

INPLASY

The effect of herbal testosterone boosters on serum testosterone, body composition and muscular strength in males – a systematic review

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ADMINISTRATIVE INFORMATION

Support - N/A.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202480078

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 August 2024 and was last updated on 16 August 2024.

INTRODUCTION

Review question / Objective What effect do the testosterone boosters, Ashwagandha, Fenugreek, Tongkat Ali, in conjunction with resistance training have on total testosterone, body composition and muscular strength in adult males subjects in comparison to a control group or placebo?

Rationale As males age there is a concurrent reduction in serum testosterone levels, muscular strength and changes to body composition. Reduced testosterone levels are associated with a range of negative effects including depression, decreased skeletal muscle mass and strength, increased adiposity/visceral fat, low bone density, Alzheimer disease and heart disease. Males may pursue a range of strategies to increase testosterone levels and reduce the impact of ageing. This may include lifestyle changes such as increasing physical activity, eating healthier, improving sleep, and managing stress. They may also investigate dietary supplements including

protein powders, amino acids, creatine, and testosterone boosters to support the benefits of physical activity.

The purpose of this systematic review is to summarise and evaluate randomised controlled trials conducted to assess the efficacy of herbal testosterone boosters and resistance training on total testosterone concentrations, changes in body composition and muscular strength.

Condition being studied Age related reductions in total testosterone; Age related reductions in muscular strength; Associated changes to body composition related to decreased testosterone and muscular strength, in particular fat free / lean mass and fat mass in males.

METHODS

Search strategy (“Testosterone booster*” OR “ashwagandha” OR “fenugreek” OR “tongkat ali” OR “withania somnifera” OR “trigonella foenum-graecum” OR “Eurycoma longifolia”) AND (“testosterone” OR “body composition” OR

“strength” OR “lean mass” OR “lean muscle mass” OR “lean body mass” OR “fat mass” OR “body fat percentage” OR “testosterone”)).

Participant or population Healthy adult male subjects > 18 years.

Intervention Studies will include an intervention and control / placebo group. The intervention group must be taking one of the three supplements (Ashwagandha, Fenugreek, Tongkat Ali) and the control must be taking a placebo. Studies must include an resistance training exercise intervention, measures of total testosterone and muscular strength and body composition. Study duration must be a minimum of 4 weeks.

Comparator

Inclusion criteria are:

Randomised controlled trials

Participants aged over 18 years

Participants are healthy males (free from conditions including cardiovascular disease, diabetes, musculoskeletal, autoimmune, endocrinological or neurologic disease) with either eugonadal or hypogonadal serum testosterone levels.

Intervention must include a group taking one of the following supplements – Ashwagandha, Fenugreek, Tongkat Ali.

Intervention must include a control / placebo group as a comparator.

Pre and post testing of total testosterone, body composition and muscular strength.

Intervention with a minimum duration of 4 weeks.

Published in English.

Exclusion criteria are:

Case studies, reviews or retrospective studies.

Participants taking any type of androgen therapy.

Interventions using a combination of supplement components or blends of supplement components.

Studies which do not include a control / placebo group as a comparator.

Studies which did not report on required data.

Study designs to be included Cross sectional randomised controlled trials.

Eligibility criteria

Inclusion criteria are:

Randomised controlled trials

Participants aged over 18 years

Participants are healthy males (free from conditions including cardiovascular disease, diabetes, musculoskeletal, autoimmune, endocrinological or neurologic disease) with either eugonadal or hypogonadal serum testosterone levels.

Intervention must include a group taking one of the following supplements – Ashwagandha, Fenugreek, Tongkat Ali.

Intervention must include a control / placebo group as a comparator.

Pre and post testing of total testosterone, body composition and muscular strength.

Intervention with a minimum duration of 4 weeks.

Published in English.

Information sources Cochrane Library, Scopus, SPORTDiscus, MEDLINE and Web of Science. Additionally, a manual search for published studies in Google Scholar will be conducted.

Search will be performed in July 2024

Search will be restricted to article published since 1990.

Articles in English only will be selected.

Main outcome(s) Baseline to post intervention:

Changes to total testosterone (measured in nmol/L, ng/dL, etc).

Changes to body composition relating to variation in fat free / lean mass or fat mass or percent.

Changes to muscular strength – 1RM (or RM range), grip strength, changes to strength measured in kilograms.

Additional outcome(s) N/A.

Data management The relevant studies were identified through database searches of Cochrane Library, Scopus, SPORTDiscus, MEDLINE and Web of Science by the primary author (JE). Reference lists of relevant papers will also be examined to locate additional studies that were not identified by the initial database search.

All identified studies were exported to COVIDENCE and initial screening carried out by two authors (JE and AM) to exclude irrelevant and duplicate titles. A third author (MM) reviewed conflicts. Data from each study will be extracted and entered into a spreadsheet, which include the following: study, year, study characteristics (design, duration, country), participant characteristics (number of participants, age), supplement characteristics (ingredient and dosage), baseline and post intervention outcome measures including total testosterone, muscular strength and body composition changes (fat free mass and fat mass) and main results.

Quality assessment / Risk of bias analysis The risk of bias of each included study will be assessed by two review authors (JE and AM). Any disagreements will be resolved by discussion. Risk of bias will be assessed using the recommended

tools in the Cochrane Handbook for Systematic Reviews of Interventions.

Strategy of data synthesis A descriptive analysis will be conducted on the pre and post changes to the outcomes stated.

Subgroup analysis Not applicable.

Sensitivity analysis Not applicable.

Language restriction Published in English only.

Country(ies) involved Australia.

Other relevant information N/A

Keywords Testosterone; body composition; strength; ashwagandha; fengreek; tongkat ali.

Dissemination plans To be published in peer reviewed journal that has yet to be determined.

Contributions of each author

Author 1 - Julian Everett - Primary author Will carry out complete review including data extraction and management, result and data analysis and paper write up under the guidance of supervisors.

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