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**1.Name of the organization:**

Sustainable Social Business Limited (S.S.B.LTD)

**2.Address of the Organization:**

Address: Gishari, Rwamagana, Eastern province, Rwanda

**3.Country:**

**RWANDA**

**4.Section/division making the submission:**

Public sector

**5.Name of Project:**

Extraction of Banana fibers

**6.Contact persons:**

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**7.Number of employees in the organization, section or division**

25

## **8. Description of my project**

### **My innovation is EXTRACTION OF BANANA FIBER**

Banana fibers obtained from the stem of banana plant have been characterized for their diameter variability and their mechanical properties, with a stress on fracture morphology.

Natural fibers have been used as an alternative to synthetic cones for their greener character; banana fibers have the advantage of coming from an agricultural residue. Fibers have been extracted by mechanical means from banana tree pseudo stems, as a strategy to valorize banana crops residues.

### **Materials Banana fibers**

Were produced at the Universidad de Las Palmas de Gran Canaria (ULPGC) facilities (Las Palmas de Gran Canaria, Spain), by means of a patented system by ULPGC. This prototype equipment enables extracting fiber from the leaves by scraping it in two stages: linear scrapping and rotational scrapping (potential production rate 90 kg/h). Afterwards, the long fiber (0.5–1 m) is chopped in a developed machine, in the context of this research work, for cutting the fiber with a high level of uniformity. The fiber was cut into small lengths according to the requirements of the enzymatic treatment (45 mm). Enzymatic cartels used were obtained from BIOCON (Les Franqueses del Vallès, Spain), Bio pectinase M01 and Bio Pectinase K, containing pectinase and hemicellulose. Conventional fibers were obtained from Innate Center CTF (Terrassa, Spain). Cotton fibers used in the blend with banana fibers were 28 mm long and had 3.8 in microware. PP fibers were cotton-like cut, 38 mm length and 330 dtex fineness. Polyester fibers were cotton-like cut, conventional mat, 38 mm long, 1.5 dtex. Finally, wool fibers had 65 mm length and 23  $\mu\text{m}$  fineness.

### **Fiber Treatments**

A design of experiments (DoE) was made for the enzymatic treatment of the fibers, taking into account the composition and characteristics of banana fibers. Two enzymatic formulations were applied to the fibers: Bio pectinase M01 (made of pectinase and hemicellulose) and bio pectinase K (made of ). The variable parameters chosen are treatment time and concentration of enzymes related to fiber weight (r.f.w.). Fiber to bath volume ratio was settled to 1:40 for scalability purposes, while temperature and pH were fixed according to datasheets for the selected enzymes: pH = 4.5 and T = 45°C.

### **Fiber Characterization**

Fibers were characterized by means of thermogravimetric and isothermal analysis, microscopy, and fineness. Thermogravimetric analyses (TGA) were run to determine potential thermal degradation of fiber; a Mettler Toledo TGA/DSC1 analyzer (Mettler Toledo, Toledo, OH, USA) was used at a heating rate of 5°C/min in air atmosphere (10 mL/min). Isothermal studies were also carried out by keeping the fibers at 220°C for 150 min, in air atmosphere with 10 ml/min of air flow. Three replicas were performed for these tests. Microscopic observations of fibers were carried out in an Olympus BX51 optical microscope (Olympus, Tokyo, Japan), at different magnifications and under polarized light; 10 samples were measured for each type of fiber (5 measure sin each fiber). SEM microscopy was made in a Tabletop Phenom device (Phenom world, Eindhoven, The Netherlands) in the fiber direction to observe its surface. Mechanical tests of fibers were performed according to UNE EN-ISO standard 5079:1996, in a

constant elongation gradient dynamometer from Instron (mod. 4501) (Norwood, NJ, USA); samples were conditioned at 20°C±2°C and 65%±4% humidity for 24 h. These conditions were also kept during testing. 10 samples were tested, at 10 mm/min.



*Figure 1: my area of production of banana fiber.*

**THE PRODUCT WE CAN GET FROM THE BANANA FIBER.**

1. Cushion covers
2. neckties bags
3. cloths

4.paper and notebook

5.best absorber pads for menstruation & ect.....



Figure 2:products from bananas fiber.

## **THE PROBLEMS MY PROJECT DEAL TO RESPOND.**

- 1.Higher cost of the products listed above.
- 2.few number investing in agro business due to lower income from it.
- 3.few food in Africa because of minimum number making agro business due to lower income from it.
- 4.to increase the way of to use our local material and residue in order to get usable products.

## **Purpose and objective of the use of banana fiber**

- 1.When we use banana fiber to produce the product listed above. the cost of that products will be reduced up 50% to 70% because of the banana fiber came residue of banana tree with easily method of extraction.
2. When we use banana fiber to produce the product listed above, the number of people making agro business will increase 40% because of no residue part of banana tree. And also the farmers get the full value of theirs plants.
- 3.to get enough food and increase the value of people making agro business in Africa.

## **RESULTS ACHIEVED**

**Now my company called Sustainable Social Business limited (S.S.B.L) started to produce the pads for menstruation management.**

## **The problems my company deal to respond.**

- 1.girls missing on the school because of loose of affordable pad. when girls loose affordable pad during theirs periodic that cause to miss on the school 1 month /9 months of study.

## **OBJECTIVE OF MY CAMPANY**

- 1.Is to keep the girls on school and keep the village woman on working.

## **THE RESPOND WE ARE MAKING FOR THAT PROBLEMS**

- 1.We produce pads for menstruation management from the banana fiber, my pads are cheaper to reduce 60% of ordinary cost of pads and affordable for menstruation because of banana fiber properties are good absorbents.
- 2.pad we produce are written information about the sex reproduction and planning familial that help the girls and women to know more about their life of sex reproduction that enable them to know how

can live and the protection required.



Figure 3: on my presentation table :Banana fibers, wrapped pads and box of 10 wrapped and associated document.

### **OUTLOOK FOR THE FUTURE AND POTENTIAL OF MY PROJECT.**

In the national competition of DOT Rwanda2017, I was win as the best innovator of year.

My project is the best one because of is based on the local material that enable to glow up rapidly and to produce many job if I get any support.

### **9.Executive Summary:**

Banana fibers obtained from the stem of banana plant for to process the usable product that we spend more money to buy it in the outside country of our continent.

My project based on the local material that can see easily on our village for the best response in the Africa.

### **10. Signature:**

CEO of S.S.B.L

GAKWAYA Samuel

