



Chilean biopolymers

Biopolymers, macromolecules produced by various biological systems, present physical and mechanical properties similar to conventional petroleum-synthesized polymers. Currently, biopolymers are utilized for the production of industrial film and plastic packaging.

In recent years, science has used biopolymers to create biomaterials able to hold specific substances and degrade when exposed to living organisms or certain environments. These characteristics have led to a number of biopolymer applications in the medical, agricultural, and mining fields, among others.

Given biotechnological advances and expanded applications, there is a necessity to create biopolymers able to adapt to the specific characteristics of and objectives for the enclosed substance.

Dr. Ignacio Poblete, researcher for the Center for Bioinformatics and Integrative Biology of the Biology Faculty at the Universidad Andrés Bello, is dedicated to this field of research and is investigating ways to create new low-cost biopolymers and biodegradable products.

"We work with the environmental bacterium *Pseudomonas putida*, which can be used to create biopolymers with specific characteristics. We can manage factors such as the type of supplied carbon and the modification of genetic and environmental properties," Dr. Poblete explains.

To accomplish this goal, mathematical modeling techniques are applied on a genomic scale to guide the genetic engineering of biopolymer-producing microorganisms. "This system allows us to tailor the metabolic network of the bacteria to create the chemical conditions needed for synthesizing a biopolymer with specific characteristics."

Dr. Poblete adds that this process has striking elements. "For example, although organic waste is used as the raw material, the resulting biopolymers require no additional chemical processing. They only need to be purified after extraction."

"Our objective is to create custom-built biopolymers so that, if a treatment requires the release of a drug in six hours, we can create a polymer that adjusts to this requirement. Customization will allow us to optimize this system for use in many different fields."