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Effects of Different Methods of Precooling on Sub-maximal Intensity Exercise in Heat and High Humidity

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Objective This study aimed to investigate the influence of using different precooling measures on the capacity of competition and the exercise performance in hot and humidity environment. The most effectual means of precooling will be recommended to help coaches and athletes to improve the ability and performance in training and matches

Methods Ten male football (Rugby) players who came from the rugby team totally completed four experimental conditions in hot/humid conditions (38°C, 50% humidity). Initially, a 30-min precooling period consisting of either nothing to control (CONT, C); wearing cooling vest (4°C, V); ingesting of ice beverage (2.3 ml /kg of 4°C, I); or the mix method of combination of V and I (V+I, M). Following this, sub-maximal exercise (80% VO₂max) of treadmill test occurred, until athletes exhausted

Results The running distance of M and V and I have a significant increase ($P \leq 0.05$) than CONT. The peak oxygen uptake of exhaustion was no significant difference between each other. After exercise, the change rate of heart rate ratio of M compared with CONT has a very significant decrease ($P \leq 0.01$). The core temperature of M and CONT has a significant increase ($P \leq 0.05$) in comparison. The surface temperature of I and M and V comparison with CONT has a very significant increase ($P \leq 0.01$). When participants exhaust, the RPE of M in comparison with CONT had significantly lower ($P \leq 0.05$). The RPB and the rating of thermal sensation of each condition were no significant difference.

Conclusions In hot and humidity condition, precooling has a promoting effect on the sub-maximal exercise. Precooling measures could improve the exercise performance and maintain the stability of functional status and physiology, especially the mix method.