

## **Photosynthetic Bio-manufacturing in green algae**

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Fuel, food, and all biological products are simply different forms of chemical energy, and as such are closely related. All of these products are ultimately derived from photosynthesis, the process by which sunlight energy is converted to chemical energy. Eukaryotic algae offer tremendous potential for the large scale production of biofuels and bio-products as algae require only sunlight as an energy source and sequester CO<sub>2</sub> during the production of biomass, and algae can be much more efficient than terrestrial plants in fixing CO<sub>2</sub> and producing biomass. Using “designed for purpose” photosynthetic organisms we have the opportunity to develop production platforms for fuel, food, and biomaterials that have unmatched efficiencies and productivities. We are developing the genetic and synthetic biology tools to enable the production of designer algae as bio-products platform. The challenges, potential, and some early successes of synthetic biology in algae for the production of high value products will be discussed, including the description of some unique products that are enabled through algae technology.