# BOOK OF ABSTRACTS

30th Annual Congress of the
**EUROPEAN COLLEGE OF SPORT SCIENCE**

1 - 4 July 2025 | Rimini, Italy
Jointly hosted by
University of Bologna | University of Padova

Edited by:
Marcora, S., Narici, M., Paoli, A., De Vito, G., Tsolakidis, E.,
Thompson, J.L., Ferrauti, A., Piacentini, M.F.

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ISBN 978-3-9818414-8-0


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**European College of Sport Science:**
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European College of Sport Science, 1 - 4 July 2025
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ISBN 978-3-9818414-8-0


Conception, DTP: SporTools GmbH – Data management in sports
Corrections: Patera, K., Tsolakidou, A., Tsolakidis, S.

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**EFFECTS OF SHORT-TERM ADAPTATION TO KETOGENIC DIET ON BODY COMPOSITION, FAT OXIDATION, ENDURANCE PERFORMANCE, MUSCLE GLYCOGEN, AND PREFRONTAL HEMODYNAMIC RESPONSES IN ENDURANCE TRAINED ATHLETES**

CHARRIER, D., DE LIMA-JUNIOR, D., MONTANARI, A., CERULLO, G., LIBARDONI, L., GIVRALLI, J., STIRCU, V., CANATO, M., BASSETTO, F., VINDIGNI, V., MARCORA, S., MORO, T., PAOLI, A.

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INTRODUCTION: Ketogenic Diets (KD) have been proposed to enhance endurance performance by increasing fat oxidation. However, their effects on muscle glycogen availability remain unclear, with some evidence suggesting a glycogen-sparing effect following adaptation. Additionally, the potential performance benefits of nutritional ketosis—through increased ketone oxidation and reduced perception of fatigue—remain controversial. Therefore, the aim of this study was to investigate the effects of short-term KD adaptation on: (1) moderate-intensity endurance performance and (2) subsequent high-intensity endurance performance under glycogen-depleted conditions.

METHODS: To date, eight trained endurance athletes (age: 28.3 ± 3.8 years; $VO_2$max: 56.08 ± 8.3 mL/kg/min) have been enrolled. Following a one-week standardized diet (50% carbohydrates, 2.0 g/kg/day protein) and habitual training, participants were randomly assigned to either a KD diet (<5% CHO, 2.0 g/kg/day protein) or a control diet (CD) (>55% CHO, 2.0 g/kg/day protein) for 10 days, while continuing their usual endurance training. Body composition was assessed at baseline and after the intervention period using dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA). Additionally, after an overnight fast, participants performed a two-hour cycling protocol on a cycle ergometer at 55% of peak power output to induce glycogen depletion. Oxygen uptake ($VO_2$), respiratory quotient (RQ), and substrate utilization (g/h) were measured for 5 minutes every 15 minutes of exercise using a gas analyzer (COSMED CPET). Pre- and post-exercise muscle biopsies (vastus lateralis) were collected to quantify glycogen content. Following the depletion protocol, time to exhaustion (TTE) was assessed using an incremental protocol (starting at 75% $VO_2$peak, increasing power by 5% every 5 minutes). Functional near-infrared spectroscopy (fNIRS) was used to evaluate prefrontal hemodynamic responses during TTE.

RESULTS: Preliminary data suggest that the KD group experienced a reduction in total body water (-3% vs. +1%) and body weight (-3% vs. +0.5%) compared to the control group. Additionally, fat oxidation rates were markedly increased during exercise in the KD group (+156%) relative to controls (+3%), while gross efficiency declined (-2% vs. +0.3%). Notably, high-intensity endurance performance was impaired in the KD group, as evidenced by a shorter TTE (-7 min vs. +7 min) compared to the control group.

CONCLUSION: These preliminary results suggest that short-term adaptation to a KD diet reduces total body water and body weight. However, while this dietary approach enhances fat oxidation during exercise, it appears to reduce gross efficiency and impair subsequent high-intensity endurance performance. Further analyses will include an increased sample size, muscle biopsies data, and fNIRS evaluations to strengthen and expand these findings.

**THE EFFECTS OF CURCUMIN SUPPLEMENTATION ON NEUROMUSCULAR PERFORMANCE IN OLDER ADULTS: A SYSTEMATIC REVIEW.**

LOPEZ-SAMANES, A., GARCÍA, A., SÁNCHEZ-IZQUIERDO, M., GAOS, S., CASTAÑEDA-BABARRO, A., MATOS-DUARTE, M., GARCÍA-SÁNCHEZ, R., LEÓN-GUEREÑO, P.

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INTRODUCTION: Curcumin is the most abundant phenolic compound in turmeric (Curcuma longa) and is widely recognized for its potent antioxidant and anti-inflammatory properties, as well as its role in mitigating exercise-induced muscle damage. However, its effects on neuromuscular performance remain relatively unexplored, particularly in older adults. It is hypothesized that curcumin supplementation may enhance neuromuscular performance in this population by improving muscle strength, reducing inflammation-induced muscle deterioration, and mitigating oxidative stress. Therefore, the aim of this systematic review was to assess the effects of curcumin ingestion on neuromuscular performance in older adults.

METHODS: A literature search was conducted using two databases: PubMed and Web of Science. Eligibility criteria were established following the PICOS method. Articles were selected based on the following inclusion criteria: curcumin intake, neuromuscular performance, older adults (i.e., >65 years old), and human participants. Neuromuscular performance parameters, such as isometric handgrip strength, knee flexion strength, short physical performance battery (SPPB) and walking speed, were analyzed.

RESULTS: A total of 187 studies were identified across the two databases. After screening titles and abstracts, 32 duplicate studies were removed, and 126 studies were excluded for not being relevant to the review topic. This left 29 studies for full-text eligibility assessment. After applying the exclusion criteria, five studies were ultimately included in this systematic review.

CONCLUSION: Current evidence suggests that curcumin supplementation, particularly when combined with piperine, may improve neuromuscular function in the upper body (i.e., isometric handgrip strength) in older adults. However, there is limited evidence regarding its effects on lower-body neuromuscular performance, such as knee flexion strength or walking speed. Therefore, further research is needed to better understand the effects of curcumin supplementation on overall neuromuscular performance in older adults, particularly in lower-limb function, to determine its full potential in preserving muscle health and mobility in aging populations.