

# BIOFABRICATED



"IT'S A FUTURE IN WHICH WE FIND OURSELVES BEING A PART OF THE ECOSYSTEMS INSTEAD OF EXPLOITING THEM. UNDERSTANDING NATURE'S PROCESSES AND CO-CREATING WITH IT."

MARÍA JOSÉ BESOAIN N. CO-FOUNDER LABVA

## INTERVIEW WITH MARIA JOSÉ BESOAIN CO-FOUNDER LABVA

**L**ABVA is an independent, self managed and open source bio-materials laboratory based in the city of Valdivia, Los Ríos region in Chile. We interviewed María José, co-founder, biomaterial researcher and architect to share with you the work they are doing and their journey of curiosity, research, innovation, education and product creation in the area of biofabrication.

### **Can you let us know how the lab was started and who else is involved**

The lab started three years ago with Alejandro (architect), Valentina (Designer) and María José (architect), the three of us have a design background. We came to live here at Valdivia, at the south of Chile where we met and started sharing our love for fermentation processes and collecting wild edible fungi. Valdivia is the fungi and also beer capital of Chile, so there is a lot of waste coming out of the breweries and we decided to create something out of it.

Our lab is a kitchen where we started to understand the biological processes that could transform agroindustrial by-products into new materials with the help of fungi and different microorganisms. All of this was very intuitive and also very guided by our curiosity, but with the help of different people in other labs we started to understand what was going on behind this amazing transformation. We started to understand our natural and anthropic abundances present here at our territory and to develop methodologies to approach this biodiversity and to teach others how to immerse in biofabrication practices. We realised then that we needed to expand our team incorporating people with scientific backgrounds, and so Gabriela (biochemist) and Esteban (marine biologist) became part of the project.

### **Your team have a wide range of experiences and skills from architects, marine biologists, bio-chemists through to designers. How do all of these skills come together in the work that you do?**

Our work is founded in transdisciplinarity, we are a team with no background whatsoever in material design, so this has been a beautiful journey and learning experience because no one is really the expert and so every question is equally important, and we really question everything. We all try to answer

these questions using our backgrounds but also venturing into other disciplines and the ethnobotanical knowledge present in our territories through the teachings from our ancestral communities. We think probably the biggest challenge of mixing our skills is that we have had to adapt our language, create new concepts that could convey all of the questions that are guiding our processes.

### **What would you say is the main goal behind the work LABVA do today?**

To question our material culture and try to create a new culture in which everyone has something to do about it as hands on experience. Teaching how to approach our territories in search of material answers and being able to create multiple answers instead of one that works for everything -the petrochemical approach- and empowering people to search for these answers locally in order to create a biomaterial palette that is diverse and unique for each territory, answering local questions instead of global ones that's our main goal.

### **Your team are very passionate in helping to disseminate knowledge through conferences, workshops and on such platforms as RawAssembly, how receptive do you feel different industries have been towards bio-materials and where do you see the most potential today and for tomorrow?**

The dissemination of innovation and new biotechnologies allows users to question deeply the processes behind the creation and degradation of our built world. This empowers users to demand changes in the industry. Here in Chile, industries are not so receptive to these changes so they try to create hybrid answers such as some percent bio-based products, which even though they use less fossil resources are not recyclable. We see potential in growing biomaterials, such as fungi, algae or bacteria, or incorporating these in the processes of manufacture, but that also means to question the neoliberal model and globalisation in order not to create the same problems again and that, for some industries, is a threat. For others, a challenge.

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**Recently you have won an award from Beyond plastic, can you share with us what you created and how that/ those biomaterials could help to change the landscape of plastics in the future.**

We won in the category Best Initiative in Education / Journalism / Campaigning. LABVA aims to bring science closer to the community, focusing especially on new materials or open biomaterials and creating a culture around this new materialities.

What would happen if we made our own artisanal bioplastics? Would you dispose of them as easily as plastic just because they are bio? Does our planet resist the generation of single use plastic alternatives without questioning or modifying our consumption habits? Those are some of the many questions that guide our investigations. We firmly believe that environmental issues can be solved by modifying our culture, in which disposable is not an option, and materialities can flow and take different shapes. Therefore, by teaching how to grow, harvest and make materials these become emotionally binding, associating territory, ecosystems and it's communities. Waste is a design flaw and it is our duty to make emotional materials so getting rid of them becomes impossible.

**Where do you start in terms of your raw materials?**

We recognise the potential of our territory associating ethnobotanical ancestral knowledge to biofabrication processes. Recognising our natural and anthropic abundance and start experimenting with its possibilities.

**Can you tell us about your Maqui Biotextile that has been developed from the bacteria present in the fermentation of Maqui?**

The *Aristolelia chilensis* (Maqui) tree is native to this region and it is also extremely abundant because it's a pioneer species, this means that it's the first to colonise degraded soils, setting the perfect conditions for other native plants to grow. It is also a food source for birds that depend on this tree to survive their migratory routes. The Maqui also plays a key role in the Mapuche tradition and cosmovision; it is used as food, medicine and for natural dyes. Creating a material 100% derived from this tree microbiota is both a discovery and also valorisation of all the scales involved in its creation. This native biomaterial materialises the collaboration in its ecosystem by colonising and feeding others beings, the collaboration between communities through openly sharing their ancestral knowledge of its conscious and sustainable collection, and the collaboration of its symbiotic microbiota, since its the bacteria and yeast present in its leaves and fruits that do this microscopic weaving. Each scale works in tight collaboration setting an example of how materials should promote values in order to change our material culture. Our part is ensuring that it grows, feeding this culture and creating the perfect environment for it to thrive. This results in a biomaterial that is deeply rooted to its territory; a biomaterial that is conceived, makes sense and can only be grown in the south of Chile.

And the potential of cellulose biotextiles in general that can be generated by bacteria through a bio fabrication process with micro-organisms and why this method offers the potential for future low environmental impact materials that are biodegradable, renewable and therefore sustainable

We can use different sources of microbiota that are present in each territory, and using a small amount of water and a sugar source (that can be also a byproduct from another industry) we can grow biomass without land use as we can grow it vertically. The byproducts generated by the growth of bacterial cellulose are useful for other processes too. So there is an inherent circularity of these fermented materials.

**What unique material attributes can be achieved?**

This material is so versatile that it can range from a paper, to a cardboard or to a textile depending on the time of growth, additives in the medium, its harvest, drying, treatments and coatings.

**You have mentioned that you are now in the early stages of building a micro factory of biomaterials. What will this look like and how will this help LABVA in the work you do?**

We are always questioning how industry works through the lens of our ethics. We also intend to test the extent to which our investigation contributes to our field and to the society. So we believe that it is time to develop a micro-factory according to our values, testing a different scale and to take advantage of the questions that arise from this process.

**What do you think the future of materials will look like?**

It will be diverse, heterogeneous, native and emotional, in constant mutation and adaptation, and they will nurture our territories in its degradation.

**What does a regenerative future look like to LABVA?**

It's a future in which we find ourselves being a part of the ecosystems instead of exploiting them. Understanding nature processes and co-creating with it.



DISCOVER LABVA'S INSPIRING WORK IN OUR BIO-MATERIALS SOURCING TABLE SECTION ON OUR DIGITAL PLATFORM - [HERE](#)

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