

MASTER THESIS PROJECT:**Enzyme-driven catalysis****- Glycose oxidase immobilized on inorganic support****BACKGROUND:**

Enzyme catalysis supported on porous support has many advantages to other catalytic processes. The enzyme catalysis is an effective and pure process due to that the enzymes are 100% specific to each reactant, i.e. no molecules are adsorbed. The enzyme stability can be greatly improved compared to that of enzymes in solution when mounted onto a porous support. No elevated pressure, temperature, dangerous chemicals or precious metals are needed for this process. Glycose oxidase catalyses the oxidation of glucose to hydrogen peroxide and D-glucono- δ -lactone. In this Master thesis, oxidation of glucose by the enzyme Glycose oxidase immobilized onto an inorganic support will be studied. The thesis will include the following parts:

- (1) Immobilization of enzyme onto inorganic support*
- (2) Evaluate reaction using known mediator molecules*
- (3) Try alternative mediator materials*
- (4) Build a closed circuit and evaluate voltage output*

Ceguma AB is a start-up company with mission is to contribute significantly to the global lowering of greenhouse gas emission within the next 10 years by developing enzyme based CCU technology. One important milestone for the company is to develop a demonstrator - an enzyme based reactor. This Master's Thesis is an exciting possibility for a skilled and ambitious student to contribute to achive skills in new enzyme-based technology.

AIM:

To immobilize glycose oxidase onto an inorganic support and prove catalytic reaction and voltage output for a closed circuit using known and alternative mediator materials.

DESIRED EDUCATION: Master's Programme in Applied Biotechnology, Master's Programme in Molecular Biotechnology Engineering Programme, Bio and Nano Materials - Master's Programme in Chemistry

LOCATION: Uppsala Biomedical Centre/Ångström Laboratory

PROJECT START: January 2023

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