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Using Empty Fruit Bunch Sap as a Fire Retardants Cellulosic Substrate

Ane Galarneau*

Research Director, CNRS Institute Charles Gerhardt of Montpellier, France

Introduction

However, despite the fact that antimony in conjunction with halogen might impart high flame retardancy, it was not particularly successful due to the unfavourable environmental impact of halogen compounds. Because of 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 last fifty 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. [1].

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 use 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 sustainable fire retardant chemicals that, when applied to cotton textiles, will preserve their quality to a large extent. The researchers attempted to limit the amount of formaldehyde released from fire retardant fabric by employing a Butane tetra carboxylic acid binding formulation in this direction. 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 [2].

However, researchers are still working on developing easily accessible, effective, environmentally acceptable, and less expensive fire retardants for cellulosic fabrics. It should be emphasised that the demand for cellulosic textile fi nishes using natural ingredients, such as natural dyes for coloration, enzyme for bio-polishing, neem, aloe vera, and banana peel extract for antimicrobial finishing, is increasing owing to current awareness about human health and cleanliness. There have been very few studies on the fire retardancy of cellulosic fabric employing bio-macromolecules [3].

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 manufacture fire protective cotton fabric out of whey proteins, casein, and hydrophobins due to their high phosphate, disulphide, and protein content, which can influence pyrolysis by causing early char formation [4].

To the best of our knowledge, no application of plant extract for flame retardant fnishing of any textile and/or polymeric material has been documented to date. Because some of the plants contain phosphorous and other minerals, they can be used to impart flame retardancy to cellulosic and non-cellulosic fabrics. The current study attempted to add flame retardancy to cellulosic cotton textiles by employing banana pseudostem sap, a plant extract that includes phosphorus, nitrogen, chlorine, and other metallic elements. A group of researchers discovered that BPS includes magnesium nitrate and potassium nitrate. Recently, researchers discovered that potassium chloride, sodium chloride, and metal phosphate are toxic. After washing the samples according to the ISO standard, the flame retardant activity of the finished samples was tested. The treated textiles, according to this procedure, were laundered at 40o using a normal detergent with a concentration of 5 g/l.C for 30 minutes The After that, the cloth was washed in fresh water for 5 minutes by drying at 100 degrees C for 5 minutes more. The specimens were then desiccated for 24 hours in a conventional desiccator atmosphere [5].

Conflict of Interest

None.

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***Address for Correspondence:** Ane Galarneau, Research Director, CNRS Institute Charles Gerhardt of Montpellier, France, E-mail: anegalarneau@gmail.com*

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