

# The award-winning startup seeking to regenerate soil for better crops



When he was little, **José Otero** would listen to his grandfather, who was a farmer, talk about the **problems of the countryside** and the challenges of **soil fertility** and reaping a **good harvest**.

Today, together with his friends and fellow **Tec graduates Ilse Álvarez** and **Mónica Serrano**, he is co-founder of [Apical](#), a startup whose aim is to help **crops** be as productive as possible by **cultivating microorganisms in the soil**.

The startup is currently at the **idea stage**, but its potential led them to receiving **international** recognition when they reached [the final of the Entrepreneurship World Cup](#) (EWC) in **Saudi Arabia** in March.

They met while studying at [Tec de Monterrey](#) and have been working together on agriculture-related projects for over 6 years, even **licensing a technology**.

**Facing them was the challenge** of helping farmers reap better harvests by making use of the land, so they decided to start their own business.



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### **Apical: the path to regenerative agriculture**

José said that their startup helps farmers **cultivate their own microorganisms**, reducing their purchases of biological supplies and agrochemicals.

*“The plan is for there to be hundreds of different types of **microorganisms** that can be produced through a personalized approach, using both fungi and bacteria, which serve to **fertilize and protect plants** against pathogens or insects,”* said Otero.

Ilse pointed out that by implementing this system, farmers could **reduce the cost** of purchasing **biostimulants and fertilizers** by up to 6 times.

*“They start using less fertilizers and pesticides, because microorganisms help **control disease**, and having **healthy soil** greatly curbs crop disease,”* said Ilse.

*“There are also important **savings on logistics**. We reduce the use of packaging because they’d be producing the stimulants right there, which also helps reduce all the pollution that can be caused by the large-scale logistics of agrochemicals,”* she added.



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## Designing technology to analyze and regenerate the soil

Through **biostimulants**, farmers can increase their yields, improve soil water retention, and reduce their use of fertilizers and pesticides. Apical proposes that these be **produced** on the farmers' own land.

This can be done through a **process** they designed that mainly consists of **3 stages**, Monica explained.

*"First, we carry out a **genomic analysis of the soil** and a study to understand the needs of the soil and the nutritional needs of the plant. Then, we isolate the microorganisms from that same soil and use them to **develop a capsule** with specific growth conditions.*

*"The final step is to **install a bioreactor** in the field for farmers to use. So, we provide them with the analysis, the capsule, and the machine. It's all a process of understanding the soil to make the right decisions during **crop management**,"* said Serrano.

With **Apical**, farmers can regenerate their land through their own **irrigation system**, even land that isn't fertile. What's more, the system would enable the process to be accelerated by continuously applying the biostimulants on a weekly basis, for example.

*"It works **the same way as coffee capsules**, where the bioreactor would be the coffee-making machine. For example, we give them a liter that they can use to make a thousand liters. The bioreactor is connected to the irrigation system they normally manage,"* said José.

Apical is currently at the idea stage and its founders are preparing to **develop prototypes** that help them **validate the technology**.

*“It’s all a process of understanding the soil to make the right decisions during crop management.” - Mónica Serrano*



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### **Creating their first project as Tec students**

Ilse, Mónica, and José were studying their final year of **Biotechnology Engineering** at [Tec de Monterrey's](#) Monterrey campus when they decided to develop their first agriculture-related project.

All three of them were returning from abroad: Ilse was coming back from the Netherlands, where she'd studied international business; José from Saudi Arabia, after researching regenerative agriculture; and Mónica from a bootcamp in **Silicon Valley** as part of an entrepreneurship scholarship after winning the **Frisa Award**.

*“One day, we got together at my house. While we were chatting, **we decided to start a business** that was aligned with the different goals each of us had.*

*“For example, I’ve always wanted to help the world, that’s why I studied **biotechnology**, to acquire tools and make an impact,”* said Ilse.

The **Tec graduate** highlighted that they focused on **agriculture** because it's a **primary activity** that impacts many sectors. For them, it was like attacking a major issue from the root to make an impact on other areas, such as **food** and **water use**.

*“We invented a **biostimulant** to increase land productivity and for the soil to contain more life, with good bacteria and fungi in order for plants to be healthier and produce more in a **100% organic and sustainable process**,”* said José.

They developed the product after a year of research and incubation processes with **CAINTRA** and the **Tec’s business incubator**, where Mónica had won a **Frisa Award** scholarship. Eventually, they managed to **license their technology** to a company.



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## Friendship and entrepreneurship on a global scale

In addition to the partnership they’ve forged as entrepreneurs, the graduates highlight the **friendship they’ve cultivated** since studying for their degrees at the Tec.

*“Moni and I met the very first day, in an orientation class, that’s where we became friends. Then, José started coming to Genetics class in the third semester because he’d done a year in Sonora,”* Ilse said.

*“We’ve been **friends for 10 years and worked together for over 6 years**. We’ve been able to balance our friendship, the project, and our goals. It’s been a path that has had its challenges, but it has also been very gratifying to walk it together,”* said Mónica.

They recently took their entrepreneurial project to a global scale. After qualifying for the [Entrepreneur World Cup](#) at **INCmty 2022**, the three friends traveled to **Saudi Arabia**, where they competed with 200 startups and won Runner-Up in the Idea Stage category.

*“It was a blessing that the three of us could be here; it was **a great team achievement**,”* said Ilse after the competition. *“For us, it’s **global validation** of the idea that we have, and it gives us extra confidence in the project.”*

With this victory, the **Tec graduates** obtained resources and expert contacts that can help them with their **goal of validating their technology** and seeking to impact global agriculture with Apical.

*“The Tec gave us the opportunity to **meet and come together**, as well as engineering and biotech tools that we’ve used, exchanges, and the Silicon Valley scholarship. It’s also given us many entrepreneurship lessons and connections through the Tec incubator,”* concluded Ilse.

***“For us, it’s global validation of the idea that we have, and it gives us extra confidence in the project.” - Ilse Álvarez***

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