야외 운동복에서의 수분전달

오 애경

The Water Vapour Transfer on Outdoor Activities Clothing

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1. INTRODUCTION

The water vapour permeability of clothing materials is a critical property for clothing systems that must maintain thermal equilibrium for the wearer. The evaporation of perspiration provides the means of cooling the human body. The perspiration should evaporate from the surface of the skin and pass as water vapour through the clothing, which must be permeable for comfort. The primary objectives in this study of the transfer through fabrics of water vapour are to measure this property in a quantitative manner appropriate to clothing systems and to provide an increased understanding of various types of fabric in water vapour transfer.

2. EXPERIMENTAL

Eight fabrics were used in this experimental. The polyurethane coated fabric, microfibre fabric, and PTFE fabric were used as a shell layer. Two different fleece fabrics were included as a middle layer in this study: a 100% polyester single sided fleece fabric and a 100% polyester double faced fleece fabric. A 100% machine washable wool fabric and polyester/cotton blend fabric were used as a base layer.

Water vapour transfer was measured according to BS 7209 : 1990. The loss in weight over a period of 24 hours was then recorded for each dish.

3. RESULTS and DISCUSSIONS

The results obtained from experiments conducted using a Turl Dish are shown in Figure 1and 2. Figures illustrate the general curves of the rate of water vapour transfer until 30hr and 8hr

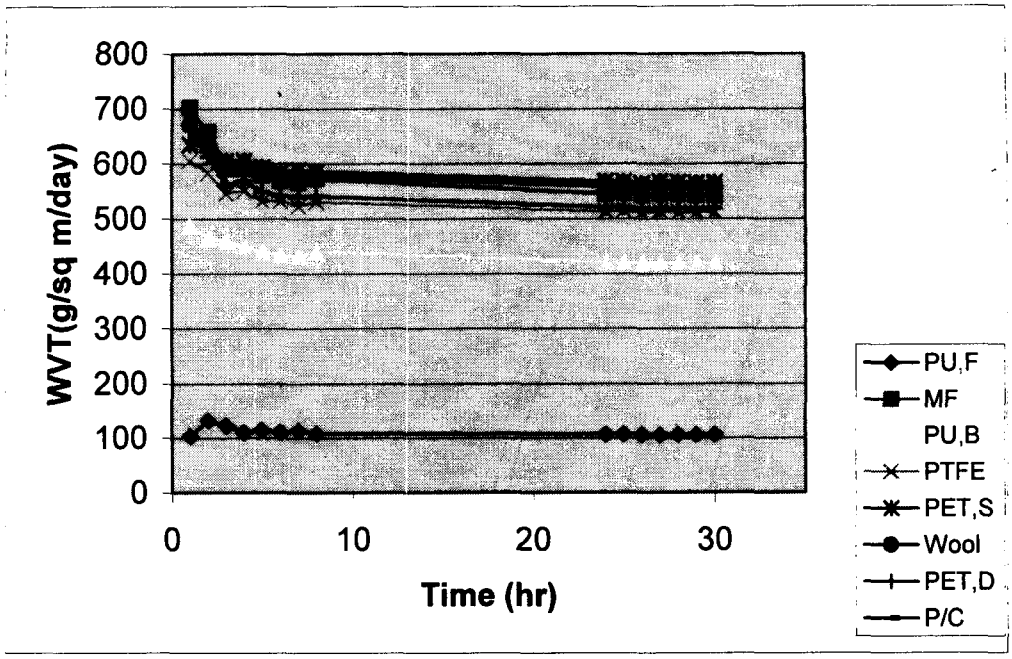

Figure 1. The rate of water vapour transfer of sample fabrics until 30 hours.

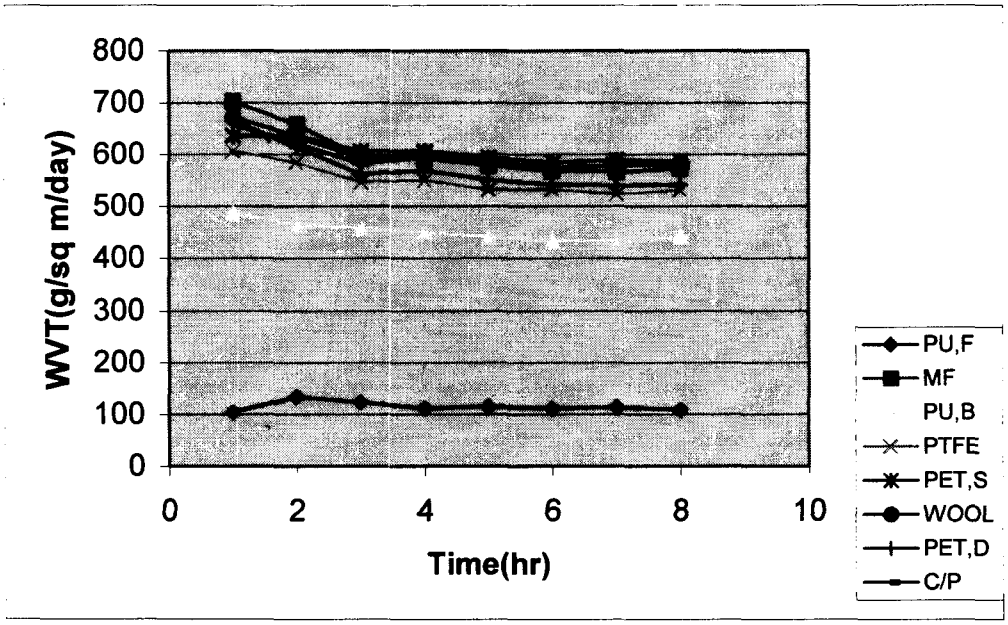

Figure 2. The rate of water vapour transfer of sample fabrics until 8 hours.

later for polyurethane coated fabrics (PU), a microfibre fabric (MF), a PTFE-laminated fabric (PTFE), a 100% polyester fabrics (PET), a 100% wool fabric and a cotton/polyester blend fabric. From these figures, microfibre fabric (MF) demonstrates the highest water vapour transfer rates, followed by wool, cotton/polyester blend and polyester fabric (PET, S and PET, D), by PTFE-laminated fabric (PTFE) and by polyurethane coated fabrics (PU, F and PU, B). In the case of waterproof breathable fabrics as a shell layer, it is clear that can allow the highest water vapour transfer, followed by laminated and coated fabrics. From these figures it is clear that the rate of water vapour transfer rapidly falls during the initial experiments, decreases very slowly until 24hr, and then approaches equilibrium after that time.

4. CONCLUSIONS

The purpose of this experiment was to clarify and to investigate preliminary principles and mechanisms of water vapour transfer through several fabrics, which will be, composed clothing systems. The water vapour transfer rate of various types of fabric has been obtained with the Turl Dish under isothermal conditions. In this study, the conclusions are as following:

First, the rate of water vapour transfer for the most part of the base layer fabrics and mid-layer fabrics is higher than that of waterproof breathable fabrics as a shell layer. Second, the rate of water vapour transfer in waterproof breathable fabrics forms a ranking: microfibre fabric followed by PTFE-laminated fabric and by polyurethane coated fabrics. Third, the rate of water vapour transfer of a laminated back with polyurethane coating is higher than that of a face coated with polyurethane fabric. This suggests that the effective laminated part needs to be nearer the skin.

5. REFERENCES

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