

# The fique fiber has not died, it is transforming



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Researchers from the UPB, Bucaramanga Section, examined for new uses for the fique fiber with the aim of improving the socioeconomic situation of thousands of farming families, reducing the use of synthetic fibers in the country and minimizing the environmental impact.

"There is the possibility to be ears and heart about what is happening in society from the university," says Rolando Enrique Guzmán López, Mechanical Engineering PhD and researcher at the Universidad Pontificia Bolivariana, Bucaramanga Section. From the Group of Research and Technological Development in Mechatronics and Agroindustry –GiDeTechMA- (from the Spanish acronym) focused on technological and industrial development. They wanted to contribute so the fique farmer sector can get out from the crisis in which it is currently.

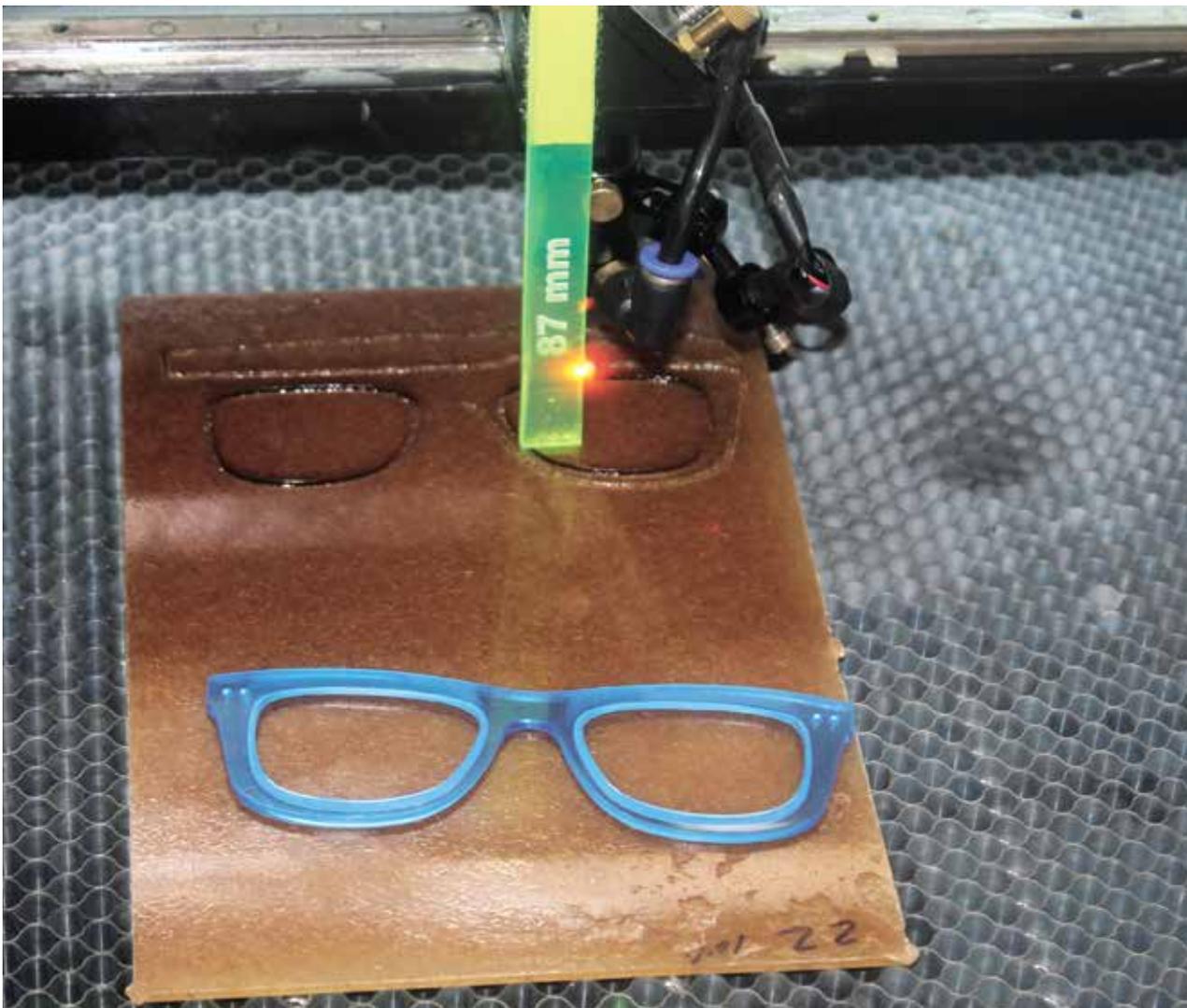
Cauca, Nariño, Santander and Antioquia are the states with the highest production of the plant in the country, according to the Information and Communication

Network of the agricultural sector in Colombia. However, the data of this Network realizes that the percentage of participation in the production and the number of cultivated hectares of the product, originating from tropical America, decreased, especially in Santander. If for 2007 in this department about 4,000 tons were produced, by 2014 they were close to 2,000. This crisis in the fique farmer sector is mainly due to the entry of synthetic materials as a substitute product.

Through the project "Morphological-mechanical characterization of composite materials reinforced with fique fibers from Santander state - Colombia". It seeks solutions because it investigates the new uses that can be given to the plant, for example, the development of composite materials that promote their implementation in the design of new products such as the technological development of machines that are more productive and tools.

**The cultivation and transformation of fique plant generates approximately 28,858 direct jobs in Colombia. Agriculture Department.**





The mechanical engineer says that the materials developed with the fique can be used as vibration dampers, acoustic insulators or for applications in which there is movement in rotating machinery. This project does not intend to compete with Santander artisans or the small companies dedicated to the manufacture of sacks, ropes, mantles or espadrilles, but they aspire to innovate to give new uses to this plant and take advantage of the fibers and the great amount of waste: juices and bagasse.

### A futuristic material

When the tombs of the aborigines were found, they already had backpacks, nets and funerary fabrics made with fique. Today, Professor Rolando Guzmán has a glasses frame and even a cell phone case made of bio-composite materials and a biopolymer matrix, resulting from his research. Now this project, in which a morphological and dynamic characterization of composite materials reinforced with fibers of the plant is made; it will allow, later on, developing products for specific industrial applications.

The fique farmer sector is in crisis due to the overproduction of fiber and the entrance of other synthetics.



Edwin Dugarte Peña, Rolando Guzmán López and Sergio Andrés Gómez Suárez.

The advantages of this innovation are in its environmental impact, since these fabrications would replace common materials such as synthetic fibers, derived from petroleum, which have carbon cycles of thousands of years. Technological development will directly affect the reduction of pollution on the planet. However, the benefits are not limited to the environment. The product of this research will result in the strengthening of the productive chain of the fique farmer sector at a national level because it provides an added value to the plant whose cultivation and transformation depend on 70,000 families in the country, which, according to the engineer Guzmán, represent a critical socio-economic situation.

For this research group the uses of the fique are not limited to those of the industry, for engineers the physical-mechanical properties of the fique are very important. Product designers may be interested in their sensory aspects as the smell or the texture. "the key point of the different approaches is, in conclusion, the obtaining of products with different values and meanings that reflect in the technification of the sector and in the increase of income for the communities that dedicate to this activity ", concludes Rolando Enrique Guzmán.

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#### Data sheet

**Name of the project:** Morphological-mechanical characterization of composite materials reinforced with fique fibers from the Santander State - Colombia, with the Scanning Electron Microscopy technique, the "Charpy" Pendulum Impact Test, the Traction Test, the Bending Test, the Brinell Hardness Test and the Frequency Response (FRF)

**Keywords:** Fique; Dynamic characterization; Mechanical characterization; Bio-composite

**Research Group:** Technological Development in Mechatronics and Agroindustry.

**School:** Engineering

**Sectional:** Bucaramanga

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