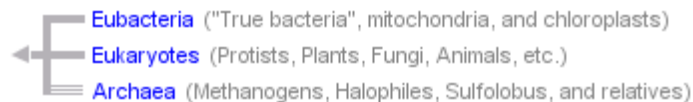


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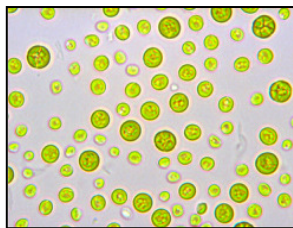
Jörg Ullmann (Diplom-Biologe), Dr. Martin Ecke (Diplom-Chemiker)

Algae: Chlorella, AFA, Spirulina

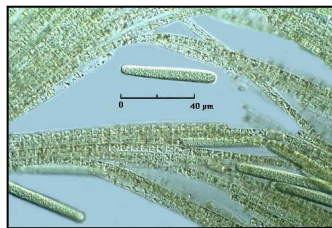
In simple terms, the “living world” is nowadays divided into three large groups: 1. *Eubacteria*, “true bacteria“, 2. *Archaea*, mostly extremophile bacteria and 3. Eukaryotes, which include plants, animals and fungi.



AFA (*Aphanizomenon flos-aquae*) and Spirulina are cyanobacteria (blue-green algae) and, as such, belong to the “true bacteria“. Chlorella, on the other hand, is a eukaryotic “true“ plant. This clearly demonstrates that the word “algae” is a collective term for organisms whose origins differ widely. Everything which lives in water in some way and needs light to live is classed as “algae“. Both man and Chlorella are classified as Eukaryotes. If this is reduced to phylogenetic relationships, it means that man is more closely related to Chlorella than Chlorella is to Spirulina or AFA.



Chlorella



AFA



Spirulina

This demonstrates that general statements about the nutritional properties of “algae” cannot be made with any certainty.

Chlorella is the most studied plant in the world as it has been used for over 100 years as a model organism in botanical research. Its effects on the animal and human organism have been the object of scientific studies for around 80 years. There is incontrovertible proof that Chlorella cultivated in clean conditions can be safely used as a food stuff.

The effect of pure Spirulina, which in some culture groups has been a regular feature of the menu for many hundreds of years, has been similarly well researched.

Their high protein and unsaturated fatty acid content, as well as a variety of vitamins and minerals, makes Chlorella and Spirulina a valuable supplement to the human diet. Moreover, recent scientific studies indicate that various constituents of these algae have pronounced immune-modulatory properties which make them interesting for applications in the medical field.

AFA also contains comparable amounts of proteins and vitamins. AFA is harvested from the Upper Klamath Lake in Oregon, USA. The problem is that AFA occurs in association with other blue-green algae in this natural environment. The German Federal Institute for Risk Assessment states:

So-called AFA algae, commonly known as primitive blue or blue-green algae, are cyanobacteria (*Aphanizomenon flos-aquae*). It is known that certain strains of these organisms produce toxins which can attack and damage the nervous system. Moreover they can be contaminated with other cyanobacteria which produce toxins which harm the liver (microcystins). Studies in the USA have shown that, depending upon when it is harvested, dried AFA algae may contain significant quantities of these microcystins. Food supplements manufactured from AFA algae may therefore be contaminated with microcystins (see here also: <http://ehpnet1.niehs.nih.gov/docs/2000/108p435-439gilroy/abstract.html>). According to this American study, the content was so high in over 70% of samples studied that the tolerable daily intake was at times significantly exceeded at a recommended daily consumption of 2 g algae. Since food supplements are consumed daily over a prolonged period, a possible health risk cannot be ruled out due to chronic contamination of the body with such large quantities of microcystins.

Joint press release from the German Federal Institute for Drugs and Medical Devices (BfArM) and the German Federal Institute for Consumer Health Protection and Veterinary Medicine (BgVV); 08/2002