



## Modified Cyanobacteria for Competitive Sugar Production

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**WARF: P160039US02**

Inventors: Brian Pflieger, Andrew Markley

**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing recombinant *Synechococcus* strains capable of higher glycogen productivity compared to the wild type.**

### Overview

Cyanobacteria are photosynthetic microorganisms capable of producing far more sugar per acre than corn, sugarcane or sugar beet. Unlike other bacteria and yeast, cyanobacteria use atmospheric CO<sub>2</sub> as their main carbon source. Moreover, the organism lends itself well to genetic modification, requires minimal nutrition and can be cultivated in locations that do not compete with food crops.

For these reasons cyanobacteria continue to be explored as an alternative sugar source for the production of biofuel and industrial feedstocks. For example, they produce and store glycogen that can be converted to ethanol or other chemicals through known saccharification and fermentation processes.

While the cost of growing cyanobacteria is currently higher than growing corn, the advancement of new strains and techniques has the potential to compete on price.

### The Invention

UW–Madison researchers have developed strains of *Synechococcus* sp. Strain PCC 7002 with the highest reported glycogen or starch production rate of any cyanobacteria or algae. The strains are genetically modified to overexpress a glucose-1-phosphate adenylyltransferase.

### Applications

- The modified strains could be freeze dried, lysed and used as a sugar source for many fermentation reactions including biofuel/biochemical production
- Could supplant or complement the use of biomass as a sugar source

### Key Benefits

- Some of the highest glycogen production rates ever reported
- For the first time, cyanobacterial sugar production may compete with conventional practices.

### Stage of Development

We have generated and tested strains. The researchers' glycogen-screening method is currently being used in the lab to evaluate promoter libraries, gene knockouts/knockdowns and induction conditions in high throughput. [See our privacy policy.](#)

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## Additional Information

### For More Information About the Inventors

- [Brian Pfleger](#)

### Related Technologies

- [WARF reference number P120017US02 describes cyanobacteria genetically modified to tolerate 50-fold more organic acid.](#)

### Related Intellectual Property

- [View Continuation Patent in PDF format.](#)

### Tech Fields

- [Clean Technology : Biobased & renewable chemicals & fuels](#)

For current licensing status, please contact Jennifer Gottwald at [jennifer@warf.org](mailto:jennifer@warf.org) or 608-960-9854

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