Lehrstuhl für Wirtschaftliche Staatswissenschaften, insbesondere Energiewirtschaftslehre

Staatswissenschaftliches Seminar
Mikroökonomik, Institutionen und Märkte

Bachelor thesis

On the current state of knowledge on bioenergy from algae and microorganisms

Biofuels are renewable energy sources produced from organic matter or wastes and play an important role in fighting climate change as a green substitute for fossil fuels. They can take many forms, such as biogas, biodiesel, or ethanol, and their application includes the transportation, electricity and heat generation, chemicals, etc.

The role of microorganisms in the production of biofuels can take many forms. One common approach is to ferment crops with high-content of glucose (e.g. sugarcane, sugar beets or corn) to produce ethanol. The discovery of new species of microorganisms, some genetically modified, opens up the possibility for using other sources of organic matter for fuel production, like fungus that can transform straw fiber into glucose or breaking down cellulose to produce ethanol.

Alternatively, biofuels can also be obtained from (micro)algae. Depending on the technique and the part of the algae used, different types of fuels can be obtained, such as biodiesel, bioethanol or butanol. Some advantages of using algae for biofuel production are that algae can be growth in land unsuitable for agriculture with low impact on fresh water sources, as it can be produced using wastewater. However, the high production costs make it difficult to compete against other fuels and there is a long road before commercial viability can be reached. In addition, and similar to other renewable energy sources, the high initial investment is another barrier that needs to be overcome in order to increase its attractiveness and promote the dissemination of the technology.

This thesis aims to explore the current developments of biofuels from algae and microorganisms with respect to technologies, costs, potentials, learning curves, environmental impact, etc., as well as future trends.

Literature

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