

## Hydration Matters: Impact on 3 km Running Performance in Trained Male Athletes Under Heat Conditions

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**Abstract :** Research Context: Endurance performance in hot environments is influenced by the interplay of hydration status and physiological responses. This study aims to investigate how dehydration, up to 2.11% body weight loss, affects the 3 km running performance of trained male athletes under conditions mimicking high temperatures. Methodology: In a randomized crossover design, five male athletes participated in two trials - euhydrated (EU) and dehydrated (HYPO). Both trials included a 70-minute preload run at 55-60% VO<sub>2</sub>max in 32°C and 50% humidity, followed by a 3-kilometer time trial. Fluid intake was restricted in HYPO to induce a 2.11% body weight loss. Physiological metrics, including heart rate, core temperature, and oxygen uptake, were measured, along with perceptual metrics like perceived exertion and thirst sensation. Findings: The 3-kilometer run completion times showed no significant differences between EU and HYPO trials (p=0.944). Physiological indicators, including heart rate, core temperature, and oxygen uptake, did not significantly vary (p>0.05). Thirst sensation was markedly higher in HYPO (p=0.013), confirming successful induction of dehydration. Other perceptual metrics and gastrointestinal comfort remained consistent. Conclusion: Contrary to the hypothesis, the study reveals that dehydration, inducing up to 2.11% body weight loss, does not significantly impair 3 km running performance in trained male athletes under hot conditions. Thirst sensation was notably higher in the dehydrated state, emphasizing the importance of considering perceptual factors in hydration strategies. The findings suggest that trained runners can maintain performance despite moderate dehydration, highlighting the need for nuanced hydration guidelines in hot-weather running.

**Keywords :** hypohydration, euhydration, hot environment, 3km running time trial, endurance performance, trained athletes, perceptual metrics, dehydration impact, physiological responses, hydration strategies

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