

Radiant **reduces** nicotine

Radiant Technologies, the Canada-based company, recently released information to TJI about its patented system of Microwave Assisted Processing (MAP), which can extract natural compounds from different biological materials including tobacco leaf.

Radiant, which was founded in 2001, is based in Edmonton, Alberta, Canada and currently has 75 employees. The extraction process, which can be used on tobacco leaf, can also be used on several different natural products. The company said that this very factor has allowed the company to work with customers in food and beverage, on nutritional supplements, cannabis, and also with clients in the pharmaceutical and cosmetic industries. The technology behind the nicotine reduction method, however, was not initially intended for industrial-scale extraction of natural products, said Steven Splinter, founder and CTO of Radiant Technologies. "MAP was originally developed in the 1990s by Environment Canada, which is the governing body responsible for coordinating environmental policies in the country, mainly for laboratory-scale applications." Radiant, then, spent several years expanding on the government's original method to then apply the technology at commercially-relevant scales, the company said.

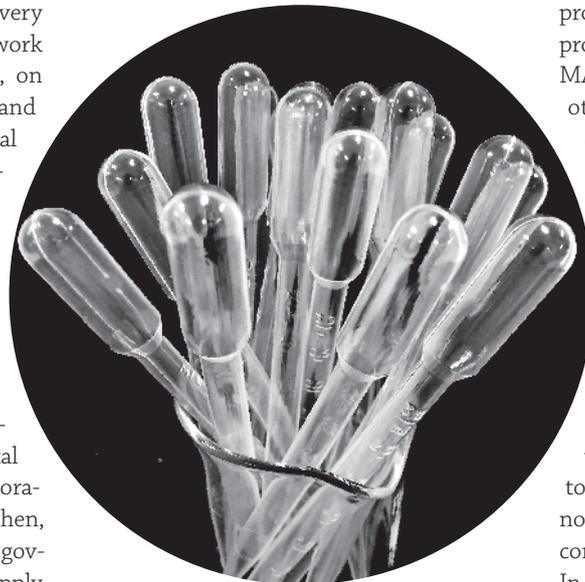
exist on the market. One of the most common methods involves using genetically modified tobacco plants, which the company said could be impractical for tobacco growers. Farmers have the added task of

inate certain compounds from plant matter. Although CO₂ is stable, the company said that using high-pressure solvents creates storage, maintenance and cost problems. Such methods are typically batch-only and, in most cases, cannot be scaled to meet the production volumes required for tobacco processing, Splinter added.

MAP has advantages, in comparison to the other nicotine reduction methods, the company stated. "There's no controversy associated with MAP extraction [like with genetically modified tobacco], there are no harmful solvents, the tobacco leaf spends less time processing (with better yields), and the solvents used (water and ethanol) don't require expensive, high-maintenance storage to function properly," Splinter said. After using the MAP process, the tobacco can still be used to manufacture tobacco products, while retaining "most if not all of its flavour and aroma," Splinter continued.

In response to the United States Food and Drug Administration's (FDA) recent plans to limit the amount of nicotine in manufactured cigarettes, Radiant filed a submission with the agency to consider the company's technology as a method to reduce nicotine levels in tobacco on 12 June 2018.

In more recent news, the company said it partnered with the Spanish biotech company, Grupo Natac to form a joint venture called Natac Solutions. "Natac Solutions will leverage experience, equipment, and scientific development between the two companies to form even more advanced solutions for our biomass extraction customers. Radiant said that it also filed 18 provisional patent applications with United States Patent and Trademark Office related to methods, systems, and apparatus for improving the efficiency, purity, quality and yield of biomass extraction.



keeping conventional and GM tobacco plants separate to prevent cross-contamination, which is not only costly but also time-consuming, according to Radiant.

The second most common nicotine reduction method entails soaking tobacco leaves in a variety of solvents, some of which are harmful. This method poses two challenges for the tobacco industry. The solvents being used for the process can actually be dangerous, and the extended soaking time damages the leaf which makes it unusable for further processing or for manufacturing tobacco products such as cigarettes, Radiant explained.

The third nicotine reduction method, which has become increasingly popular for plant extraction, uses supercritical CO₂. The method uses extremely high pressure and very specific temperatures in order to elim-

HOW DOES IT WORK?

"MAP uses microwaves to locally heat the water in natural materials and drive designated compounds out into a solvent," Splinter explained. "Tobacco processed with MAP uses a flavour-saturated solvent of water and food-grade ethanol. This, combined with the fast heating from the microwave, drives nicotine out of the tobacco leaf while preserving its taste and flavours. MAP is very fast, which minimises tobacco degradation due to prolonged soaking in solvent."

The MAP nicotine reduction method is only one of four popular options that currently