Intellectual property Canada: Using yeast to make cannabinoids

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Not many people say “yeast” is their most crucial teammate – but Alex Campbell and his fellow inventors do. Together with his colleagues from Concordia University, Campbell is part of a team that founded Hyasynth Biologicals Inc. The Hyasynth inventors rely heavily on their yeasty coworker to produce cannabinoids (yes, the stuff typically found in cannabis plants).

Campbell and the Hyasynth team developed a method of genetically engineering various yeasts so that they produce cannabinoids – the group of active chemicals in cannabis.

The difference between conventional cannabis production and Hysaynth’s model is that cannabis plants can only produce two cannabinoids – THC and CBD – in an active dose. In comparison, Hyasynth’s yeasts can produce more than 105 different cannabinoid molecules. These compounds have broad applications. For example, there is clinical evidence that the cannabinoid CBDV could be effective in managing behavioural issues associated with Autism Spectrum Disorder. The idea is that different yeasts can be engineered to produce specific target compounds, which can then be sold in therapeutic formulations.

Campbell realized his passion as an inventor while he was studying engineering. He knew he was passionate about science, and biology in particular, since his elementary school days. He never found an exact area of science that compelled him, and felt that much of his university experience consisted of learning other people’s theories. That is, until Campbell landed a position on the Queen’s Genetically Engineered Machine (QGEM) Team.

In 2011, Campbell and his teammates engineered the nematode, C elegans to enhance its ability to chemotax (like a chemical compass) towards the pollutant Naphthalene. The goal was to use the pollutant-seeking worm to assist in environmental bioremediation projects.

About the QGEM project, Campbell remarks, “I loved the idea of modifying life to teach it to carry out applications that would help people. The term we use now for this is Synthetic Biology.”

Campbell followed this passion and enrolled in a Master's program at Concordia under Prof. Vince Martin, an expert on modifying yeasts to produce opioids. Campbell and his colleagues decided to see if they could replicate the cannabis pathway in yeasts. This was initially challenging as cannabis is a plant, while yeast is a fungus. They started by synthesizing various enzymes produced by amoebas and various fungi and then introducing them to yeasts. By doing this, they "taught" the yeasts to produce the enzymes themselves, creating the biochemical pathway that produces cannabinoids.

Early on, the Hyasynth team realized how important it would be for them to protect their intellectual property. Many of the cannabis enzymes were already patented, so there was a lot of pre-existing IP that Campbell and the team had to work around.

The Hyasynth team worked with BLG to file for patents protecting their core processes and technologies and the group has been able to leverage their IP as they grow the company.

"Engineering these organisms takes a long time. It's been eight years that we've been doing this as a company, and we've been pre-revenue the whole time. So the greatest asset the company has right now is really our intellectual property," says Campbell.

That will change later this year, as Hyasynth is starting production and sales of its yeast-created CBD, which they will sell for lower prices than CBD produced by cannabis plants.

When asked if Campbell had any advice for young inventors looking for inspiration, he said "put yourself in situations where you can apply the things you're learning to real world problems. Join clubs, join competitions. Get out there, get your hands on stuff – that's the best way to learn and create."

BLG is proud to work with inventors large and small to protect their ideas and help grow their vision. Get in touch to learn how we can help you.

By

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