

# A bet on environment



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**The Center for Studies and Research in Biotechnology -Cibiot-, of the Pontificia Bolivariana University, developed a patent protected system, which allows you to separate and concentrate industry compounds to produce raw materials.**

**F**ique history in Colombia dates back to pre-Hispanic times, when the Indians tied their bows to hunt with this fiber, while women elaborated fabrics for clothing for their families. Over time this plant originated the sack, sandals and jíquera, products that represent the Colombian culture around the world.

In Colombia, the fique grows in most areas of the country, especially in the departments of Cauca, Nariño, Santander, Antioquia and Boyaca. The country produces about 30 thousand tons of fique a year and 70,000 families depend on this activity.

In 2016  
the Superintendence  
of Industry and  
Commerce granted  
this technology  
a patent, open to all  
kinds of fluids, and not  
only fique juice  
mentioned as an  
example of application.

Although it is biodegradable, its main problem is the waste generated during the extraction of the fiber from the leaf: is used about 4%, while the remaining 96% comprises fluids and bagasse.

In this regard, teacher and coordinator of Cibiot, Margarita Enid Ramirez Carmona, along with her group of researchers, is working since 1999 around the better use of fique.

"After a business conference we began an understanding with a company interested in working on natural products. At that time, the Group already had a development fique juice to separate the compounds of interest, but in liquid and they needed it in powder. We made the process from liquid to solid and identified it was very slow, from





there we developed a technology that meets the functionality of a separation process," says researcher Margarita Enid about the beginnings of this technology.

Thus, the research group began working on a filter that would serve the "figuero" sector, the cosmetics, agricultural and pharmaceutical industries, and others. The mission was to add value to the waste of this plant.

The task was to create a filter for separating and concentrating components of figue juice, in order to obtain a solid material which served for different industrial applications.

However, what is new about this development? Researcher Ramirez explains that "the novelty lies in the way the system is set up the: the arrangement of the elements of separation, the way it is regenerated, called in situ desorption and implementation of a biodegradable removable element to filter".



The "system for fluid separation and method for the application thereof", as it was called this technology, its main function is adsorption, ie, the fique liquid juice passing through the filter to adsorb by the filling (to trap) the fluid contaminant particles from fluids to be purified.

The success of this product is the combination of mineral and plant material: "(...) It is this combination which makes it possible to perform the adsorption process, to obtain a liquid with less particle size compared to other filters," explains Ramirez Cardona.

But UPB technology has another value added service such as, for example, the process of the filter cleaning. It has a removable initial block made in biodegradable material, which can be removed when the filter is saturated, so that this separation system has longer service life.

The disposition of the filters is another differentiator of this development. It is circular and they are arranged concentrically, allowing more units in the same space having more profit and increasing production.

**The researchers plan to apply this technology to the metals concentration processes under the Mining research Project, which they currently develop.**



Yesid Velez Salazar and Leidy Johanna Castrillón Rendón.



This prototype is easy to transport and a low construction cost, when is compared with similar technologies: "It was made thinking about being easy to deliver in the country and to reduce costs, not in technology as such, but in construction" researcher Ramirez adds.

This prototype, which is located at the Biotechnology Laboratory at the UPB, has its base and steel structure. The other filter components are built in PVC. The filling, which is the differentiator, is made by mineral stones and natural fibers.



Prototype of technology, located at the Laboratory of Biotechnology of the UPB.



From left to right: Group Researchers: Margarita Enid Ramírez Cardona, Rubén Darío Giraldo Aristizábal, Yesid Vélez Salazar, Leidy Johanna Rendón Castrillón, Óscar Alexis Muñoz Blandón y Carlos Ocampo López.

### Value added:

- Avoids the use of chemical reagents.
- It can be scaled and replicated easily.
- Productivity increases in less time.
- It has a removable biodegradable initial block that could be changed in case of saturation, so that the system has longer service life.

"The development of this system allowed us to engage with the figuero producer and the industry, because our purpose was a filter for the benefit of this community," researcher Yesid Salazar Vélez Salazar concluded.

### Data sheet:

**Project Name:** "System for fluid separation and method for the application thereof"  
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