Master/Diploma project

Degradation of carbon dioxide by micro organisms

The accumulation of carbon dioxide in the atmosphere is a key factor of the expected global heating. Hence, the reduction of the carbon dioxide release is an important objective in the near future. Various strategies are discussed for industrial applications: I. More efficient use; II. Carbon neutral technologies; and III. Degradation or storage of produced carbon dioxide. Unfortunately, applications based on fossil fuels cannot be improved with respect to their carbon dioxide release to a neutral balance. However, they will be important and cannot be replaced in near future. Especially, power plants using fossil fuels have to manage this problem. An elder approach is to liquefy the gas and to store it in subterraneous caverns. Recent studies show that this is not a practicable solution. Hence, energy companies are looking for efficient methods to degrade/convert the carbon dioxide into environmental neutral products.

Microorganisms could be an answer. As plants some microorganisms can use carbon dioxide as carbon source for their life cycle. Whereas plants are the main source for carbon dioxide neutral fuel, their efficiency for the above described industrial applications is to low. Here, high uptake and conversion rates coupled with high growth rates are required to fit the industrial needs. Microorganisms may fulfil these conditions.

Within this project it should be explored which metabolic processes are used by microorganisms for the carbon dioxide conversion. The work shall describe the current knowledge about metabolism and microorganisms. Finally, a possible industrial use and its requirements shall be evaluated.