Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 2026

The effect of caffeine and beetroot juice supplementation on specific judo performance during simulated competition-day conditions in judo athletes

Protocol summary

Study aim
Investigating the effect of caffeine, beetroot juice, and their combination on judo-specific performance in simulated conditions of the competition day in judo athletes

Design
A crossover, placebo-controlled, double-blind, randomized, phase 3 clinical trial on 35 judo athletes. The RAND function of Excel software will be used for randomization.

Settings and conduct
Each participant will participate in 4 experimental sessions (following BR, caffeine, caffeine plus BR, placebo), completing 5 trials in each session (4 min of randori plus SJFT plus CMJ test plus hand grip strength test plus cognitive function). The study will be double-blinded and will be conducted in Ankara, Türkiye.

Participants/Inclusion and exclusion criteria
Inclusion criteria: Must have at least a brown belt in judo; must not smoke; must not drink alcohol; must have a daily caffeine intake of less than 100 mg. Exclusion criteria: Must have any injury or illness; must be taking any supplements or medications.

Intervention groups
1) Beetroot juice consumption (2 hours pre-exercise & immediately after the second trial, 70 ml each time); 2) Caffeine consumption (60 minutes pre-exercise and immediately after the third trial, each time 3 mg/kg of body weight); 3) Beetroot juice + caffeine consumption (beetroot juice: 2 hours pre-exercise & immediately after the second trial, 70 ml each time; caffeine: 60 minutes pre-exercise and immediately after the third trial, each time 3 mg/kg of body weight); 4) Placebo consumption (consumption of nitrate-depleted beetroot juice and opaque capsules containing 250 mg of sucrose as a placebo on an identical schedule).

Main outcome variables
SJFT outcomes، Cognitive function

General information

Reason for update
Adding some secondary variables to evaluate possible mechanisms; Using both sexes as subjects;

Acronym

IRCT registration information
IRCT registration number: **IRCT20231004059615N5**
Registration date: **2025-07-18, 1404/04/27**
Registration timing: **prospective**

Last update: **2026-01-18, 1404/10/28**
Update count: **1**

Registration date
2025-07-18, 1404/04/27

Registrant information

Name
Davar Khodadadi

Name of organization / entity

Country
Iran (Islamic Republic of)

Phone
+98 21 2263 3583

Email address
davar.khodadadi@yahoo.com

Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2025-07-23, 1404/05/01

Expected recruitment end date
2025-07-27, 1404/05/05

Actual recruitment start date
empty

Actual recruitment end date
empty
Trial completion date
empty

Scientific title
The effect of caffeine and beetroot juice supplementation on specific judo performance during simulated competition-day conditions in judo athletes

Public title
Effect of caffeine and beetroot juice supplementation on specific judo performance
Purpose
Other
Inclusion/Exclusion criteria
Inclusion criteria:
All male judokas between the ages of 18 and 30. Have a training history of more than 5 years. Have at least a brown belt in judo. Do not smoke. Do not drink alcohol. Have a daily caffeine intake of less than 100 mg.
Exclusion criteria:
Have any illness or injury in the past 3 months Take any medication or nutritional supplement in the past 3 months
Age
From **18 years** old to **30 years** old
Gender
Both

Phase
3
Groups that have been masked

- Participant
- Investigator
- Data analyser

Sample size
Target sample size: **24**
Randomization (investigator's opinion)
Randomized
Randomization description
The names of the subjects will be entered in one column of Excel; in another column, each subject will be randomly assigned a number using the RAND function (=RAND()); then, the numbers will be sorted from smallest to largest; 25% of the subjects will receive Intervention 1 (caffeine supplement), 25% of the subjects will receive Intervention 2 (beetroot juice supplement), 25% of the subjects will receive Intervention 3 (caffeine + beetroot juice), and the remaining 25% will receive placebo. In the second to fourth sessions of the experiment, the subjects will be switched (for example, subjects who received Intervention 1 in the first session will be randomly assigned to Intervention 2, 3, or placebo in the second session).
Blinding (investigator's opinion)
Double blinded
Blinding description
The order in which the beetroot juice supplement or placebo was administered will be determined by one outside the study and will not be disclosed to participants or researchers until after the data analysis. Participants will also receive the supplements and placebo in a capsule (caffeine) and a bottle (beetroot juice) that are opaque and look similar. In addition, the color and taste of the placebo will be simulated by adding food coloring and flavoring to the supplement.
Placebo
Used
Assignment
Crossover
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of the International Science and Technology University
Street address
Tunahan Mah. Dumlupinar 30 Agustos Cad. No:2, Metromal Business F Blok Office
City
Ankara
Postal code
21,06824
Approval date
2025-07-03, 1404/04/12
Ethics committee reference number
202507-01

Health conditions studied

1

Description of health condition studied
Improve exercise performance
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
SJFT index
Timepoint
In the 6 stages after judo randori
Method of measurement
Using the following formula: SJFT index = HR0 + HR1 / total number of throws

2

Description
Cognitive function
Timepoint
At baseline and after SJFT

Method of measurement
Using the Psychomotor Vigilance Test

Secondary outcomes

1

Description
Number of throws
Timepoint
In the 6 stages after SJFT
Method of measurement
Counting the number

2

Description
Heart rate
Timepoint
In the 6 stages immediately at the end of SJFT and 1 minute after SJFT
Method of measurement
Using a Polar heart rate monitor

3

Description
Rate of perceived exertion
Timepoint
In the 6 stages after SJFT
Method of measurement
Using the Borg scale

4

Description
Jump height
Timepoint
In the 6 stages (pre-exercise and after SJFT)
Method of measurement
CMJ Test

5

Description
Muscular strength
Timepoint
In the 6 stages (pre-exercise and after SJFT)
Method of measurement
Isometric strength testing device for hand muscles

6

Description
Blood lactate
Timepoint
At baseline, pre-exercise, mid-exercise, pre-final SJFT and post-exercise.
Method of measurement
Via Enzyme-Linked Immunosorbent Assay

7

Description
Muscle oxygenation
Timepoint
During the final SJFT
Method of measurement
Near-infrared spectroscopy

8

Description
Blood glucose
Timepoint
At baseline, pre-exercise, mid-exercise, pre-final SJFT and post-exercise.
Method of measurement
Via hexokinase method

9

Description
Plasma nitrate and nitrite
Timepoint
At baseline, pre-exercise, mid-exercise, pre-final SJFT and post-exercise.
Method of measurement
Via chemiluminescence assay

10

Description
Blood caffeine
Timepoint
At baseline, pre-exercise, mid-exercise, pre-final SJFT and post-exercise.
Method of measurement
Via High-Performance Liquid Chromatography

11

Description
blood PH
Timepoint
At baseline and post-exercise
Method of measurement
Blood gas analyzer

Intervention groups

1

Description
Intervention group1: Beetroot juice supplement (BEET It Sport®; James White Drinks Ltd., Ipswich, UK); 2 days before the test: 2 servings, 70 ml each, containing approximately 6.4 mmol nitrate;1 day before the test: 2 servings, 70 ml each, containing approximately 6.4 mmol nitrate;Test day: 2 servings, 2 hours before the test and after the second randori, 70 ml, containing approximately 6.4 mmol nitrate.
Category
Other

2

Description
Intervention group 2: Caffeine supplement (Caffeine®, Olimp Laboratories, Poland); Test day: 3 servings, 1 hour before the test and after the second and fourth attempts, 2 mg/kg body weight each.

Category
Other

3

Description
Intervention group 3: Beetroot juice supplement (BEET It Sport®; James White Drinks Ltd., Ipswich, UK); 2 days before the test: 2 servings, each 70 ml, containing approximately 6.4 mmol nitrate; 1 day before the test: 2 servings, each 70 ml, containing approximately 6.4 mmol nitrate; Test day: 2 servings, 2 hours before the test and after the second attempt, 70 ml, containing approximately 6.4 mmol nitrate. Caffeine supplement (Caffeine®, Olimp Laboratories, Poland); Test day: 3 servings, 1 hour before the test and after the second and fourth attempts, 2 mg/kg body weight each

Category
Other

4

Description
Control group: Similar to the intervention condition, they will receive placebo (colored water instead of beetroot juice and a capsule containing cellulose instead of caffeine).

Category
Other

Recruitment centers

1

Recruitment center

Name of recruitment center
INTERNATIONAL SCIENCE AND TECHNOLOGY UNIVERSITY

Full name of responsible person
Heidar Sajedi

Street address
Tunahan Mah. Dumlupinar 30 Agustos Cad. No:2, Metromal Business F Blok Office

City
Ankara

Postal code
21,06824

Phone
+90 312 475 76 15

Email
heidar.sajedi@istu.edu.pl

Sponsors / Funding sources

1

Sponsor

Name of organization / entity
INTERNATIONAL SCIENCE AND TECHNOLOGY UNIVERSITY

Full name of responsible person
Erdal Dursun

Street address
Tunahan Mah., Dumlupinar 30 Agustos Cad. No. 2, Metromal Business F Blok Office

City
Ankara

Postal code
21,06824

Phone
+90 312 475 76 15

Email
heidar.sajedi@istu.edu.pl

Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
Yes

Title of funding source
INTERNATIONAL SCIENCE AND TECHNOLOGY UNIVERSITY

Proportion provided by this source
100

Public or private sector
Private

Domestic or foreign origin
Foreign

Category of foreign source of funding
Sponsor: country of origin

Country of origin
IR

Type of organization providing the funding
Persons

Person responsible for general inquiries

Contact

Name of organization / entity
Islamic Azad University

Full name of responsible person
Davar Khodadadi

Position
Assistant professor

Latest degree
Ph.D.

Other areas of specialty/work
Physiology

Street address
Faculty of Physical Education and Sports Sciences, Velayat University Complex, Shahid Sohani St., Sohank

City
Tehran

Province
Tehran

Postal code
1955847781

Phone

+98 21 2263 3583

Fax

Email

davar.khodadadi@yahoo.com

Person responsible for scientific inquiries

Contact

Name of organization / entity

Islamic Azad University

Full name of responsible person

Davar Khodadadi

Position

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Latest degree

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Postal code

1955847781

Phone

+98 21 2263 3583

Fax

Email

davar.khodadadi@yahoo.com

Person responsible for updating data

Contact

Name of organization / entity

Islamic Azad University

Full name of responsible person

Davar Khodadadi

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Province

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Postal code

1955847781

Phone

+98 21 2263 3583

Fax

Email

davar.khodadadi@yahoo.com

Sharing plan

Deidentified Individual Participant Data Set (IPD)

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Undecided - It is not yet known if there will be a plan to make this available

Informed Consent Form

Undecided - It is not yet known if there will be a plan to make this available

Clinical Study Report

Not applicable

Analytic Code

Not applicable

Data Dictionary

Not applicable

Title and more details about the data/document

All data collected during the study will be shareable after de-identifying the subjects.

When the data will become available and for how long

The data will be published after the extracted articles are accepted.

To whom data/document is available

All people

Under which criteria data/document could be used

All data collected during the study will be shareable after de-identifying the subjects. The requester will only be permitted to use the data for meta-analysis reviews.

From where data/document is obtainable

Corresponding author: Davar Khodadadi, Faculty of Physical Education and Sports Sciences, Islamic Azad University Central Tehran Branch, Tehran, Iran Email: davar.khodadadi@yahoo.com

What processes are involved for a request to access data/document

Sending an email request to the corresponding author: Davar Khodadadi Email: davar.khodadadi@yahoo.com

Comments