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BAMBOO AS ALTERNATIVE MATERIAL IN ECOLOGICAL JEWELRY

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ABSTRACT

The purpose of this research was to design ecological jewelry through alternative materials such as bamboo olate, to generate environmental responsibility. Nowadays, products with low environmental impact are realized, in this sense the bamboo olate was an ideal alternative, because it is the plant with greater growth in the world, being able to be used since the two years of growth for artisanal purposes, it is a renewable resource and totally sustainable, in six months reaches a height of 60 meters, it has a high durability giving it a permanent finish. In the creative stage, sketches of pieces were projected to be worn for women with a range of age between 25 and 35 years old with average economic level. About the structural design, basic forms were taken under the concept of "strength", giving great power to the pieces. The methodology of Victor Papanek with an ecological approach was taken as the fundamental axis of the project. Bamboo treatments were given as: carving, polishing and varnishing and some other elements. In conclusion it was found that it is possible the application of bamboo in the design of ecological jewelry because it has the characteristics of strength and aesthetics required

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INTRODUCTION

The word "jewelry" is defined as personal objects used as adornment, social position sign, official rank or symbol of socio-cultural beliefs, manufactured in different organic and inorganic materials such as feathers, bones, shells, metals and stones (Jewelry Education Complex, 2008).

Jewelry in Mexico

The indigenous tribes (Toltec, Mixtec, Zapotec, Mayan and Aztec) were known for decorating their bodies with paintings, tattoos, jewels and feathers. Archaeological evidence shows that the Aztecs wore finely carved jade jewelry. Several jewels were found in Tombs of Mixtec tribe, including gold pendants, turquoise, quartz earrings, and pieces with animal motifs. The ear plugs, pendants and bracelets Mayan preferably made of jade. Maya jewelry is thought to have some religious function, since it was used in many funerary rites (Glade, 2014). The Regional Chamber of the Jewelry and Silver Industry of the State of Jalisco is an autonomous institution of public interest, constituted according to the provisions of the Law, registered before the Ministry of Economy since 1968 and associated with the Confederation of Industrial Chambers.

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The leading national organization responsible for representing, strengthening, protecting and disseminating the interests of the jeweler sector provides cutting-edge and innovative services that drive the sustainable development of the industry. (Chamber of Jewelry Jalisco, 1968). Undoubtedly, the jewelry chamber in Jalisco is one of the most important in the area of jewelry in terms of trade, as well as being one of the most influential states in the same manufacturing industry. It is important to highlight the great production that is obtained in the jewelry industry, that is why we must take care of non-renewable resources and make a lesser use of them. This is a great opportunity to obtain pieces of jewelry with alternative materials, like bamboo, for example. Proposing different materials allows us to have a greater freedom of choice, and the possibility to obtain good results.

Hand-made jewelry

At the present time this kind of jewelry is a very popular art who belongs to a population or artistic field of a specific society or ethnic groups. It involves the making of objects that often have traditional manual procedures that cannot always be bought at a specific mall. (Jiménez, 2016). Handcrafted jewelry is custom made by a highly skilled craftsman, (Figure 1). It is sold in local markets and jewelry stores all around the world. This jewelry is made of different materials, and a combination of elements, which are almost always of the best and highest quality.



Source: [https:// orfebrealejandrogilade.blogspot.mx/2013/05/joyeria-artesanal.html](https://orfebrealejandrogilade.blogspot.mx/2013/05/joyeria-artesanal.html)

Figure 1. Goldsmith in process of welding

The word craftsman comes from the Italian word *artigiano*, which means that it is a person who is trained in arts and crafts; it is known that handmade jewelry has existed for 7000 years B.C., where the first handmade ornaments, necklaces, Bracelets, rings and earrings were made in gold and copper. Over time they specialized in the representation of human and animal forms. Handmade jewelry is not only unique, also durable and strong ideal to wear on any occasion.

Jewelry & Watches

Currently, several designers are using biodegradable materials, recyclable or reusing objects to make beautiful pieces of jewelry; at the same time they caring for the planet. Also, worldwide, many companies are using more friendly and less polluting processes to extract the materials needed to make fine jewelry, the biodegradable materials used are very varied: coconut, orange peel, wood, and so on. These raw materials can be treated with natural oils and supplemented with recycled metals, such as copper and silver. With them, it is possible to make a variety of pieces; most of them are usually necklaces (Figure2).



Source: http://ecuadorecologico.com/directorio_empresas_ambientales_ecuador/muyo-bisuteria-organica/

Figure 2. Jewelry with Seeds

Many jewelry designers in our country have been committed to recycling through the use of materials such as aluminum cans, plastic containers, and so on. Likewise, paper can be a good material to make wonderful designs, because it is cheap and is very present in everyday life. The pieces made with these materials have a special value because they are handmade; therefore, they are unique and unrepeatable pieces, besides contributing with nature.

Cane Guadua in the design of ecological jewelry

In the past, people were attracted by gold and silver jewelry, but in the contemporary world, there are other possibilities with the use of alternative materials.

Lately, wood and non-wood materials such as bamboo, are unique options that give a classic but modern look.



Source: Own

Figure 3. Characteristics of Bamboo Otake

Bamboo otake (Figure 3)

- **Common name:** Guadua, Otake
- **Family:** Poaceae
- **Subfamily:** Bambusoideae
- **Scientific name:** *Bambusa Arundinacea* L.
- **Other common names:** Gramineae, Bamboo

"The word otake is a mexicanism, of the Nahuatl language otlatl, means kind of reed; walking stick. It is described as a grassy corpulent plant (*Guadua amplexifolia*), whose hard gnarled stems serve to make sticks, walls, fences and roofs of rustic rooms "(Gutiérrez, et al., 2003). Bamboo is the fastest growing plant in the world, and can be used from two years of growth for handicrafts, and is known as "the plant of a thousand uses" (Lastra, 2013). Curiously, bamboo is ecological, the life of bamboo resides in its root and although it cuts the stem, will continue to grow, so it is a renewable resource. It requires only a small amount of water without any pesticides. Bamboo grows 1m per day, 5cm per hour and 32m in a month, absorb more carbon dioxide than any other plant. (Figure 4).



Source: http://forum-psicologos.blogspot.mx/2014_04_01_archive.html

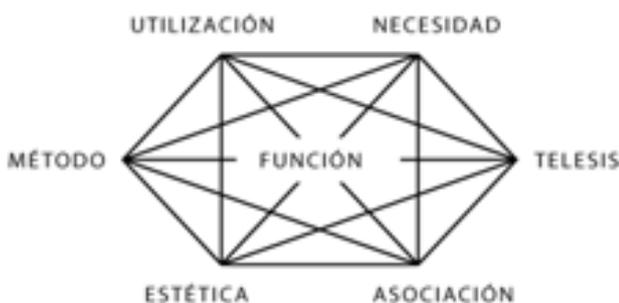
Figure 4. Cultivation of Guadua

It is native to Asia, America, Africa and Oceania, this can be adapted to several climates such as: tropical, subtropical and temperate. It is ideal for the conservation of births and water currents, protects the soil from erosion, as well as fauna and flora. There are about 1600 species of bamboo in the world: 64% are native to South Asia, 33% are from Latin America, 450 are found in America and 170 in Colombia, Brazil, Venezuela, Peru and Ecuador (Naulaguari, 2012).

Each piece of bamboo is distinctive, it is because each of the bamboo stems is different in color, shape and texture. Therefore, each piece of jewelry made from this bar is a unique piece of art (Read know, 2016). The bamboo tree is the one that grows faster all around the planet, the wood of the stems is solid, who cultivates it, it must be patient, since only at the seven years will see how it begins to grow. Meanwhile, their roots deepen down. Its production is permanent because it does not need to be replanted after the cut. Because of its high resistance, it is also called "vegetal steel", it is recognized 1,500 different uses and its qualities of resistance, flexibility, rectitude and utility are for the Orientals a symbol of the virtues necessary to achieve wisdom (Martínez, 2010). Agricultural-industry Aspect: Around the guadua are beginning a series of new industries, such as the manufacture of laminates, agglomerates, paper, toothpicks, furniture, crafts and food. Its application and age of cut for its use is from 6 months to 1 year for handmade or semi-industrial manufactures, being the Guadua nigra: characterized by its green culms with slight black spots the most used for handicrafts.

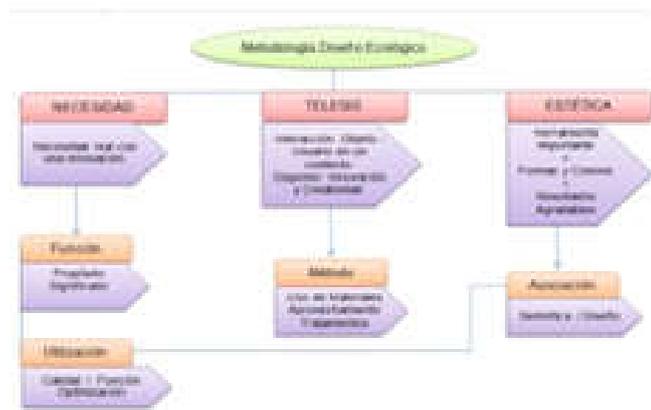
MATERIALS AND METHODS

The methodology followed is of a qualitative and experimental type based on the ecological design of Victor Papanek (Figure 5), focusing especially on issues related to aesthetics and sustainability, at a time when this word was not commonly used (Pelta, 2011).



Source: <https://www.emaze.com>

Figure 5. Methodological Process of Victor Papanek "Functional Complex"



Source: Own

Figure 6. Own methodology based on the Functional Complex scheme of Victor Papanek

Victor Papanek's methodology was retaken, since more than a methodology or a strategy, Papanek proposes a reflection towards the responsible design, one that we do not have to regret years later when we do not know how to reuse it once the laws proscribe it for be harmful to health or which trash can throw it without affecting ecology (Szymanski, 2011).

The main objectives are

- Propose an alternative material in ecological jewelry.
- Get economic, environmental and social benefits.
- Implement a new market in the area of jewelry, with better benefits.
- Determine why author's design can generate new ideas in a world where standardization and mass production rules.

According to the methodology of Victor Papanek only three phases were managed for the project: necessity, Telesis and Aesthetics, resulting (Figure 6). The first stage called (Necessity) guided us to what was wanted to be achieved in the investigation as well as to treat the economic requirement involving a novelty; In this case the use of a new alternative material Bamboo Oate. The same stage was directly involved with Function and Utilization; the first refers to the way in which the design object fulfilled its purpose, in this case the aforementioned necessity, and the second refers to the quality that the design object could have in order to fulfill the main function. The second stage called (Telesis) referred to the interaction between the object, the user and its context, adjusting to the general socioeconomic order in which they acted. The market niche comprises women between the ages of 25 and 35 years old, from an average socioeconomic stratum.

In this case the main material was an optimal, economic and efficient way for society. The Telesis stage was involved with the method which allowed the interaction of tools, materials (mainly bamboo, in addition to materials for finishes) and treatments such as curing bamboo to obtain resistant pieces of jewelry, taking advantage of materials in a way more efficient. Finally the third stage called (aesthetics) was very important for the elaboration of the design so it helped to combine forms and colors for the results endowed with own meaning, considering the aesthetic as a simple personal expression full of mystery and folly In this Stage were set the finishes that are applied to the pieces, like the wood dyes for the shine and color with the help of paraffin. The same stage was involved with the association, the stage that fosters the semiotic object through its own design, material, finished and sensorial relevance; as well as highlighting some abstract values of it. This step shared objectives with the application described above.

RESULTS

The result of this product was innovative in comparison to what exists in the area of ecological jewelry; Research helped to implement new ways and techniques to make ecological jewelry and propose new materials that does not cause damage to the environment. In regard to design, main objective was to obtain economic, environmental and social benefits and implement a new market in jewelry area. Based on the investigation of bamboo oate it was essential to know everything about this material in order to give a good finish to each piece of jewelry made (Figure 7) and it had the aesthetic appearance that every jewelry item requires.



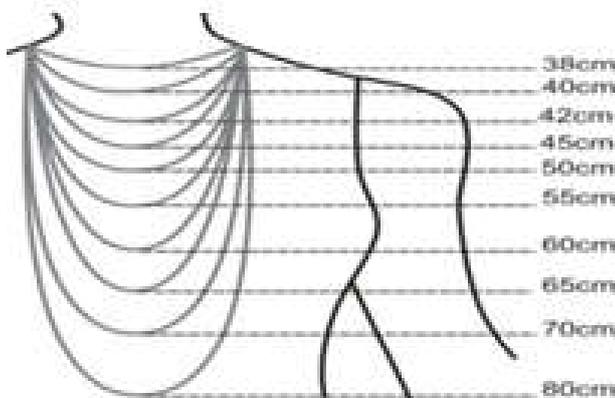
Source: Own

Figure 7. Otate Bamboo Jewelry

Ergonomics

As far as jewelry is concerned, there are no ergonomic data to make jewelry objects as functional as possible, but there are some guidelines that we must consider for design such as: Dimensions, weight and materials, (Oliveros, 2005).

- Collars: Not more than 0.22 lbs, diameter of 16" minimum to 20" maximum, (Figure 8).
- Bracelets: 0.13 lbs, minimum 2.6" diameter, 5.5" long.
- Rings: Maximum weight 0.03 lbs, diameter from 5.1" to 9.5", thickness of material 0.08", ring diameter goes from 0.04" to 0.8", (Figure 9).



Source: <https://grawissimo.pl/pl/n/list>

Figure 8. Collar measures

RINGS

Today, fashions admit the use of rings on any of the five fingers, and both hands.

- Pinky: Pinky type
- Annulment: Alliances or Important and delicate rings.
- Medium: Big, voluminous, and a little fashion
- Index: Shuttle type
- Thumb: Flat and unadorned rings

The measurement is taken with special rings ranging from 1 to 33, the most frequent measures being women from 6 to 8.5. With respect to the most convenient hand to use rings, it depends on the tastes, activity, comfort, and right or left handed nature of each person.

BRACELETS

The ideal measure of a bracelet is one that does not come out of the wrist and moves naturally without being adjusted. Although like everything, depends a little of the type of piece and the like and comfort of the user. For slaves and rigid armbands, the measurement is more complex. In bracelets it is advisable to fit more tightly those pieces that have a more important part than the rest or a central motif, since that part must always go in the upper area and try not to turn. In this way the piece will suffer less friction and will look more beautiful all the time. Nowadays, bracelets with inner elastic are allowed (either rubber or cable) are aesthetic and very comfortable, especially for old people.

NECKLACES AND CHOKERS

In women's long necklaces 31.5" measure is ideal, because stylized the figure and can be turned twice and be used in both ways (Yanes, 2017).

DISCUSSION

Today, mining and the jewelry industry in general are receiving more pressure because consumers are looking for responsibly extracted products; most buyers are concerned about the social and environmental impact of precious metals, diamonds, Gems and colored stones. Therefore it is important to stimulate practices that require less energy and natural resources to promote responsible consumption that prioritizes recycling and reuse (Kaia Joyas, 2013). Although mining is fundamental to many aspects of human life and indispensable for the jeweler sector, work must be done to mitigate the environmental impacts it generates (Castro, 2012).



Source: https://mlm-s2-p.mlstatic.com/20036-MLM_20183099257_102014-C.jpg

Figure 9. Ring Measurements



Source: Own

Figure 10. Otate Bamboo Ring

With respect to the results obtained

In the final pieces (Figure 10) it was very important to establish the variation of angles in pieces that contain in order to improve the clearance spaces obtaining a better ergonomics. The pieces of jewelry were complemented with application of natural seeds and other elements, without the need to minimize the main material (bamboo otate).

Conclusion

"A 100% friendly material with environment was proposed (biodegradable). Taking advantage of its maximum growth, as essential characteristics such as flexibility and durability"

"Individuality shaped in author's design could let to value originality and creativity of the segment, to specialize and be shown to the world" "Consequently, author's design would be a possible way for construction of an identity in the market, by ways of customized production, handcrafted searches and original designs". "The author's design is influenced by new techniques but without ceasing to be a rustic or manual process of small and medium scales. Or it could lose the essence of the individualized artisanal process" "The mixture of original and alternative elements shaped in a craft product can enrich the author's design and generate better ideas to capture a bigger market niche" "Besides the contribution generated by this project, it will be obtain more alternatives about of forms, techniques and materials. Improving Mexican design"

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