

# Difference Between Actinomycetes and Fungi

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## Key Difference – Actinomycetes vs Fungi

Microorganisms are tiny organisms which cannot be seen by our naked eyes. There are several groups of microorganisms. **Bacteria and fungi** are significant among them. Most bacteria and fungi are beneficial while a small percentage causes diseases and other harmful effects. Fungi play various crucial roles in the environment. They are the dominant decomposers of organic wastes and are involved in recycling of nutrients in all terrestrial habitats. Fungi are able to break down complex material such as **cellulose** and lignin and help other organisms to absorb nutrients. Actinomycetes are a group of bacteria which are gram positive and behave like fungi. They are beneficial in agriculture and soil systems. Actinomycetes grow as colonies which resemble mycelia of fungi. The key difference between actinomycetes and fungi is that **Actinomycetes are prokaryotic organisms while fungi are eukaryotic organisms.**

## What are Actinomycetes?

Actinomycetes are a phylum of **gram positive bacteria**. They are prokaryotic organisms with a primitive unicellular organization. Actinomycetes are anaerobic microorganisms. They show filamentous and branching growth pattern on solid substrates resembling fungi mycelia. Their colonies are extensive like mycelium. Aerial hyphae are found in many genera of actinomycetes. Some actinomycetes genera are motile and have flagella. Actinomycetes are responsible for the musty odor ( the smell of freshly ploughed soils) which comes after rain.



**Figure 01: Actinomycetes**

Actinomycetes are found in terrestrial and aquatic environments. The common genera of actinomycetes are *Streptomyces*, *Nocardia*, and *Micromonospora*. Many actinomycetes species can be observed in the soil. Soil bacteria are harmless to animals and plants. They act as good decomposers. Hence they are important in increasing the availability of nutrients for plants. Actinomycetes produce a wide variety of useful **secondary metabolites** which have potent biological activities, including commercially important antibiotics and immunosuppressive compounds. Some of them are used for manufacturing of commodity chemical, health products, and agrochemicals.

## **What are Fungi?**

Fungi are a group of microorganisms which includes **yeast**, moulds, mushrooms and filamentous fungi. Fungi can be single celled or multi-celled. They show eukaryotic cellular organization. Fungi are found in almost all habitats. But most of them are found in lands, mainly in soil or on plant material. Fungi are heterotrophs, and they obtain foods by absorbing molecules which were digested using their digestive enzymes. One characteristic feature of fungi is the presence of chitin in their cell walls. Chitin is unique to fungi.

Fungi are economically and ecologically important microorganisms. They break down dead plant and animal materials and help to recycle them. They are the principal decomposers in the soil. Some fungi maintain **symbiotic** relationships with plants and support plants in the absorption of essential nutrients. Several fungal species produce numerous drugs, including **penicillin** and other antibiotics.

Some fungi like mushrooms are edible; fungi is also indispensable in the production of bread, champagne, and beer.



**Figure 02: Fungi**

Fungi cause a number of plant and animal diseases. In humans, several diseases such as athlete's foot ringworm, thrush, and other diseases are caused by fungi. Plant fungal diseases include rusts, smuts, leaf, stem and root rots.

### **What are the similarities between Actinomycetes and Fungi?**

- Actinomycetes and fungi are filamentous.
- Both produce spores.
- Both types are good decomposers.
- Both groups include antibiotic producing species.

## What is the difference between Actinomycetes and Fungi?

Actinomycetes vs Fungi	
Actinomycetes are non-motile filamentous gram positive bacteria belonging to the genus of the Actinobacteria class of bacteria.	Fungi are a group of microorganism which includes single cell and complex multicellular organisms such as yeast, mushrooms, moulds, etc.
Cellular Organization	
Actinomycetes are prokaryotic organisms.	Fungi are eukaryotic organisms.
Cell Wall Composition	
Actinomycetes contain peptidoglycan in their cell walls.	Fungi contain chitin in their cell walls
Cell Size under Microscope	
Actinomycetes filaments are smaller.	Fungal filaments are bigger.
GC Content in DNA	
GC content in actinomycetes DNA is less than fungi.	Fungi have more GC bases in DNA.

### Summary – Actinomycetes vs Fungi

Actinomycetes are a group of gram positive bacteria. They grow well under anaerobic conditions. The morphology of actinomycetes resembles fungi. They grow as extensive colonies or mycelia. Hence they are referred to as filamentous bacteria. Fungi are a phylum which includes yeasts, moulds and mushrooms. Actinomycetes and fungi are beneficial economically and ecologically. Actinomycetes are unicellular prokaryotic organisms while fungi are unicellular or multicellular eukaryotic organisms. This is the main difference between actinomycetes and fungi.

## Reference:

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2. "Fungus." Wikipedia. Wikimedia Foundation, 12 July 2017. Web. [Available here](#). 20 July 2017.
3. "Actinomycetes." The Free Dictionary. Farlex, n.d. Web. [Available here](#). 20 July 2017.

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