 and arriving on Mars in September 2014. The MOM had 5 experiments. Though planned for a 6-months life-time, the MOM has been in orbit around Mars and providing useful data.

16:00

The next Indian planetary mission is Chandrayaan-2, which will have, in addition to orbiter, a Lander and a Rover, to study the Moon. India also has a planned mission to study the Sun from L1 point called the Aditya-L1 mission. This talk will describe the Indian planetary missions, highlight the science results and provide a glimpse of the challenges in these exploration programs.



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2–5.15 PM

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