



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 10, Issue, 02(C), pp. 30878-30879, February, 2019

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Review Article

BACTERIA – GOOD AND BAD

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DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1002.3143>

ARTICLE INFO

Article History:

Received 4th November, 2018
Received in revised form 25th
December, 2018
Accepted 23rd January, 2018
Published online 28th February, 2019

Key Words:

Fertilizer, atmosphere, biotechnology
field, nutrients, disease, commercial.

ABSTRACT

Some bacteria degrade organic compounds for energy, and without bacteria, the earth would have no soil in which to grow plants. Bacteria living in the gut can help animals break down food. These so-called 'good bacteria' help maintain the conditions necessary for food digestion. Some bacteria live on the root nodules of certain plants, for example, peas, beans and clover, and are able to 'fix' atmospheric nitrogen into a form that can be absorbed by the plant as a fertiliser. We are also able to use bacteria to break down our sewage and to clean up oil spills. We can manipulate bacteria to grow a protein of interest, for example, insulin, and then grow them in large vats to produce a large quantity of the desired protein. Bacteria play an important role in the development of healthy food production, environmental protection, and ecological balance as well as the use of Micro-organisms for the management of crops of pest in the future will play an important role in the field. If farmers use these Micro-organisms as an alternative to lethal chemicals, then grain production will be able to support the development of organic farming.

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INTRODUCTION

Nature of science

Scientists have observed bacteria using microscopes to identify them. But it is the living processes that bacteria use and the wastes they give off that can be used either for human benefit or that cause disease.

Scientists believe it was the chemical processes of early cyanobacteria, harnessing the energy from the sun, that released the oxygen that makes up our atmosphere. It took approximately 2 billion years for the bacteria to build up enough oxygen in the atmosphere to allow for the evolution of multi-cellular organisms.

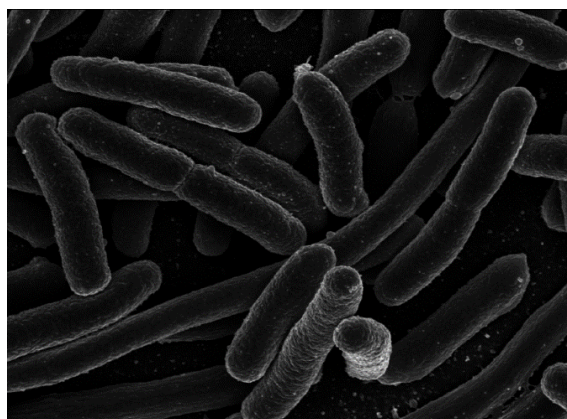
Useful bacteria

Bacteria have long been used by humans to create food products such as cheese, yoghurt, pickles, soy sauce and vinegar. We are also able to use bacteria to break down our sewage and to clean up oil spills.

Escherichia coli bacteria

Escherichia coli (*E. coli*) is a rod-shaped bacterium that lives in the gut of warm-blooded animals. It is a crucial tool in modern biotechnology and often used in molecular biology laboratories due to its ease of culture and rapid growth. Scientists use *E. coli* to work with DNA and proteins from other organisms. It is

a normally harmless bacterium that lives in the lower intestine though some strains of this bacterium can cause infection of the intestine, urinary tract and other parts of the body.



Many bacteria are very fast growing – under ideal conditions, *Escherichia coli* (*E. coli*) are able to double their number in 20 minutes. This makes them very useful tools in molecular biology and biochemistry, as they can be manipulated much faster than more complex and slower growing organisms. We can manipulate bacteria to grow a protein of interest, for example, insulin, and then grow them in large vats to produce a large quantity of the desired protein.

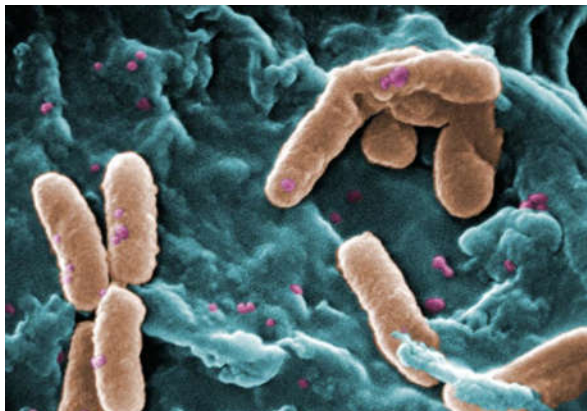
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Harmful Bacteria

Only a small handful of known bacteria are capable of causing disease. These bacteria are termed pathogenic.

Pseudomonas bacteria

Pseudomonas bacteria have some natural resistance to antibiotics, which is made worse by some drug treatments. They are a common hospital-acquired infection and will infect wounds and the respiratory tract.



To cause disease, the bacteria must invade the cells of a living organism. Most bacteria will not invade another living organism, and many more bacteria are rendered harmless by our immune systems, while others, such as gut bacteria, are beneficial.

In many developing countries, poor hygiene, limited access to clean water and poor (or no) sewage treatment leads to huge numbers of deaths from bacterial infections such as those that cause dysentery.

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How to cite this article:

Harsha Sharma– *Bacteria – Good and Bad*. *Int J Recent Sci Res*. 10(02), pp. 30878-30879.

DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1002.3143>
