

***Chlamydomonas reinhardtii* - A powerful host for the production of biofuels and high value products**

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The increasing interest on the application of phototrophic microorganisms as a production host for sun energy based bio-products is reflected by a variety of worldwide established collaborative research initiatives working in the field of algae biotechnology.

This presentation will summarize recent advances achieved in our group with the microalga *C. reinhardtii* and includes new molecular engineering approaches for more efficient sun-to-biomass conversion efficiency and the establishment of a mechanism for the production/secretion of a high value product. In addition it will be demonstrated that *C. reinhardtii* with its cellulose-free cell wall has the ability of cellulose degradation and assimilation for growth, a phenomenon which has been previously only shown for heterotrophic bacteria and fungi. Phototrophic microbes like *C. reinhardtii* may thus serve as bio-catalysts in cellulosic biofuel production approaches.

Finally, the identification of a new microalgal candidate for an efficient bio-refinery concept including rapid cell growth, high lipid content and good biogas production yields will be presented.

[Keywords] Microalgae, *C. reinhardtii*, Biofuels, Cellulose, Light harvesting