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Utilizing Banana Stem Nectar as a Fire Retardants Cellulose Substrate

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Abstract

The objective of nanotechnology is to create nanodevices that are intelligent, versatile, incredibly tiny, extremely sensitive, and consume little power. With the help of a nanosensor, nanomaterials and nanofabrication technologies. The gadget is predicted to be compact in size and power consumption; consequently, the energy gathered from it may be used the atmosphere required to fuel such a system for wireless, self-sustaining operation The goal of self-powered nanotechnology at developing a self-powered, self-contained system, wirelessly and sustainably. It is highly desired for wireless devices and even required for implanted biomedical systems to be self-powered without using a battery, which not only can largely enhance the adaptability of the devices but also greatly reduce the size and weight of the system. Therefore, it is urgent to develop self-powered nanotechnology that harvests energy from the environment for self-powering these nanodevices.

Keywords: Metal nanowire • Air pollution • • Electromagnetic field • Living environment

Introduction

Cotton is 100% cellulosic in nature, catches fire easily, and is difficult to extinguish, posing a major health concern and causing damage to textile items. Since the sixteenth century, significant attempts have been undertaken to increase the flame retardant quality of cotton textiles using various synthetic compounds. Inorganic salts, borax and boric acid mixture, di-ammonium phosphate, urea, and other simple and popular nondurable fire retardant compounds are available on the market. UK researchers employed polyurethane foam and antimony-based halogen-containing formulations as a back coating on cotton cloth to make it fire resistant in the last decade of the nineteenth century [1].

However, while antimony in conjunction with halogen might give good flame retardancy, it was not particularly successful due to the unfavourable environmental impact of the halogen compounds. Due to their synergistic impact, a phosphorous-based flame retardant combined with a nitrogenous molecule has been claimed to be the most effective thus far. As a result, during the past forty years, phosphorous, nitrogen, and halogen-based flame retardants such as Tetrakis phosphonium salt and N-alkyl phosphopropionamide derivatives have dominated the market as commercial flame retardant products [2].

However, when similar formulations are applied to cotton fabric, its tear and tensile strengths are diminished, and the fabric becomes stiff when exposed to acidic conditions. Furthermore, the treatment is poisonous, dangerous, costly, and time consuming due to the participation of a large amount of chemical and a high temperature curing procedure. As a result, there is a need to produce more cost-effective, ecologically friendly, and long-lasting fire retardant chemicals that, when applied to cotton textiles, will preserve their quality to a large extent. In this regard, the researchers attempted to limit the amount of formaldehyde released by fire retardants butane tetra carboxylic acid binding cloth formulation [3].

They are also focusing on developing halogen-free phosphorous and nitrogen-bonded flame retardants in order to build more char-forming cellulosic substrate6. A recent study combined nano zinc oxide and polycarboxylic acid to create ecologically friendly fire retardant cotton fabric. However, researchers are still working on developing easily accessible, effective, environmentally acceptable, and less expensive fire retardants for cellulosic fabrics. It should be noted that, as a result of increased public awareness about human health and hygiene, the demand for cellulosic textile finishes containing natural products, such as natural dyes for coloration, enzyme for bio-polishing, neem, aloe vera, and banana peel extract for antimicrobial fi nishing, is increasing in research and development [4].

There have been few studies on the fire retardancy of cellulosic fabrics employing bio-macromolecules. A group of researchers recently described using DNA from herring sperm and salmon fins on cotton cloth to make it thermally stable. They believe that because DNA includes phosphate, carbonaceous deoxyribose units, polysaccharide dehydrate, and certain important amino acids, it aids in the creation of carbonaceous char and the release of ammonia, making cellulosic cotton fibre thermally stable. They have also attempted to create fire protective cotton fabric using whey proteins, casein, and hydrophobins due to their high phosphate, disulphide, and protein content, which can influence pyrolysis by causing early char formation [5].

Conflict of Interest

None.

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