

Cupuaçu Seed

The seed of this Amazonian fruit is a versatile alternative for producing protein and lipid ingredients for the plant-based sector.

With the support of The Good Food Institute Brasil, Dr. Ederlan de Souza Ferreira, from the Federal University of Bahia, developed three new ingredients from the cupuaçu by-product to formulate plant-based products.

The **cupuaçu seed**, usually discarded during pulp processing by the industry, is a **rich source of proteins** and lipids and has been shown to have great potential for developing new food ingredients for the plant-based market. It represents 20% of the total weight of the fruit, and it is estimated that Brazil annually generates more than **5,000 tons of this by-product**, which can be converted into 1,600 tons of lipids and 205,000 kg of plant-based protein.

Three ingredients were developed from the cupuaçu seed: a **lipid ingredient**, plant-based butter, and two protein ingredients, the **concentrate** and the **extrudate**. The ingredients were applied to a nugget-like, meat-analog product.

Cupuaçu-seed butter:

- Has an **extraction yield of 33%** with cold pressing and 60% with the use of organic solvent;
- Unsaturated **oleic** (42%) and saturated **stearic** (32%) fatty acids are the majority in the composition of butter;
- Has an **acidity and peroxide value** well below the values recommended by law for extra virgin olive oil;
- Works as an **alternative to other vegetable oils** in the formulation of margarine, ice creams, and mayonnaise and can positively impact the nutritional profile of these products;

Protein ingredients:

- The protein concentrate reached 48% protein and presented **digestibility of 89%**, even without any prior treatment;
- The concentrate has **excellent water and oil absorption capacity**, as well as **foaming capacity** and stability, and can be applied to plant-based meat products such as hot dogs and hamburgers, as well as to replace food additives such as humectants, thickeners, foaming agents, and others;
- **The extrudate**, made from a mixture of defatted cupuaçu seed flour and isolated soy protein, presented superior sensory characteristics of **color, brightness, texture, chewiness, and hardness** compared to commercial soy extrudate.

The nugget-like, meat-analog product:

- The product developed has around **20% protein and 3% fiber**, values higher than those found in a commercial product based on chicken-analog – on average, 15% and 1.5%, respectively.

Invest in the project

To advance the development of the project and achieve its objectives, the following steps involve strategic investments in three key areas:

Technology: An estimated investment of 30,000–35,000 BRL will be directed toward optimizing the protein extractability process using emerging technologies. In addition, technology will be applied to reduce or remove compounds responsible for off-flavors and antinutritional substances.

Product: The focus will be on developing and applying ingredients in formulations and supplementing products compatible with the potential properties identified. The extrudate-nugget with the protein concentrate will be produced, followed by an evaluation of nutritional and sensory aspects. The estimated investment ranges from 5,000 to 15,000 BRL, depending on the product intended to be produced.

Market: To meet the market demand for lipid and protein ingredients, a feasibility study, including an analysis of the raw material production chain, will be conducted. The study's estimated value is between 15,000 and 50,000 BRL.

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To support and invest in the continuity of the project, contact our team by e-mail:

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