

MICROGRAVITY SCIENCES AND PROCESSES (A2)  
Microgravity Sciences onboard the International Space Station and Beyond (6)

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EXPERIMENTS IN MICROGRAVITY: THE INDIAN PERSPECTIVE.

**Abstract**

Scientific growth and advancement in the recent years has spilt light on the need and advantages of conducting physical and biological experiments in microgravity environments. Certain experiments, such as those related to crystallography have shown that, in microgravity, crystals with improved chemical properties and a greater degree of structure can be obtained. This has paved way for examining protein crystals and has consequently enhanced the growth and development of quality drugs. Through programmes such as ESA's Biorack, evolution at cellular level has been studied. It includes research pertaining to different behavior of certain biological cells and unicellular organisms. Microgravity Experiments further extend to fluid sciences and human physiology. Experiments testing surface-tension driven flows have been studied, paving way for better understanding of industrial processes. Fluid distribution in the human body and its behavior in microgravity has been studied benefitting medicinal advancement on the earth. All this indicates the importance of microgravity experiments in all walks of human life. Indian research in microgravity was initiated by the Indian Space Research Organization as the '*National Microgravity Research Programme*'. It aims at conducting ground experiments and space based experiments in microgravity, and subsequently developing newer technologies that may supplement currently existing ones and contribute towards the betterment of human life. SRE-1, the first mission of Space Capsule Recovery Experiment was designed to demonstrate the capability to recover an orbiting space capsule, and the technology of an orbiting platform for performing experiments in microgravity conditions. It was used to study metal melting and crystallization in microgravity. It also researched on the synthesis of nano crystals in microgravity. Following its success, ISRO plans to complete the second mission through SRE 2 in 2010 with a biorack to be able to study the biological effects of microgravity on certain bacteria. This paper aims to illustrate the Indian perspective of microgravity experiments. It deals with the progress made in the past and also explores the possible future course of such research.