Pilot plant for production of single-cell protein from CO2 - 2022-0446925

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Descriere: Aarhus University, Biological and Chemical Engineering, intends to buy a process plant for production of single-cell protein from a source of CO2 and hydrogen produced from water electrolysis. The plant will be used in research activities related to production of food decoupled from area use. The end goal will be to gain experience with the scaled-up process, including extraction of performance and efficiency data for different microbes and operational schemes, operateability and dynamics of process and possibilities for recirculation of offgas CO2.Aarhus University, Department of Bio- and Chemical Engineering carries out a wide range of research, development and educational activities. In the areas of renewable energy and materials, the institute conducts significant pilot-scale activities in carbon and energy conversion. As part of this, research into new processes for the production of renewable fuels, chemicals, materials and food from different raw materials such as carbon dioxide, biogas or biological material in combined with renewable electricity in the form of hydrogen. At AU's facility in Foulum, there is a wide selection of pilot-scale process plants.As part of an ongoing project, the institute intends to purchase a specially tailored pilot plant for production of single cell protein from CO2 and power tailored for use in research and development activities. The plant will be integrated with various utilities on site. The equipment will be used in an R&D project aimed at producing a proof-of-concept for a new process for the production of protein from a feedstock of CO2, renewable electricity and key nutrients. The aim will also be to investigate the efficiency, characteristics and dynamics of this new process using different microbial strains and under different operating situations, i.e. varying load, flow, temperature, nutrients etc.A block diagram of the process can be requested via contact person. The feed stream is a stream of biogas (CO2 and methane) and renewable electricity. The loop must consist of the following units:- Electrolyser - Gas conditioning reactor - Two bubble coloumn reactors of 100 L each- Membrane separation units- Buffer tank- Offgas return loop- Gas circulation blowers- Dosing systems for media and pH-control- Oil heating system- Instrumentation including flow controls, flow meter, pressure sensor, temperature sensor, etc.- CIP/SIP tankThe plant must be able to vary process parameters including temperature and flow.AU is responsible for connections to the existing coolant, steam system, DMI water and a flare. The setup must be designed as a stand-alone plant, taking into account additional equipment for safe start-up and shutdown. The control system must be designed for remote control using control valves and other automation tools.