

Culture Encyclopedia Article

Culture

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Culture

A culture is a single specie of microorganism that is isolated and grown under controlled conditions. The German bacteriologist Robert Koch first developed culturing techniques in the late 1870s. Following Koch's initial discovery, medical scientists quickly sought to identify other pathogens. Today bacteria cultures are used as basic tools in science and medicine.

The ability to separate bacteria is important because microorganisms exist as mixed populations. In order to study individual species, it is necessary to first isolate them. This isolation can be accomplished by introducing individual bacterial cells onto a culture medium containing the necessary elements microbial growth. The medium also provides conditions favorable for growth of the desired species. These conditions may involve pH, osmotic pressure, atmospheric oxygen, and moisture content. Culture media may be liquids (known broths) or solids. Before the culture can be grown, the media must be sterilized to prevent growth of unwanted species. This sterilization process is typically done through exposure to high temperatures. Some tools like the metal loop used to introduce bacteria to the media, may be sterilized by exposure to a flame. The media itself may be sterilized by treatment with steam-generated heat through a process known as autoclaving.

To grow the culture, a number of the cells of the microorganism must be introduced to the sterilized media. This process is known as inoculation and is typically done by exposing an inoculating loop to the desired strain and then placing the loop in contact with the sterilized surface. A few of the cells will be transferred to the growth media and under the proper conditions, that species will begin to grow and form an pure colony. Cells in the colony can reproduce as often as every 20 minutes and under the ideal conditions this rate of cell division could result in the production of 500,000 new cells after six hours. Such rapid growth rates help to explain the rapid development of disease, food spoilage, decay, and the speed at which certain chemical processes used in industry take place. Once the culture has been grown, a variety of observation methods can be used to record the strain's characteristics and chart its growth.