

FIRST REPORT

Disrupting the water chemicals market

GW I takes a look at a company hoping to decarbonise the manufacture of water treatment chemicals with its bio-based method.

BIO-BASED PEROXIDES

SOLUGEN

Solugen, based in Houston, Texas, has developed a biologically-based method to produce peroxides and a range of other chemicals for water treatment applications. In contrast to the traditional petrochemical-based manufacturing technique, Solugen combines plant sugars, enzymic catalysts and water as a solvent in a reactor to produce hydrogen peroxide as well as other chemicals. The idea was born out of the work of one of the company's founders, Gaurab Chakrabarty, who was studying how cancer cells make hydrogen peroxide to mutate and beat the body's immune system.

The company's aim is to build chemical "mini-mills", the capacity of which were not disclosed but will be operated by a customer's existing personnel, that would be able to generate peroxides on or near site, rather than a reliance on large centralised plants with the need to transport hazardous concentrated chemicals. The peroxide production process also yields a co-product of a chelant – which can bind iron in water streams – at a ratio of 1:1. While Solugen undertakes the manufacture of peroxides and chelates by itself, it has teamed up with partners to create other chemicals such as biocides and surfactants.

Solugen uses CRISPR (clustered regularly interspaced short palindromic repeats) gene editing technologies to modify cells and produce the enzyme required for the process, and has been working on two enzymes to date. Despite its products being more environmentally friendly than petrochemical-based chemicals as well as less hazardous or toxic, Solugen still has to compete fiercely on cost with existing chemical solutions. It has techno-economically optimised the manufacturing process, where the cost of enzyme production is "in-line with manufacturing peers."

Currently, the majority of its business is supplying both peroxides and chelants for produced water treatment in the oil & gas sector, as disinfection and iron removal solutions, respectively. The chelates also act as a corrosion inhibitor for the pipes that are transporting produced water. The remainder of its business is in other industrial water treatment. In future, Solugen foresees itself having three main business areas, serving the oil & gas, mining and industrial sectors.

Solugen, founded in 2016, currently sells the chemistry in volume but in line with its goal to set up distributed manufacturing plants near to customer sites, the second phase of its business development will be to set up off-take partnerships with clients that will have a permanent source of chemical supply. It has also identified dozens of other chemical types that it would like to manufacture using its bio-based methods, including biopolymers.

A \$32m Series B funding round was closed earlier in 2019, following a \$13.5m Series A round in late 2018 and roughly \$5m in seed before that. Solugen intends to use this capital to scale up its production process and invest in more sales & marketing activities, as well as intensify research and development. Its sales team currently consists of personnel formerly of chemical giants such as BASF, Clariant and Nalco and it has won several multi-million-dollar contracts in the oil & gas space.

Treatment category:



Potential applications:



Potential industries:



USP: Being price competitive with industry-proven chemicals without sacrificing performance.

Funding stage: Raised Series B round worth \$32m.

Stage of development: Commercial. Scaling up production. Patent protected with six more patents pending.

CEO: Gaurab Chakrabarti
Website: www.solugentech.com

Star rating:



ICON KEY

Digital categories:

Dissolved solids removal

Disinfection/oxidation

Applications:

Boiler water treatment

Cooling towers

Wastewater treatment

Produced water treatment

Industries:

Upstream oil & gas

Mining

Industrial

Star rating system:

Unrated

Interesting

Worth a detour

Worth a journey