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Botanical Solution gains ground

Tissue culture technology solves key challenges for pesticides based on botanicals

▼ Rebecca Coons

Agriculture is challenged on many fronts, most significantly by regulatory pressure, growing pest tolerance and the need to balance increasing demand for food with pressure to use fewer resources. Botanical compounds with naturally pesticidal modes of action are being brought to bear on these challenges but often come with pain points of their own. Such products can face significant supply constraints and traditionally require the exploitation of natural resources. Consistency can also be difficult to manage, as is the registration process.

Botanical Solution Inc. (BSI; Davis, California) has developed a technology that provides a scalable and sustainable supply of key botanical products. The platform is based on plant tissue culture and allows BSI to discover and develop botanical products that are sustainable, highly consistent and cost effective. Its first active ingredient, ABM-01, is a fungicidal compound once extracted from the bark of *Quillaja saponaria* Molina, or soapbark tree. Indigenous to Chile, the tree is particularly slow-growing, taking 25-30 years to reach maturity.

“We’re controlling and vertically integrating the process from plant production all the way to final product,” BSI CEO Gaston Salinas tells CW. The company starts by growing plants in vitro for 30–60 days. By using bioreactor systems, the company can grow biomass quickly and produce specific chemical compounds. “The plants are biofactories; we are able to produce as much as needed of this biomass all year-round,” he added. With about 2,000 square meters of lab space in Chile, BSI has the same soapbox tree extract production capacity as 100,000 hectares of agricultural land. “And no matter if you take one gram, one kilogram or one ton of this fresh material, the technical composition is almost identical batch to batch. This consistency cannot be achieved with traditional growing and extracting.”

ABM-01 is the active ingredient in BSI’s broad spectrum biofungicide *Quillibrium*, which prevents and controls *Botrytis cinerea*,

Alternaria alternata, powdery mildew, sour rot and other harmful fungal diseases in high-value crops worldwide — diseases which are responsible for hundreds of millions of dollars in losses every year.

“*Botrytis cinerea* is increasingly impacting high-value crops such as table grapes, cherries and blueberries,” Salinas said. “The fungus manages to develop no matter what the temperature is, and growers have difficulty combatting it — especially close to harvest when they must think about export markets and residue restrictions. This is where fungicides like *Quillibrium* come in. They can provide insurance for growers to keep fresh produce free of *B. cinerea* longer.”

Although the regulatory process for biopesticides is shorter than conventional chemical crop protection products, it is still a difficult process. “Our first application was in 2013, and eleven years later, we’re in almost three countries. The processes could be better,” Salinas said. In Chile, it took BSI four years to get approval back in 2016, largely because BSI had to follow the traditional chemical regulatory pathway. “Approval in Peru was way faster; it took about 18 months,” Salinas said. “By that time, they had created a registration process for biological products to reflect the better safety profile compared to traditional chemicals.”

Currently, *Quillibrium* is commercialized in Chile, Peru and Mexico, the latter aided by a partnership between BSI and Syngenta that dates to 2019. “In Mexico, registration was stuck almost two years,” Salinas said. “In the US, a market we are very keen to enter, it’s been a mixed story. Four to five years ago, it was easier to get a biological registered with EPA and California Department of Pesticide Regulation. But these days, it’s more difficult. We don’t expect to be registered in the US any sooner than 2026. Still faster than European Union registration, but still a significant length of time.”

Outside of agriculture, BSI is also working



PLANT POWER: BSI tech produces sustainable, highly consistent botanicals.



CULTURE: BSI is using plants as biofactories. The company can grow biomass quickly.

to produce and commercialize QS-21, a saponin of *Quillaja Saponaria*, and has a development partnership with Croda International PLC. QS-21 has been used in commercial vaccines as an adjuvant since 2017 but is in short supply due to high demand and strict deforestation laws in Chile, according to

Salinas. “We almost entered the pharmaceutical space by accident,” he said. “We knew that QS-21 is a gold-standard vaccine adjuvant used in popular RSV, shingles, malaria and other vaccines. But we never had an intention to enter the pharmaceutical space, having started out with a narrow focus on agriculture. But it soon became apparent that pharma industry was relying on the wild *Quillaja Saponaria*.”

Salinas acknowledged that the biocontrol space is getting overcrowded, “with over 200 companies trying to sell the same story. Fortunately, our unique value proposition is backed by seasoned investors that believe in our technology and our products.”

Last month, BSI announced that it has closed another \$7.6 million financing, bringing total funding to \$23 million as part of Series A, which will fund the commencement of in-house production of QS-21. Though its focus for now is on expanding the market for ABM-01 in fungicides and QS-21 as vaccine adjuvants, there are broad applications beyond extracts from Chile’s soapbark tree. “Depending on the plant species, sometimes you can address shortfalls in the supply of those materials or, just as importantly, improve quality,” Salinas said. ■