



Study of mechanical properties and characteristics of eco-fibres for sustainable children's clothing

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Abstract

The aim of this paper is to study the application of eco-fibres as a new approach to achieve the multifunctional design for children's clothing toward sustainability in the clothing industry. In this regard, this study focuses on the evaluation of the fabrics' mechanical properties including tensile strength and microstructural details as critical points for multifunctional children's clothing purposes. The eco-fibre fabrics studied are organic cotton twill and recycled polyester. Studies have proven that frequent laundering and dry-cleaning result in increased pilling. Furthermore, high quality of colour fastness properties was found in 100% organic woven cotton fabric and recycled polyester fabric printed by non-harmful dyes. Organic cotton fabric is found to offer minimum tear resistance due to the lower strength of cotton fibres. The study found very good physical properties of organic cotton fabric during the mechanical test as well as recycled polyester fabric, which are also safe and eco-friendly. Therefore, these materials are suitable to be used in sustainable clothing design, as it is also a means towards the reduction of environmental pollution and tackle resource depletion associated with the clothing industry.

1. Introduction

Sustainable fashion for children's clothing is in high demand in today's society. Sustainability and multifunctional design use integrated technology and takes into account the economic, environmental and social factors to improve the functionality of products. Indeed, this is based on the consciousness of the ecological environment. This is important as it meets the function, quality and cost of the product while considering environmental attributes, social health and economic issues during the product's entire lifecycle. Additionally, children's clothing design should meet the physical and psychological needs of new shapes, unique appearances and others to attract children [1]. Therefore, designers should pay attention to comfort, convenience and

Therefore, creating multifunctional capsule wardrobe is a possible solution to the problem of excessive clothing consumption in the fast fashion industry as proven by Jalil and Shaharuddin [5].

Multifunctional clothing can be an alternate source of revenue in the fashion industry which supports the movement towards sustainability [6]. Since multifunctional clothing can be repeatedly transformed, its life cycle is prolonged and the utilization rate of the commodity is increased [7]. Furthermore, in this unique design technique, fasteners such as zippers, hooks, velcro tape or buttons, whether made sustainable or not, attach individual clothing components. Each component can be unconnected and reconnected to produce a completely different type of clothing at the consumer's whim. Thus, suitable sustainable materials should be strong, soft and compatible with other materials to protect children's health.