Effects of cosmic radiation on Microalgae – A study

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ABSTRACT

It is nearly more than five decades that researches were carried out at Hydrology labs of Osmania University, Hyderabad, and Kakatiya University, Warangal, involving micro-algal species subjecting them to various sources of radiations. The main sources involved were gamma rays, x-rays, Beta-rays, ultrasonics, ultra-violet and High Altitude cosmic radiations. There is comparatively little information available regarding the cosmic-ray effect on micro-algal members. These species showed high tolerance compared to higher plants. Various algal species belonging to the order Chlorococales and Conjugales of class Clorophyceae were mainly employed.

In the present context, the effect of cosmic rays mostly was studied employing algal species with regard to survival, cytomorphology and mutagenic studies. These studies were carried out on seven species belonging to four genera of chlorococcales and seven species belonging to three genera of Conjugales. In all such studies, it was clearly observed that species with bigger dimensions proved more sensitive.

The Indo-American collaboration project at Hyderabad under IQSY-EQEX for balloon flights on the campus of Osmania University provided an opportunity.

The algal samples were taken in screw top polythenes tubes. These containers were hooked to balloon. These balloons were launched at sunrise, reaching an altitude of 33033 meters to 57537.5 meters.

Recently, these balloons were mistaken mostly for UFOs (Unidentified Flying Objects). The TIFR has been conducting cosmic ray and upper atmospheric research. The prestigious balloon flights experiments were also conducted at Vignana Bharathi Institute of Technology in association with the Indian Space Research Organisation (ISRO). However, present balloon flight experiments were conducted only from the Osmania University campus and TIFR balloon flights. The species of Chlorococcales have shown that they are quiet resistant to the cosmic radiation. The genus Chlorella used in culture was shown to be suitable space-food and these species were quite resistant. In Chlorococcalean species, malformations were found and finally, recovery of the cells was observed. In the members of Conjugales, more morphological abnormalities were observed and it was quite interesting to note that large cells proved to be more sensitive compared to the cells with smaller dimensions. After balloon flights, the algal samples were brought to the laboratory and these experiments were conducted with micro algae only with the balloon flights from Osmania University. More detailed studies are observed and finally, it may be surmised that cosmic rays proved to be comparatively less harmful. More detailed studies are enumerated.