The effect of nitrate supplementation on sport performance: High intensity intermittent performance in recreational athletes

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The objective of the current study is to assess the effect of 6-day dietary nitrate ingestion on high intensity intermittent sports performance in recreational soccer players.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON42220

Source
ToetsingOnline

Brief title
Nitrate for high intensity intermittent exercise

Condition

- Other condition

Synonym
Performance enhancement

Health condition

Effecten van nitraat suppletie op hoog-intensiteit sport prestatie

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: NWO (STW)

Intervention

Keyword: High intensity intermittent exercise, Nitrite, Red beetroot juice, Soccer

Outcome measures

Primary outcome

Total distance covered during the Yo-Yo Intermittent Recovery 1 test (Yo-Yo IR1

test)

Secondary outcome

- plasma concentration of nitrite and nitrate - salivary concentration of

nitrite and nitrate- heart rate - gastro-intestinal tolerance questionnaire

Study description

Background summary

Oral ingestion of nitrate (NO3-) in the form of both nitrate salts and concentrated red beetroot juice has been shown to significantly lower blood pressure at rest and to improve exercise performance during cycle time trials. Furthermore, a positive exercise performance effect of nitrate ingestion has been observed in recreational athletes during intermittent exercise. However, this was achieved after acute supplementation with a substantial dose of dietary nitrate. Whether similar ergogenic effects of nitrate supplementation can be achieved with a more conventional 6-day nitrate supplementation protocol with a lower daily dose remains to be established. Based on the gaps in current literature, our main goal will be to gain further insight into the effects of a 6-day nitrate supplementation protocol on high intensity intermittent exercise performance in recreational athletes.

Study objective

The objective of the current study is to assess the effect of 6-day dietary nitrate ingestion on high intensity intermittent sports performance in

recreational soccer players.

Study design

This study is a double-blind, randomized cross-over placebo controlled study. Over a 3 week period, 1 day every 2 weeks, subjects will be requested to perform an intermittent exercise performance test (Yo-Yo IR1 test). In the 5 days leading up to the exercise test, subjects will be asked to consume 1 dose of the supplement (nitrate or placebo) daily and a last dose on the test day.

Intervention

6 days of supplementation with 6x 800-1000 mg (800-1000 mg/day) nitrate in the form of 140 mL concentrated red beetroot juice, or 6x 140 mL nitrate-depleted concentrated red beetroot juice (placebo), separated by a 1 week wash out period.

Study burden and risks

Subjects will be required to report to the laboratory for a total of 4 visits (i.e. including screening and familiarization visits). On test days, subjects will be asked to fill out a questionnaire on the gastro-intestinal tolerance before commencing with the intermittent exercise test. A venous blood sample will also be collected as a pre-exercise measurements through the use of a venipuncture in a forearm vein. Subjects will also be asked to provide a sample of unstimulated saliva during the same time point. After the pre-exercise measurements and a standardized warm-up, subjects will be required to perform an intermittent exercise test (Yo-Yo IR1 test). Prior to the familiarization test, subjects will be asked to record their diet and activity for 36 h and refrain from strenuous physical exercise or labour for the 24 h preceding the visit. They will be asked to replicate their food intake and refrain from exercise for the 36 h and 24 h respectively, prior to the 2 subsequent trial visits. Subjects will also be asked to avoid alcohol for 24 h and caffeine for 12 h preceding each trial day, and to have their final standardized meal and drink (except for water), 3 h prior to performing the intermittent exercise test on the evening of a test day. The subjects will be asked to fill out a medical questionnaire at the screening. The risks that are associated with participating in this study are low. The dose of concentrated red beetroot juice used in the current study has been administered in multiple clinical and exercise studies. No adverse events were reported, except for reports of mild headache (which may or may not be associated with the intake of nitrate). The long term effects of nitrate ingestion still need to be fully investigated. The use of nitrate rich beverages has however been described to lead to mild gastrointestinal distress (bloating, belching) in some cases. Performing a venipuncture can result in a small risk of fainting or developing a hematoma when the needle is subsequently removed. This risk is very small due to the

fact that the blood draw will be done by well trained and experienced staff members. For the intermittent exercise test, the potential risks and discomforts inherent to the exercise testing procedure during each visit are minimal and are similar to those associated with any form of strenuous physical activity including fatigue, fainting, abnormal blood pressure etc.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Healthy
- Players of the first two senior selection teams of a regional soccer club competing at the 3rd KNVB level or higher
- Training >=2 days a week
- Competing at a level >= *klasse 4*

- 18-40 years
- Male

Exclusion criteria

- Use of medication
- Injury prohibiting them from performing the exercise protocol effectively
- Smoking
- Currently supplementing diet with nitrate
- Lactose intolerance

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)
Control:	Placebo
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	18-05-2015
Enrollment:	54
Type:	Actual

Ethics review

Approved WMO

Date:	22-04-2015
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL52438.068.15

Study results

Date completed:	04-04-2016
Actual enrolment:	40