UNIVERSITI TEKNOLOGI MARA

COMFORT PROPERTIES OF BAMBOO/COTTON 1X1 RIB KNITTED FABRICS

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ABSTRACT

Moisture management, water vapour permeability, air permeability, and thermal conductivity properties are important factors that could decide the comfort level of clothing worn by humans. In this study, these comfort properties were investigated on thirteen 1x1 rib knitted fabrics produced using scoured 100% cotton yarn (30 Tex) and 100% bamboo yarn (37 Tex) with different arrangement of cotton and bamboo yarn. The results showed that the treated fabrics have better overall moisture management properties, water vapour permeability, and thermal conductivity while the untreated fabrics have better air permeability. The increase of bamboo yarn in the combination of bamboo/cotton fabrics decreased the moisture management properties but improved the thermal conductivity of the fabrics. It was found that the position and arrangement of the bamboo and cotton yarns in the fabrics affect the fabric's moisture management and thermal conductivity. Statistical analysis using SPSS showed that the moisture management was not influenced by loop length while the water vapour permeability was not influenced by the courses/cm of the cotton fabrics. However, all the physical properties did influence the air permeability including course/cm, wales/cm, weight, thickness, and loop length. In addition, the weight and loop length of bamboo did not influence the thermal conductivity. ANOVA results show that there is no significant difference between the physical properties and comfort properties. However, among the physical properties, thickness have the highest influenced to OMMC ($p < 0.05$). When the moisture management increased, the air permeability also increased, however the water vapour permeability and thermal conductivity decreased. It was also found that with the increased of water vapour permeability, the air permeability also increased followed by the decreased in moisture management and thermal conductivity.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

At present, the standard of life is getting higher as the demand of consumers are increasing, in particular, in the aspects of clothing comfort. Clothing comfort is a subjective matter that is always related to the feeling of the wearer which acts as a layer to conserve body temperature at different atmosphere. One way to achieve clothing comfort is through moisture management textile which is one of the aspects that decides the degree of comfort fabric (Sampath & Senthilkumar, 2009). Moisture management is water vapour and perspiration movement controlled from the skin to the outer surface of the fabric to make the wearer feels comfortable (Meng et al., 2011; Onofrei, Rocha, & Catarino, 2011; Prakash, Ramakrishnan, & Koushik, 2013c; Sampath et al., 2012; Sampath & Senthilkumar, 2009; Süpüren et al., 2011).

According to Chinta & Gujar (2013), textile comfort includes feeling soft and supple that would not cause any irritation on the skin such as itching and scratching. The clothing should not stick to the skin even when the skin is wet. The clothing act as a barrier between the external environment and the human body. Moisture management fabrics are important to wear during exercise to keep the skin dry and make the wearer feel comfortable. Terliksiz et al., (2016) stressed that any textile material that is categorised as comfortable should not impact the thermal balance between the environment and body. The parameters that determine the comfort of textiles include moisture management, water vapour permeability, air permeability and thermal conductivity.

There are many factors that affect the moisture management of textiles. These include the spinning technology adopted, fibre type, yarn twist, yarn count, yarn hairiness, fabric cover factor, fabric porosity, fabric thickness, and the finishing process (Ajmeri & Bhattacharya, 2013). In terms of fibre type, bamboo-based fabrics have become the centre of attraction and have been the subject of many research efforts with the aim to improve moisture management of the fabric (An, Gam, & Cao, 2013; Filiz, 2011; Kandi, Das, & Mahish, 2013; Mahish, Patra, & Thakur, 2012; Majumdar,