## **Natural Fibers Design Attributes**

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Abstract : Inside the wide Colombian natural fiber set is the banana stem leaf, known as Calceta de Plátano, which is a material present in several regions of the country and is a fiber extracted from the pseudo stem of the banana plant (Musa paradisiaca) as a regular maintenance process. Colombia had a production of 2.8 million tons in 2007 and 2008 corresponding to 8.2% of the international production, number that is growing. This material was selected to be studied because it is not being used by farmers due to it being perceived as a waste from the banana harvest and a propagation pest agent inside the planting. In addition, the Calceta does not have industrial applications in Colombia since there is not enough concrete knowledge that informs us about the properties of the material and the possible applications it could have. Based on this situation the industrial design is used as a link between the properties of the material and the need to transform it into industrial products for the market. Therefore, the project identifies potential design attributes that the banana stem leaf can have for product development. The methodology was divided into 2 main chapters: Methodology for the material recognition: -Data Collection, inquiring the craftsmen experience and bibliography. -Knowledge in practice, with controlled experiments and validation tests. -Creation of design attributes and material profile according to the knowledge developed. Moreover, the Design methodology: -Application fields selection, exploring the use of the attributes and the relation with product functions. -Evaluating the possible fields and selection of the optimum application. -Design Process with sketching, ideation, and product development. Different protocols were elaborated to qualitatively determine some material properties of the Calceta, and if they could be designated as design attributes. Once defined, performed and analyzed the validation protocols, 25 design attributes were identified and classified into 4 attribute categories (Environmental, Functional, Aesthetics and Technical) forming the material profile. Then, 15 application fields were defined based on the relation between functions of product and the use of the Calceta attributes. Those fields were evaluated to measure how much are being used the functional attributes. After fields evaluation, a final field was defined <hot food packaging>, influenced by traditional use of the fiber for packing food. As final result, two products were designed for this application field. The first one is the Multiple Container, which works to contain small or large-thin pieces of food, like potatoes chips or small sausages; it allows the consumption of food with sauces or dressings. The second is the Chorizo container, specifically designed for this food due to the long shape and the consumption mode. Natural fiber research allows the generation of a solider and a more complete knowledge about natural fibers. In addition, the research is a way to strengthen the identity through the investigation of the proper and autochthonous, allowing the use of national resources in a sustainable and creative way. Using divergent thinking and the design as a tool, this investigation can achieve advances in the natural fiber handling.

Keywords : banana stem leaf, Calceta de Plátano, design attributes, natural fibers, product design

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