

## THE COMFORT OF SPORTSWEAR MATERIALS FOR BADMINTON PLAYERS IN A HOT ENVIRONMENT

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### INTRODUCTION

Hydrophobic textiles are used in design of functional clothing. Many reports in the literature suggest that sportswear made from these kinds of fabrics has better water-conductivity than pure cotton [1,2]. We developed several knitted fabrics using such material manufactured in Taiwan. The optimal fabrics were selected on the basis of objective measurements [3] and were further evaluated by subjective methods.

Twenty-seven badminton players joined a field wear trial to compare the traditionally preferred cotton(CN) and a newly developed multilayered polyester/cotton (PET/C) for suitability during exercise.

### METHODS

Badminton was chosen since this activity generates a high sweat rate.

The trial was conducted indoors during the summer month of Taiwan. Ambient temperature and relative humidity were ranged from 30.8 to 32.6°C and from 56.5 to 62.5%, respectively. Physiological factors such as heart rate, sweat rate, subject weight loss, and core temperature were measured. The weight of shirts were measured both before (dry) and after (wet by sweat) exercise. A questionnaire was used to detect the psychophysical comfort of the white short-sleeved polo shirts, and the Kolmogorov-Smirnov method was used in statistic analysis.

### RESULTS

#### 1. Subjective questionnaire

The questionnaire was filled out separately in three different periods: A) at the begin of wearing the shirt, B) during warm-up and C) after playing badminton. The descriptions included degrees of comfort and discomfort.

Figure 1 is the comparison of the degree of satisfaction with CN and PET/C and figure 2 shows the intensity of discomfort between the two fabrics. There was a tendency, although not significant, that the satisfaction of the PET/C fabrics was higher than CN and the intensity of discomfort of CN was higher than PET/C.

Differences in the degree of satisfaction and the intensity of discomfort, between the male and female subjects, are shown in figure 3 and 4, respectively. It is significant that the males had higher satisfaction votes than the females, while the females registered higher levels of dissatisfaction.

#### 2. Physiological aspects

According to the results of subject weight loss, there are no obvious differences between the two fabrics. The sweat rate of the male subjects is greater than that of the females. The weight of the shirts in different stages of the test shows that the CN shirts are heavier than PET/C ones in both dry and wet conditions.

The heart rates of the two fabrics are quite close and it also shows the intensities of exercise are similar. The post-exercise core temperature of CN is significantly higher than that of pretest, while PET/C is not.

### CONCLUSIONS

1. The newly designed functional multilayered PET/C fabric tends to be more comfortable and more satisfying. This affirms the performance of the functional fabrics, however, it is not statistically significant. Badminton is a very active exercise and the trial was conducted in very hot environment. The PET/C fabric may be too thick to function adequately under these conditions.

2. Females felt uncomfortable and had a greater intensity of dissatisfaction than reported by the males. These data indicate an increased sensitivity of females.

3. We found that the weight of sweat on CN shirts was greater than PET/C ones in the same intensity of exercise. That resulted in the higher core temperature after exercise in CN cases. Factors such as weight loss and sweat absorbed were similar for the two suit designs.

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Fig.1 The degree of satisfaction of PET/C and CN.

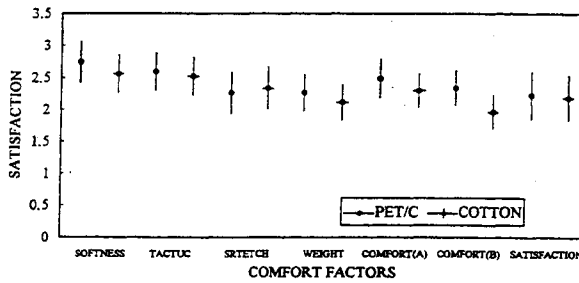


Fig.2 The intensity of discomfort of PET/C and CN.

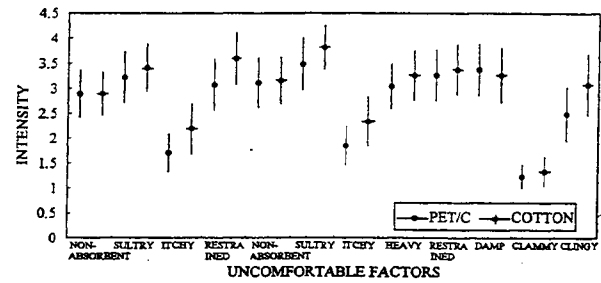


Fig.3 The degree of satisfaction of the females and males.

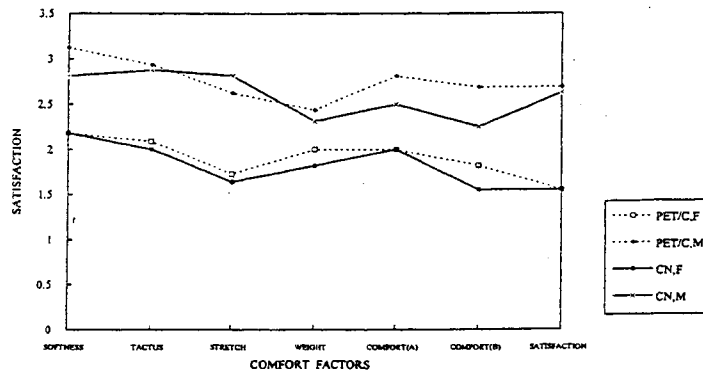


Fig.4 The intensity of discomfort of the females and males.

