UPCYCLING OF NATURAL FIBERS TO CREATE NEW FASHION PRODUCTS

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ABSTRACT
This paper aims to discuss how to give a new life to textile waste, creating new products and thus extending the life cycle of natural fibers. Also it is intended to create a sustainable fashion brand that is based on circular economy principles and on the upcycling of natural fiber fabrics at the end of life, for the creation of clothing and accessories. The raw materials for this project of upcycling will be industrial pre consumption waste, such as production surplus, leftovers, scraps and fabric samples that are discarded by companies. Preference will be given to natural fibers such as cotton and linen.

INTRODUCTION
The textile industry and specially the fashion industry are at the top of the ranking with the greatest environmental impact. The textile value chain starts with the raw material, goes through all the transformation processes, reaching the final product and finally the distribution, and there are countless impacts on the environment in all these stages. (Choudhury, 2014; Muthu, 2014)
Sustainability has been one of the main issues these days, in all areas. Excessive consumption in fashion and clothing has led the market to look for new ways to treat waste. To trying to solve the problems and the environmental impacts, different concepts of fashion and design have emerged. Upcycling is a concept for waste recovery processes, because it transforms waste into products, or raw materials, with better quality and higher added value. The main goal is to avoid the waste of useful materials and so, reducing the consumption of new raw materials and resources to create new products (McDonough & Braungart, 2002). Another concept that cannot be ignored when it comes to sustainability and the circular economy is the Cradle to Cradle (C2C) approach. Applying the C2C concept to the textile industry by reusing fibers for the production of new products, makes perfect sense. Fibers are an important material in the textile industry, so it is important to minimize their impact on the environment as much as possible (McDonough & Braungart, 2002)
Cotton is the most widely used natural fiber in the world. Its production should be mainly organic, however the consumption associated with the cotton cultivation has a great impact on the planet and ecosystems, from the area for cultivation, the water used for irrigation, the energy used for harvesting till the chemicals used in agriculture (Tab.1). Year by year, harvest after harvest, intensive cotton cultivation explores and abuses the ecosystems. (Bartl, 2019)

Tab. 1 - Consumption of Resources for Cotton Cultivation (Bartl, 2011)

Resource	Demand for 1 t raw cotton
Crop land	8000 – 18000km^2
Agricultural chemicals	8.3 – 13.8kg
Water	Average: 5700m^3 up to 29000m^3
Energy	36 – 55GJ

The brand developed aims to spread more sustainable habits and encourage slow fashion, with the creation of products (women's fashion clothing and accessories) mostly handmade through the use of raw material from the waste of natural fibers of local textile companies.

RESULTS AND CONCLUSIONS

Figure 1 presents a coordinate made with 100% cotton fabric collected from the waste of a local textile company. Instead of having been discarded, this fabric was upcycled to two more valuable garments, a ruffled top and a midi skirt. The transformation process was handcrafted, with the help of two domestic sewing machines.

Fig. 1 - Coordinate stitched with 100% cotton fabric

The amount of water and energy saved in this upcycling process can be calculated from the data presented in table 1. The top weighs 62 gr and the skirt 143 gr, the set makes up 205 gr. According the table 1, for the set of Figure 1, were saved between 1,169 l and 5,945 liters of water. Regarding the energy spent per 1,000kg of cotton, which varies between 36Gj and 55GJ, for the coordinate top plus skirt, were saved between 7,380KJ and 11,275KJ of energy. These are significant values for only two pieces of clothing and this is just an example of two products of the proposed brand. Comparing to a collection with hundreds of pieces, the savings will be much higher.

The communication of the entire project it's being done mostly through social media. The Instagram page started in December 2019 and currently has 1,130 followers. The first products to be promoted were linen and cotton bags, with various functions. In 2020, with the arrival of the pandemic, cotton masks washable and reusable, began to be sewn. In addition to this, various pieces were also released, such as ribbons and elastic bands for hair, shirts, tops, skirts, dresses, pants, kimonos, bags for mobile phones or glasses, coasters, coin purses, make-up discs, etc.

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