

Introduction and significance of microbial diversity in nature

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Microorganisms are microscopic living organism, which are mostly single celled entities. With the discovery of microorganisms in 1674 by Anton Von Leeuwenhoek, using microscope designed by himself, the study of various forms of microorganisms began. The study of microorganisms is called Microbiology

With the passage of time, scope of Microbiology increased and now more and more branches of Microbiology have emerged. Now microbiology is recognized as a discipline of science having wide potentiality of application not only in medicine, agriculture, industries and biotechnology but also in metallurgy, petroleum exploration, bioremediation, space research and nanotechnology also.

Microorganisms are very diverse in forms and structure. They include all the bacteria and archaea and almost all the protozoa. They also include some microfungi, microalgae and certain animals, such as rotifers. Many



macroscopic animals and plants have microscopic juvenile stages.

Some microbiologists also include viruses as microorganisms, but others consider these as nonliving things.

Microorganisms spread over in every soil, in hot-spring, in ocean, in mountains, in desert and in arctic zone. They are also found in deep sea and also deep inside the soil. Microorganisms have been observed to be capable of thriving under vacuum in outer space. They have also been found to thrive even inside rocks up to 580 m below the sea floor under 2,590 m of ocean off the coast. Scientists also confirmed the existence of microorganisms living 800 m below the ice of Antarctica.

### Significance

Microorganisms are crucial to nutrient recycling in ecosystems. As some microorganisms can fix nitrogen, they occupy a vital part of the nitrogen cycle.

Some studies indicate that airborne microorganisms may play a role in precipitation and weather changes. While most microbes are beneficial, but a small proportion of them cause disease and even death in plants and animals.



The number of microbes is so vast that we cannot ignore them. There are innumerable number of microbes in the earth surface which are actively metabolizing and thereby causing transformation of matters.

The atmosphere is full of microbes and actually we are buried in the ocean of microbes. 90% of the cells of our body consist of microbes. They are the creator of the fertile surface of the earth.

Microorganisms provide evidence of origin of life and evolution on earth.

Microorganisms are used to understand about origin of sex, speciation, adaptation, cellular function, genetics, physiology and biochemistry of life.

Our understanding of the molecular basis of life, the structure and function of genetic materials is a contribution of microbiology. The concept of recombinant technology, genetic engineering etc have developed from study of microorganisms.

The concept of green chemistry used in organic farming, pest control, production of biofertilizer is a direct contribution of microbiology.

Microorganisms are used as guinea pig in research involving genetics, medicine and in various other



branches of sciences.

Although they are often associated with dirt and disease, Microorganisms are the pillars of life on Earth.

The diversity of microorganisms is critical to the functioning of the ecosystem, because there is the need to maintain ecological processes such as decomposition of organic matter, nutrient cycling, soil aggregation and controlling pathogens within the ecosystem.

