

Difference Between Nostoc and Anabaena

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Key Difference - Nostoc vs Anabaena

[Cyanobacteria](#) or blue-green algae are important organisms in [ecosystems](#). They are capable of [photosynthesizing](#) and producing their own foods. As a byproduct of photosynthesis, oxygen gas releases to the atmosphere. It is believed, cyanobacteria are the first organisms that contributed to creating an oxygenic atmosphere at the beginning of the life on Earth. There are different genera of cyanobacteria. Among them, Nostoc and Anabaena are two genera. Nostoc is a type of cyanobacteria that composes gelatinous colonies formed from filamentous cells. Anabaena is another type of filamentous, bead-like cyanobacterium that exists as [planktons](#). The **key difference** between nostoc and Anabaena is that **vegetative cells of Nostoc are covered with mucilaginous sheath while cells of the Anabaena are not covered with a mucilaginous sheath.**

What is Nostoc?

Nostoc is a blue-green alga or cyanobacterium. Nostoc cells are arranged in beadlike chains, and it forms colonies that are covered with mucilaginous sheaths. Nostoc is frequently found in still water habitats. And also nostoc can be found in the soil. Nostoc has two pigments that give the characteristic blue-green colour to Nostoc. They are blue phycocyanin and red phycoerythrin. Other than these two pigments, Nostoc has [chlorophyll](#) a pigment for capturing sunlight and photosynthesizing. Nostoc has the capability of fixing atmospheric [nitrogen](#). This ability is facilitated by the structures called heterocysts possessed by Nostoc.



Figure 01: Nostoc

The reproduction of nostoc usually occurs through fragmentation. Nostoc has special dormant structures or cells to withstand the harsh environmental conditions. They are known as akinetes. Akinetes are thick-walled cells that have the ability to resist from desiccation. Nostoc serves as a good supplementary food source in Asia.

What is Anabaena?

Anabaena is a cyanobacterium that is composed of beadlike or barrellike cells formed into colonies. It is a filamentous cyanobacterium that normally exists as plankton. It has uniform trichomes. Anabaena cells are not covered with a mucilaginous sheath. The vegetative cells or trichomes of Anabaena are arranged in chains, and they are not branched.

It is found in symbiotic relationships with certain plants. One common water fern is *Azolla*. The association of *Anabaena* with plants provides plants nitrogen while plants supply carbon for *Anabaena*. Therefore, most of the rice farmers use *Azolla* fern which has *Anabaena* as an [organic fertilizer](#) to supply nitrogen into rice plants. *Anabaena* possesses the ability to fix atmospheric nitrogen. Nitrogen fixation is carried out by the specialized cells called heterocysts of *Anabaena*. Heterocysts develop from vegetative cells for the above purpose. *Anabaena* is a photoautotrophic cyanobacterium. It performs oxygenic photosynthesis and produces its own foods. During the photosynthesis, it releases oxygen into the atmosphere.



Figure 02: *Anabaena*

Anabaena can be found in fresh water, and it is considered as a contaminant of drinking water since it gives fishy odour and taste. *Anabaena* is popular as a producer of neurotoxins, which is a harmful product for wildlife. Similar to *Nostoc*, *Anabaena* is also

reproduce by fragmentation. And also it possesses akinetes to withstand harsh environmental conditions.

What are the Similarities Between Nostoc and Anabaena?

- Nostoc and Anabaena are prokaryotic organisms. Hence they don't have a true [nucleus](#).
- Nostoc and Anabaena are two bacterial species.
- Both Nostoc and Anabaena are filamentous, and they possess unbranched trichomes.
- Both Nostoc and Anabaena are cyanobacteria or blue, green algae.
- Both Nostoc and Anabaena can fix atmospheric nitrogen.
- Both Nostoc and Anabaena can do photosynthesis.
- Both Nostoc and Anabaena have heterocysts.
- Both Nostoc and Anabaena are found in moist environments.
- Nostoc and Anabaena belong to the same order and family.
- Both Nostoc and Anabaena use fragmentation as a method of reproduction.
- Both Nostoc and Anabaena possess akinetes for the tolerance of harsh environmental conditions.

What is the Difference Between Nostoc and Anabaena?

Nostoc vs Anabaena	
Nostoc is a gelatinous form of cyanobacterium, which is filamentous.	Anabaena is a beadlike filamentous cyanobacterium, which normally exists as planktons.
Presence of Mucilaginous Sheath	
Nostoc has a mucilaginous sheath.	Anabaena does not have a mucilaginous sheath.

Summary - Nostoc vs Anabaena

Anabaena and Nostoc are two cyanobacteria that can photosynthesize and fix nitrogen. Both are able to make symbiotic relationships with certain plants. Both possess heterocysts and akinetes. Both forms are filamentous and have [vegetative cells](#) that are beadlike. Both cyanobacteria cells are arranged in chains. Both possess chlorophyll a and phycocyanins. Both nostoc and Anabaena reproduce by fragmentation. The difference between nostoc and Anabaena is that Nostoc has a mucilaginous sheath covering its vegetative cells while it is absent in Anabaena.

Reference:

- 1.The Editors of Encyclopædia Britannica. “Nostoc.” Encyclopædia Britannica, Encyclopædia Britannica, inc., 2 Nov. 2016. [Available here](#)
- 2.“Anabaena.” Anabaena - microbewiki, [Available here](#)

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- 2.'Anabaena sperica2' [\(CC BY-SA 3.0\)](#) via [Commons Wikimedia](#)

How to Cite this Article?

APA: Difference Between Nostoc and Anabaena.(2018 February 20). Retrieved (date), from <http://differencebetween.com/difference-between-nostoc-and-vs-anabaena/>

MLA: "Difference Between Nostoc and Anabaena" Difference Between.Com. 20 February 2018. Web.

Chicago: “Difference Between Nostoc and Anabaena.” Difference Between.Com. <http://differencebetween.com/difference-between-nostoc-and-vs-anabaena/> accessed (accessed [date]).



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