

Quick Guide to Understanding Microbial Ecology

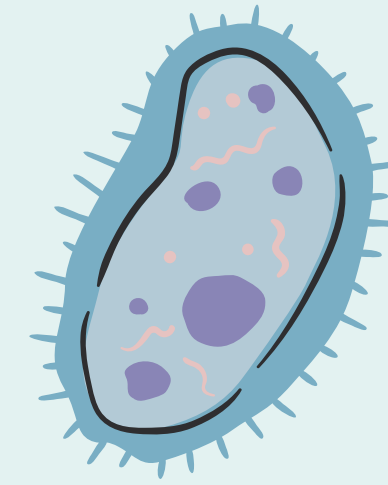
How conventional microbiological methods and NextGen tools have teamed up to produce a new understanding of microbial relationships in a given environment.

Source DOI: 10.14304/SURYA.JPR.V4N11.2

What is microbial ecology?

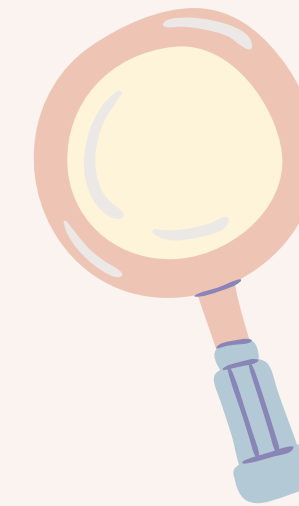
The study of microbes and their relationship with the environment, and other microbes.

This not only includes what microbes are doing in an environment, but what microbes are there influencing them.



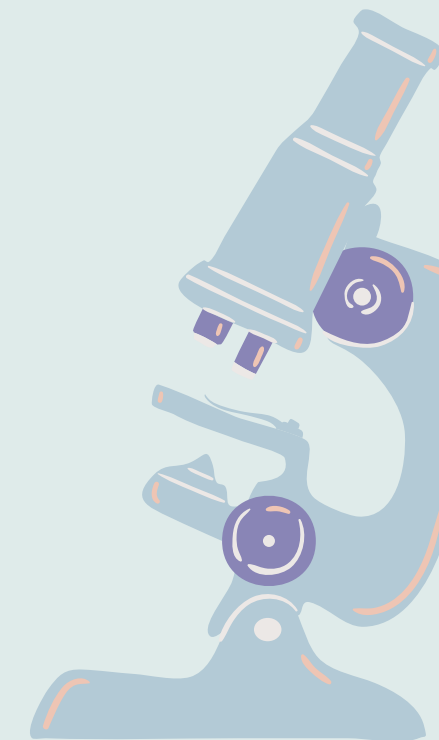
Who is there?

The fundamental goal of microbial ecology is to determine what microbes are present in an environment in order to describe the community structure. This is a good first step to begin describing a microbial environment.



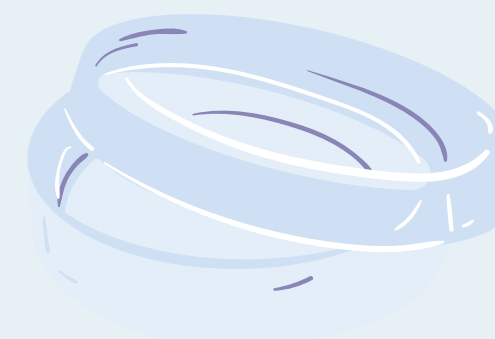
How do we study microbial ecology?

By characterizing abiotic factors, examining present microbes, and determining their functionalities. This can be determined through culture dependent techniques or culture independent methods.



Culture dependent techniques

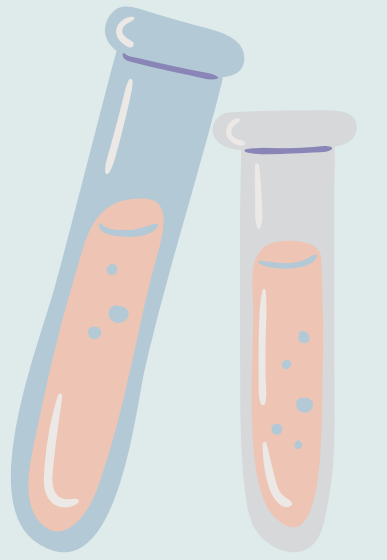
The traditional method used to study microbes. However, less than 1% of microbes are cultureable, and those that are require biochemical tests in order to determine full characterization.



Why are some microbes unculturable?

Bacteria may not grow under lab conditions because the required nutrients may not be present in the culture media, or the media itself contains toxins.

In order to determine the microbes present, their genome would need to be sequenced.



Culture independent techniques

New era of technology that allows for complete and comprehensive analysis. Specifically, gene sequencing utilizes phylogenetic markers, such as 16S rRNA gene, to quickly generate data.

Additional examples of new developments include targeted amplification, metagenomics, RNA-seq, proteomics, and Tn-seq.



Why is microbial ecology important?

Microbial ecology has proven to be important for a number of reasons. It has allowed us to create an archive of different organisms in existence, document phylogenetic relationships, and improve already existing phylogenetic trees. Moreover, this field of study will continue to be crucial as scientists continue to capitalize on the use of microbes in order to secure our future.

