KOMBO

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FOR

PÃO PÃO BIOTECH

A BIODEGRADABLE TABLEWARE COLLECTION THAT EMERGES FROM FOOD WASTE AND RETURNS TO THE EARTH.



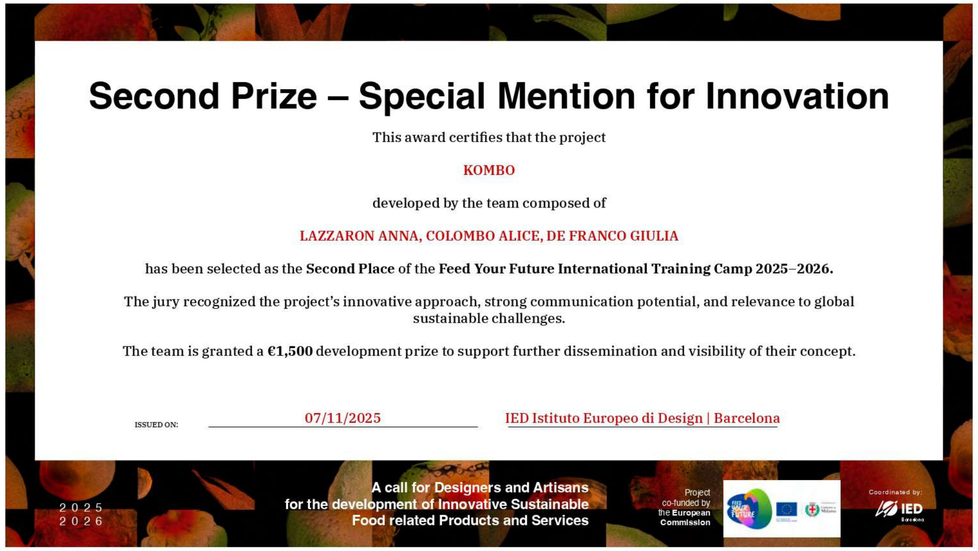
Kombo *(2nd winning prize)*

Italy **Anna Lazzaron** is a designer and writer based in Milan and Barcelona, exploring narratives between material culture and human behaviour. She works on research projects and editorial platforms.

Italy **Alice Colombo** is a multidisciplinary designer working across product, material and graphic design, exploring experimental fabrication processes where functionality meets poetic expression.

Italy **Giulia De Franco** is a product and material designer exploring biomimicry, bio-materials and 3D modelling, investigating the intersection of design, science and sustainable innovation.

Tutor and mentors: Ivan Merino, Josean Vilar





3.2 Kombo *(2nd winning prize)*

Project overview

Kombo is **a collection of biodegradable tableware created from the by-products of kombucha fermentation**. The project explores the potential of **SCOBY**—a symbiotic culture of bacteria and yeast that generates microbial cellulose during fermentation—**as a living material for sustainable product design**.

By transforming this organic residue into functional objects, **Kombo proposes an alternative to disposable plastic tableware while revealing the aesthetic and ecological qualities of microbial materials**.

The project reimagines fermentation waste as a design resource, creating objects that originate from food production processes and eventually return to the natural environment.







3.2.1 Description of prototype

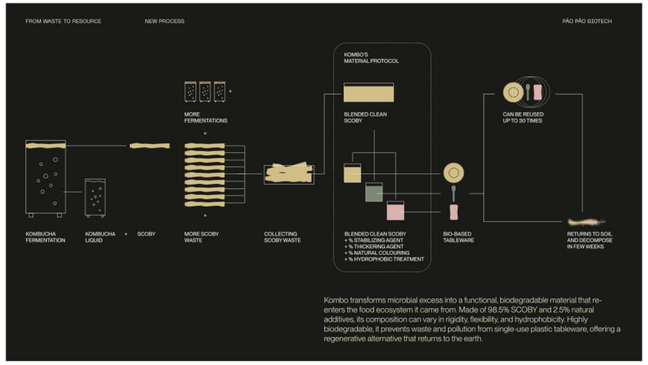
Design Concept and Development

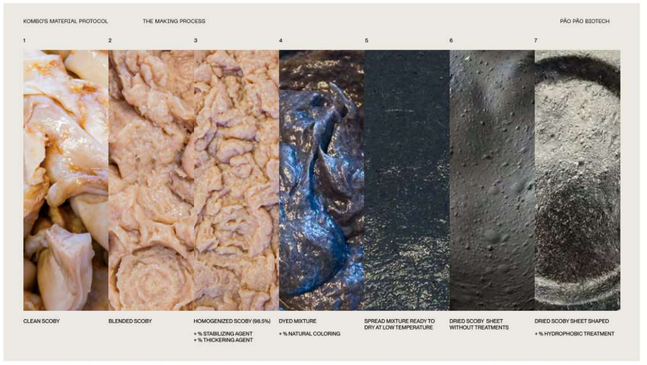
The design process of Kombo began with the observation that large-scale kombucha production continuously generates excess SCOBY layers, a microbial biofilm often discarded despite its potential as a natural material.

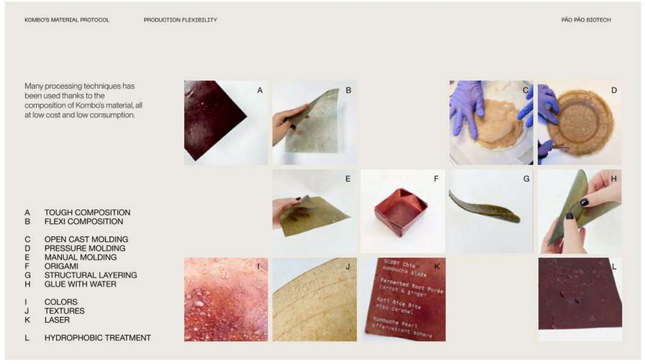
Working in collaboration with PàO PàO Biotech in Milan, the team investigated how this biological by-product could be transformed into a usable biomaterial. **The project explores the idea of growing tableware through fermentation rather than producing it through conventional industrial manufacturing**.

Through a series of material experiments, the designers developed **a processing protocol that blends cleaned SCOBY with small percentages of natural stabilising, thickening, and colouring agents**.

This process allows the microbial cellulose to be transformed into a flexible yet durable material that can be shaped, dried, and finished using different fabrication techniques.









Prototype and Materials

The resulting biomaterial is composed of approximately 98.5% SCOBY and 2.5% natural additives, creating a biodegradable composite that can vary in rigidity, flexibility, and surface qualities.

During the prototyping phase, the **material was processed through multiple low-energy techniques including open casting, pressure molding, manual shaping, structural layering, and origami folding**. These fabrication methods allow the material to be transformed into a wide range of tableware elements such as **plates**, **spoons**, and **decorative components**.

The surface of the material can also be modified through **natural pigments**, **texture imprinting**, **laser engraving**, and **hydrophobic treatments**, enabling both functional and expressive variations.

The resulting objects maintain visible traces of their microbial origin, **transforming biological irregularities into a distinctive material aesthetic**.







Impact and Future Potential

Kombo addresses the **environmental impact of disposable tableware, a sector responsible for millions of tons of waste every year**, most of which originates from virgin plastic materials.

By transforming fermentation waste into biodegradable objects, **the project proposes a circular system in which kombucha production generates the material for tableware that can be used in the same cafés and restaurants serving the beverage**. Once discarded, the objects naturally decompose and return to the soil, closing the material loop.

Beyond its functional role, Kombo also invites a shift in perception: **rather than hiding the organic origins of the material, the project highlights its microbial textures and irregularities as an aesthetic language**. In doing so, **it encourages users to rethink waste not as a residue, but as a living resource embedded within ecological cycles**.



3.2.2 Visual documentation













[11] Kombo_Final presentation.pdf
[12] Kombo_Press-kit (content media folder)