DESIGN TOOL TO EVALUATE EXPERIENCES OF MATERIALS DEVELOPED WITH AMAZONIAN AGRO-INDUSTRIAL WASTE

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1. INTRODUCTION

The Amazon region is home to great biodiversity and a population with traditional knowledge deeply linked to the management of natural resources. Despite the plurality of its territory, large spaces are in a constant process of urbanization, with a growing demand for alternatives in the matter of waste. The Açaí production chain (Euterpe oleracea Mart.) is one of the most important for the region, its importance is related to the cultural identity, economic value, and health benefits that the consumption of the fruit promotes.

Although, the high production, derived from industrial processing, is responsible for environmental and social problems in the region's main cities. Açaí waste is composed of the seed, fibers (which cover the seed), and dregs from the production process. The amount of residue produced varies from 71 to 95% of the processed seed mass (BUFALINO et al., 2018).

Materials have meanings that should not be reduced only to their functional qualities and technical properties. Designers have the opportunity to understand the experiences and perceptions of new raw materials.

Developed by Camera and Karana (2018), Ma2E4 is a set of tools that aims to help understand how people evaluate a given material, at four different experiential levels: sensorial, interpretative, affective, and performative. Therefore, the present work aims to evaluate composite materials, developed with PLA/Açaí fibers and PLA/Açaí seeds, using Ma2E4 tools. Through a qualitative assessment, it was possible to identify sensory patterns among the materials developed.

2. MATERIALS AND METHODS

As for the methodological procedures, the research is characterized as exploratory, with qualitative data analysis. Therefore, for the analysis, composites with different percentages of Açaí residues in their composition were selected, as shown in Figure 1. The use of Polylactic Acid (PLA) as a matrix aimed to obtain a biodegradable composite. PLA was processed with fiber crushed in a knife mill and seed powder.

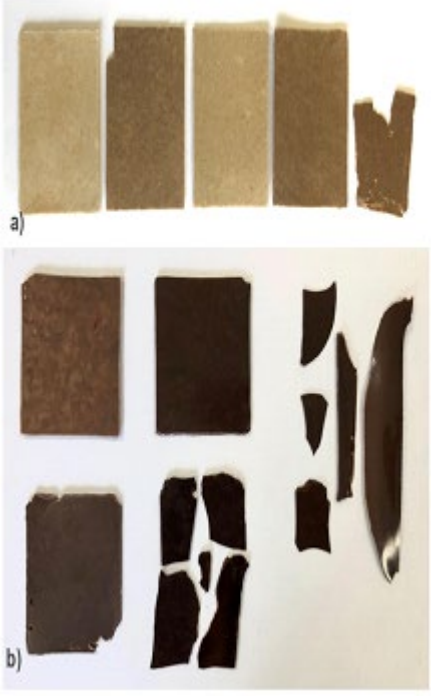

Figure 1: a) PLA/Açaí Fiber Composites; b) PLA/ Açaí seed composites
Source: Authors, 2023

An adaptation of the Ma2E4 method was made, according to Figure 2, so that the researcher had the opportunity to carry out a sensory assessment and interpret the information together with the results of the two samples.

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Figure 2: Scale for Sensory Evaluation
Source: Authors, 2023 - Adapted from: Camera; Karana, 2018.

The rating scale ranges from -2 to 2, for opposite characteristics (e.g., light or heavy), where 0 is a neutral point. The evaluation present in this research was made by the research designer, after processing the composites.

3. RESULTS

The result of the sensory evaluation of the PLA/Fibers sample, in general, indicated a hard, smooth, light and fibrous material with an irregular texture, since the Açaí Fibers were randomly dispersed on the surface. During the sensory evaluation stage of the PLA/Seeds samples, the material developed corresponds to a smooth, opaque, light, non-elastic and matte raw material.

Both raw materials were neutral in terms of temperature (hot or cold). It was identified that higher the fiber percentage, higher the "Irregular Texture" and "Fibred" scales of the PLA/Fibers composite. Unlike the samples with fibers, the material with seeds had a regular and non-fibrous texture, as the seed powder was not visible on the upper plane of the composite.

Traditionally, in science and engineering, materials are characterized only technically, to ascertain their structures and measure their properties. It is understood that, in order to be able to state that PLA/Fibers and PLA/Seeds composites are light or heavy, elastic or non-elastic, it is necessary to subject the samples to technical characterizations. However, through understanding sensory qualities, this research directs the possibility of mapping application profiles, comparison with similar materials and future investigations to understand the perception of potential users.

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