

## **Technological sustainability in garden and park furniture using textile fibers like banana and glass fibers to achieve high durability with the help of highly pure epoxy compounds**

**Dr. Tarek Ahmed Mahmoud Abd Alla Rashed**

Lecturer at industrial learning department - Faculty of Education – Helwan University

[Tarekahmedrashed1973@gmail.com](mailto:Tarekahmedrashed1973@gmail.com)

### **Abstract:**

The problem of lack of sustainability for public garden furniture in special weather conditions such as heat and rain, and the damage of these furniture as a result of continuous use and exposure to stress, pressure and land. The research aimed to provide local qualities of overlapping materials suitable to serve as furniture for public parks and by using filler materials reinforced with banana and glass fibers. Hybrid composite materials based on polymeric materials were prepared by manual epoxy casting supported by banana fibers in the form of filaments and glass fibers.

### **Four samples were produced:**

- The first sample: 50 grams banana fibers bristles, 100 grams glass fibers, 1 kg epoxies.
- The second sample: 50 grams banana fibers bristles, 200 grams glass fibers, 1 kg epoxies.
- The third sample: 100 grams fiberglass (1) woven layer, 1 kg epoxy.
- Fourth sample: 200 grams of fiberglass (2) woven layer, 1 kg epoxy.
- The fourth sample is the ideal sample for garden and park furniture, due to its high tensile strength; high elongation, very high tensile stress and high pressure resistance although it is one of the highest samples in terms of weight loss and ground resistance. They are very suitable qualities for making garden and garden furniture, which allows for a higher use life and resistance to use conditions, and not affected by conditions of weather conditions such as high temperature, cold and rain.
- As for the first sample, it is an economic sample. It appears to us in the case of wanting to obtain the lowest cost of raw materials, high tensile strength, high elongation, relatively high flexural stress, with high pressure stress and very little weight loss. It is a very ideal economic sample for garden and park furniture.
- As it becomes clear the important economic aspect in producing this type of furniture in a simple way and in a pure Egyptian style, as the material of banana fibers and glass fibers was used instead of burning them in order to achieve an important environmental aspect. Also, glass fibers are used for reinforcement, which gives a large part of the continuity of the furniture with some maintenance. As for the epoxy material, it is of reasonable price compared to other materials used in making this type of garden and park furniture.

### **Key Words:**

Epoxies - banana fibers - glass fibers - garden furniture