

*Tsysar H.O.,  
acquisition of higher education of the educational degree "Master"  
specialty 101 "Ecology"  
Supervisor: Pavliukh L.I.,  
PhD, Associate Professor  
National Aviation University  
any0603999@gmail.com*

## **MICROALGAE AS A SUSTAINABLE ENERGY SOURCE**

We live in a world that is on the verge of an environmental collapse caused by anthropogenic influence on the environment. Every year the quality of water bodies, atmospheric air, soils, and biosphere deteriorates, and scientists are tirelessly looking for environmental ways to solve global problems. One of the most relevant solutions to the problem of environmental pollution is the use of microalgae to clean water objects and obtain biofuels to reduce contamination.

Microalgae is a type of prokaryotic algae (cyanobacteria), no longer than 1 micron. A feature of this species is the development of organisms solely due to the presence of chlorophyll and the transformation of sun rays into energy and organic compounds - glucose and oxygen (photosynthesis). Microalgae are popular because they have a high speed of development and, accordingly, a high biomass growth rate. Many states such as Japan, India, China, Thailand, Mexico, and the United States are made from the 20th century to microalgae in artificial water bodies due to the high nutritional value and attempts to obtain environmental biofuels.

The most relevant type of microalgae is *Spirulina*, as it has high adaptation to the environment (in the usual sense, it dwells in fresh water in tropical belts, but also develops well in salt seawater) and high biomass growth and high protein indicator.

However, to obtain fuel, a large number of fats are needed, which are few in algae, in comparison with plant cultures, which are used to obtain fuel (rape, soy, sunflower, corn).

Despite this, biofuels, obtained from microalgae, is more relevant for several reasons:

1. For dilution of microalgae, it is not necessary to extend the environment. For their cultivation, sun rays and water are needed, unlike *Brassica napus*: soil, regular watering, technique, fertilizer (herbicides, nitrogen and mineral fertilizers, insecticides), and after a given culture of the area, on which RAPS has not increased, cannot be used about 10 years.
2. The microalgae grow faster, multiply and have a high biomass indicator. Special care for microalgae for successful biofuel production is not necessary.
3. High indicator of oil production (for biofuels) on 1 / ha Unlike many plant crops: soy - 447 l / ha, RAPS - 71,000 l / ha, microalgae with a low-fat rate (25-30%) - 58 600 l / ha, microalgae with high fats (60-70%) - 137 000 l / ha.
4. To obtain biofuels, the microalgae can be located in different territories (marine water areas, uncomfortable areas of unused land) in reservoirs, while not occupied by huge areas.
5. Since microalgae are photosynthetic organisms, then with their cultivation, the environment is obtained by an increased positive effect: the saturation of the atmosphere of oxygen and carbon dioxide absorption.
6. Microalgae is a reducing source of energy, unlike oil, gas, coal or oilseed plants and in comparison.

The indisputable minus of obtaining biofuels is the use of nitrogen fertilizers to obtain high efficiency of microalgae, as well as the use of different cultivations due to a decrease in the efficiency of algae in open reservoirs. Accordingly, it is necessary to use a bioreactor, which requires higher costs to obtain biofuels and will have a high cost per liter.

The costs of obtaining biofuels directly depend on the type of algae, methods of production and dilution of algae, as well as environmental factors (exploding, climate, and others). At the moment, algae are used as nutritional supplements, drugs, and extremely rare in the form of biofuels. The first company, which began to engage in obtaining environmental biofuels from algae, was the American company "Fort Myers Co". Currently, the company is looking for new methods of growing and content of algae, as well as a new type of algae with a higher indicator of lipid content, for the globalization of this type of fuel.

Nevertheless, despite the negative properties of biofuels, humanity has no other choice. Minerals have the property to end, and to preserve our everyday life while restoring the balance of the biosphere, we need to develop and improve alternative methods for producing green energy: the use of solar panels, windmills, hydroelectric power plants, energy during garbage processing, and obtaining environmental biofuels from microalgae.