MOISTURE PROPERTIES OF TEXTILES

Rita M Crow
Human Protective Systems Division
Defence and Civil Institute of Environmental Medicine
North York, Ontario, CANADA, M3M 3B9

INTRODUCTION

Manufacturers advertise that their fabrics are superior to those of their competitors because the fibres used in their fabrics "wick" perspiration away from the body, into the atmosphere while retaining none of it. This, they claim, leaves the wearer warm and dry. Our study was to investigate the interaction of percent regain, water retention and drying properties of fabrics.

METHOD

The percent regains of seventeen fabrics varying in fibre type and construction were determined by measuring the amount of water vapour absorbed by them from their oven-dry state in a conditioning room (20°C and 65% relative humidity). They were then wetted out in distilled water and placed between wet sponges overnight to equilibrate. They were then weighed and placed on a rack in the conditioning room and the time to dry to their original conditioned mass was recorded.

RESULTS

The results are shown in Figures 1, 2 and 3. It can be seen that there is no correlation between amount of water the fabrics pick up and their percent regain. Further, the amount of water the fabrics initially picked up is fabric thickness-dependent. Finally, their drying times are directly related to the amount of water initially in them and are independent of fibre type and so percent regain.

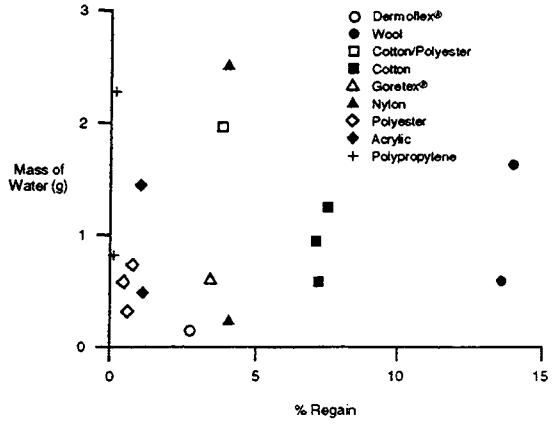

Fig. 1 This shows no relationship between the % regain of the fibre and the mass of water initially in the fabric. (r = .074)

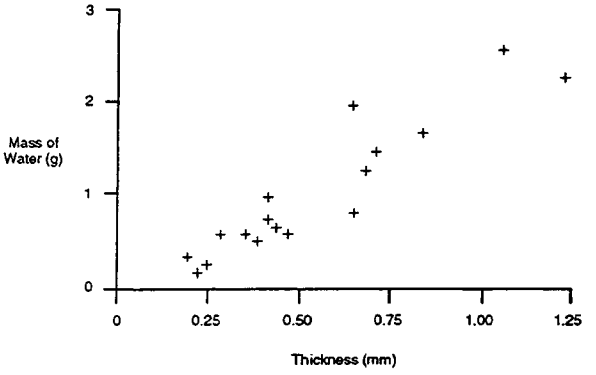

Fig. 2 There is a good correlation between mass of water held by the fabric and its thickness. (r = .92)

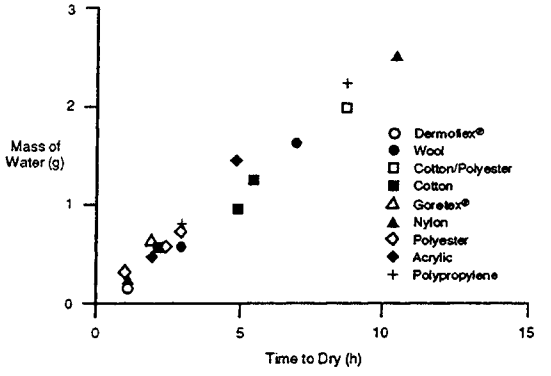

Fig. 3 The linear relationship between the initial mass of water in the fabric and time to dry for a range of fabrics made from various fibre types. (r = .98)

CONCLUSIONS

Manufacturers' claims that their fabrics pick up no water are incorrect. It would appear that this confusion arises from the fact that some fibres such as polyester and polypropylene absorb very little to no water vapour from the air and this in fact is erroneously generalized to liquid water. Therefore advertisements which extol the virtues of polypropylene or acrylic socks to keep your feet warm and dry are scientifically wrong. They will pick up water and they will get wet.