TESTOSURGE®

Next Generation Bioactives for Hormonal Aging

A Product By

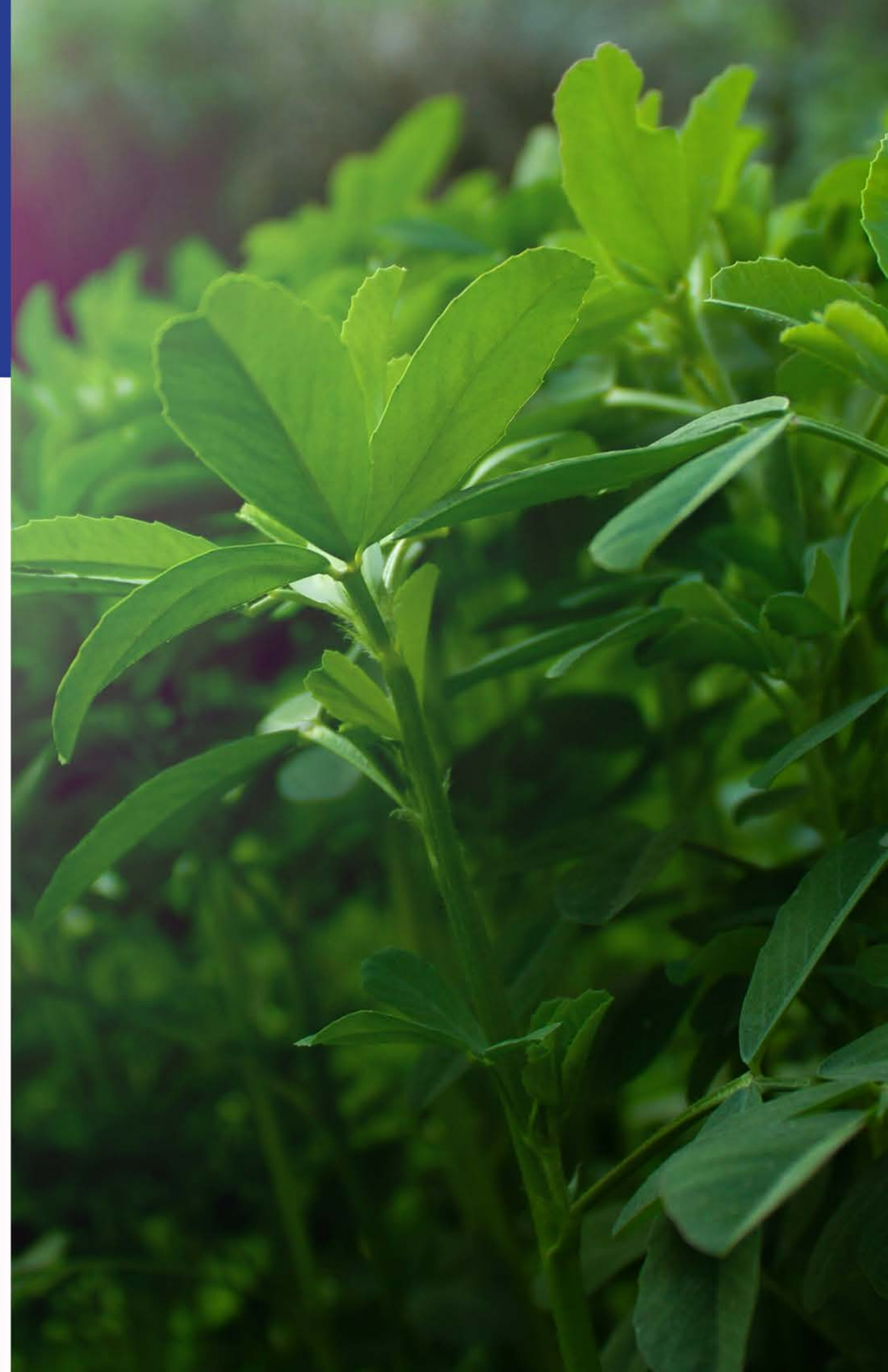
INDUS Biotech®

Science • Safety • Efficacy

www.indusbiotech.com

PRESENTATION OVERVIEW

- Overview – Indus Biotech
- What is NATRUSOLATE® Technology?
- Serendipitous event
- What is Testosterone?
- What is TESTOSURGE®?
- Scientific evidence
- Mechanism of Action
- Safety evidence
- Quality certifications
- Success stories



OUR JOURNEY

Vision

- Evolutionary memory between plants and humans
- Plant-based ingredients for chronic diseases. Food as a medicine

Challenge

Drug

- Metabolic Toxicity
- Off-target Toxicity

Focus

- Moved from botanical drugs to nutraceuticals
- Plant-derived compounds for preservation of health & long-term wellness

Where are we now

- Manufacturing clinically tested ingredients from food raw materials

ENABLING HEALTHY LIVING THROUGH INNOVATION AND EVIDENCE BASED CONSUMER HEALTHCARE PRODUCTS

GLOBAL PATENTS
222

HUMAN CLINICAL STUDIES
38

TOXICOLOGY STUDIES
48

PEER REVIEWED PUBLICATIONS
103

FOOD CAN BE MEDICINE

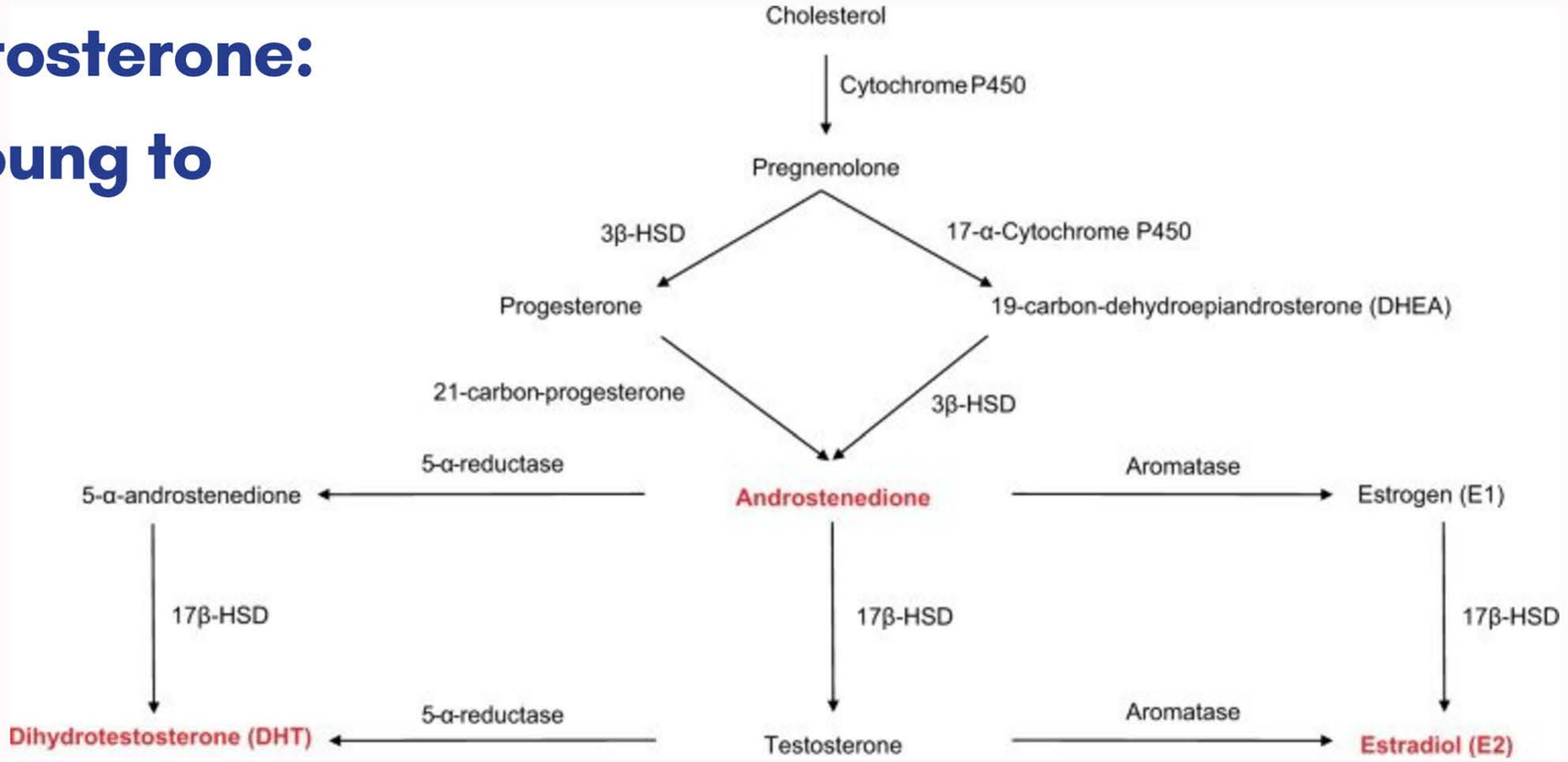
MEN'S HEALTH

WOMEN'S HEALTH

SPORT NUTRITION

GENERAL WELLNESS

Understanding Testosterone: Life Stages from Young to Aging Population



1.Martin & Touaibia (2020). Antioxidants (Basel, Switzerland), 9(3), 237.

There is a need for creating a platform of **'test optimizers'** for different life stages based on the need for that generation

YOUTH / ATHLETES

Boosting T levels for **optimum performance**

MARRIED POPULATION

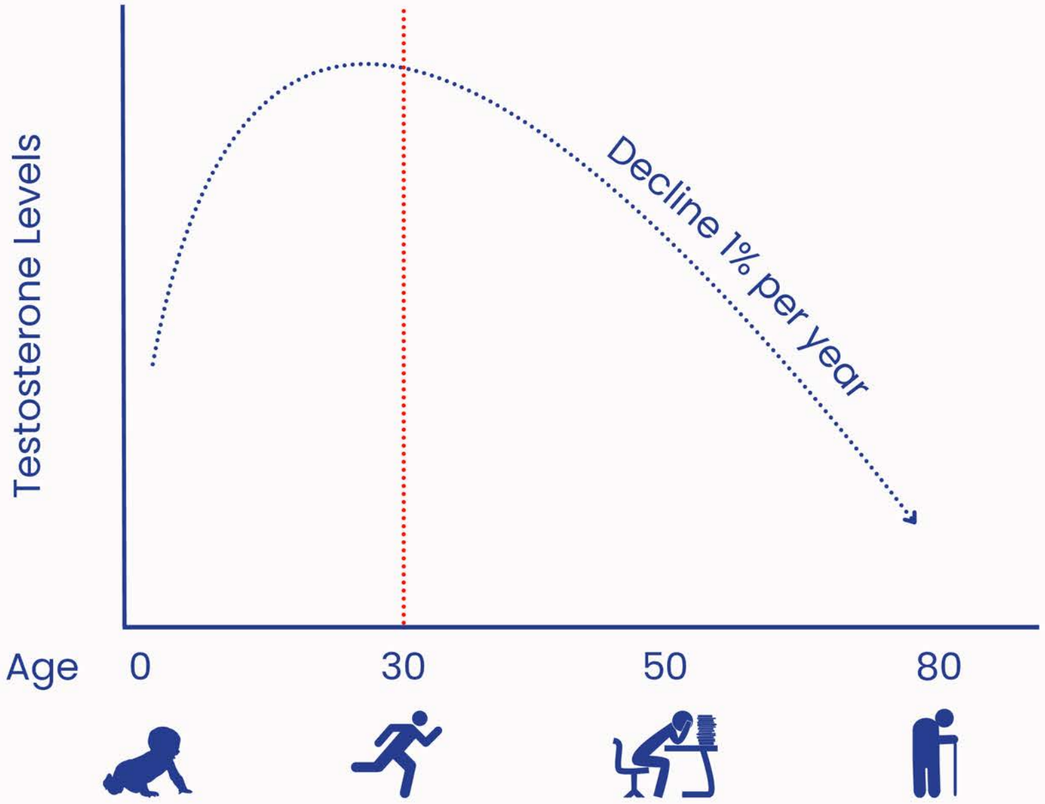
Boosting T levels for **sexual health**

MIDDLE AGE

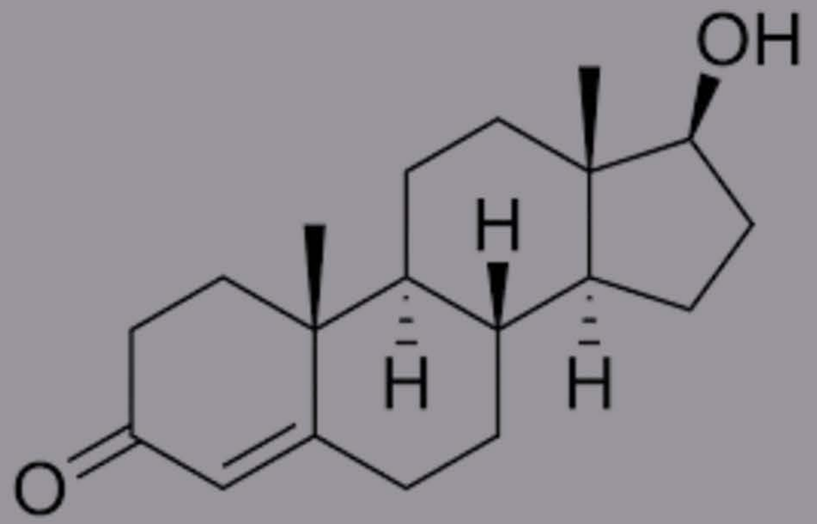
Boosting T levels for **vitality**

AGED POPULATION

Optimal T levels for **bone health & prostate health**



AGING	**METABOLIC SYNDROME**	**MEDICATION**
	STRESS	**COVID-19**



T-Pandemic

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SERENDIPITOUS DISCOVERY

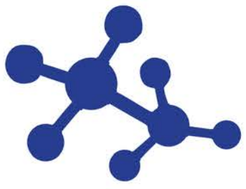
2001

Drug development for Rheumatoid Arthritis

2003

Fenugreek's Aphrodisiac properties

2004



Identification of Bioactives

2006

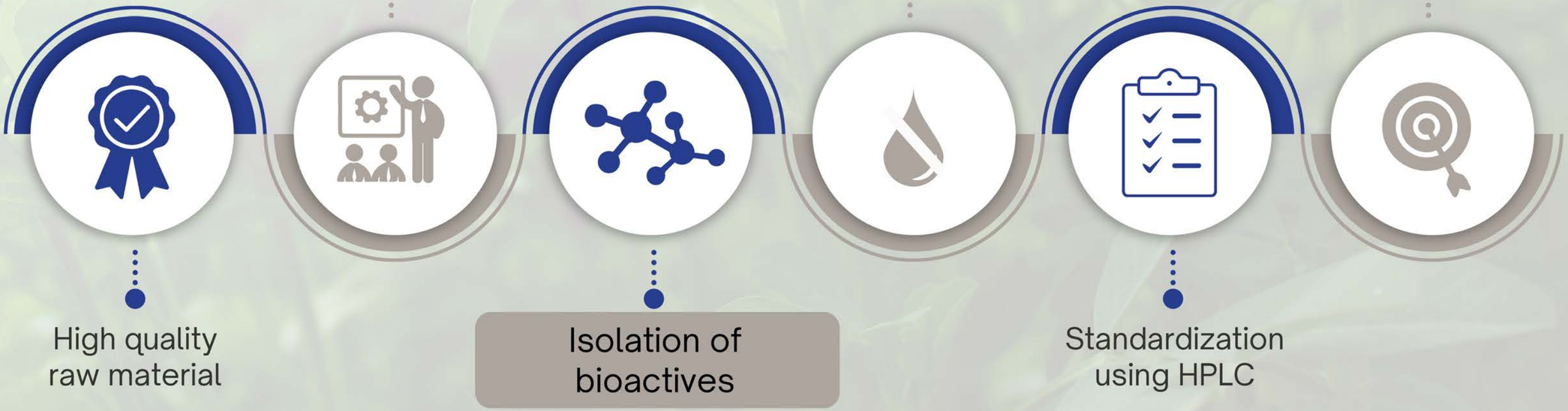
Efficacy finding 1st Human Clinical study

2025

Standardized clinically tested ingredients from various food chain raw materials

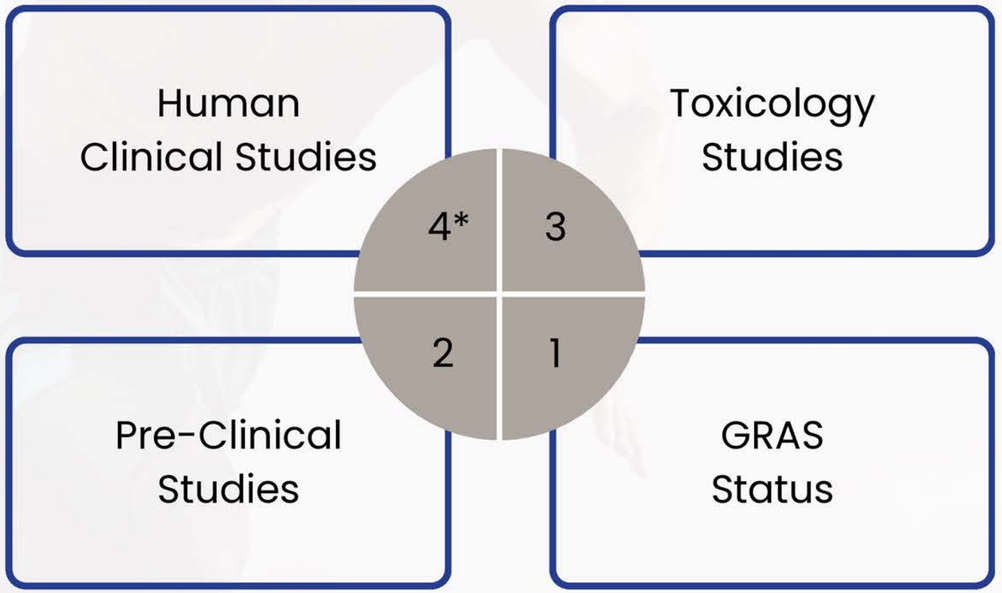
NATRUSOLATE

A Revolutionary Extraction Technology



TESTOSURGE

- Clinically proven to increase free, bioavailable and total testosterone in men
- Acts within 10 hours of consumption
- Only ingredient that tackles Men’s Health from 6 different pathways
- Strong Science certified based on strength of published clinical studies
- Informed Ingredient & BSCG (Banned Substances Control Group) certified
- 90 day toxicology study



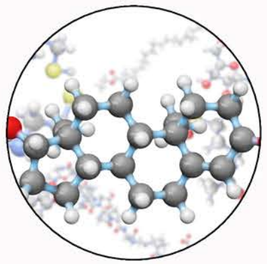
** 2 published trials and 2 more trial results expected in Q1 FY26*

Specification: not less than 80% Glycosides

**Most purest & unmatched form available in the market*

FENUGREEK SEED

NOT LESS THAN 80% GLYCOSIDES



INCREASES TESTOSTERONE

Benefits of Optimal Testosterone Levels

- Sexual Health
- Muscle mass
- Cardiovascular Health
- Weight Management
- Healthy Aging
- Immunity
- Energy

Human Clinical Study 1

Study Objective	To assess serum testosterone levels in healthy volunteers at a single dose of 600 mg Testosurge
Study Design	Crossover study
Study Centre	India
Study Population	16 participants (7 days of washout with 2 study periods of 10 h each)
Dosage	600 mg (two capsules of 300 mg) once
Primary Outcome	Serum free testosterone (directly measured (mFT) and calculated (cFT)
Secondary Outcome	Total testosterone (TT), Calculated Bioavailable testosterone (BT), Vital signs, Adverse events (AE)

ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES Knowledge to Innovation

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Research Article

EFFECTS OF GLYCOSIDES BASED FENUGREEK SEED EXTRACT ON SERUM TESTOSTERONE LEVELS OF HEALTHY SEDENTARY MALE SUBJECTS: AN EXPLORATORY DOUBLE BLIND, PLACEBO CONTROLLED, CROSSOVER STUDY

MAHESH MOKASHI[1], RENU SINGH-MOKASHI[2], VISHWARAMAN MOHAN[2], PRASAD THAKURDESAI[2]

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Received: 24 March 2014, Revised and Accepted: 21 April 2014

ABSTRACT

Objective: To evaluate acute effects of IND9 supplementation on serum testosterone levels in healthy sedentary male subjects. Methods: The study was designed as randomized, double blind, placebo controlled, two period, crossover study with 7 days of washout period using single study center. Sixteen healthy male subjects were randomized and received single dose of 600 mg (two capsules of 300 mg) of either IND9 or matching placebo capsules during each of the 2 study periods of 10 h each. Blood samples were collected three times at 3 h, 7 h and 10 h. The outcome measures were measurement of serum free testosterone (mFT) and total testosterone (TT), calculated levels of free testosterone (cFT), bioavailable testosterone (BT) levels and safety parameters. Results: During the study period, significant time-dependent interactions were found for mFT and cFT levels (within Placebo and IND9 supplemented arms), BT levels (within IND9 but not in Placebo arm) and TT levels (none of the arms). Two-way ANOVA of data of change from baseline at 10 h showed no significant interactions between the treatments and periods (absence of crossover effect) for all measures. Pairwise comparisons between change from baseline data (at 10 h) by unpaired 't' test showed significant increase in TT, BT and cFT but not in mFT levels in IND9 arm as compared to respective levels in placebo arm. The supplementation of IND9 and placebo was found to be safe and well-tolerated. All values were found within physiological limits. Conclusion: Acute administration of IND9 capsule supplementation to sedentary males showed potential androgenic benefits with good safety profile.

Keywords: Fenugreek seed extract, serum testosterone, Bioavailable, healthy sedentary subjects

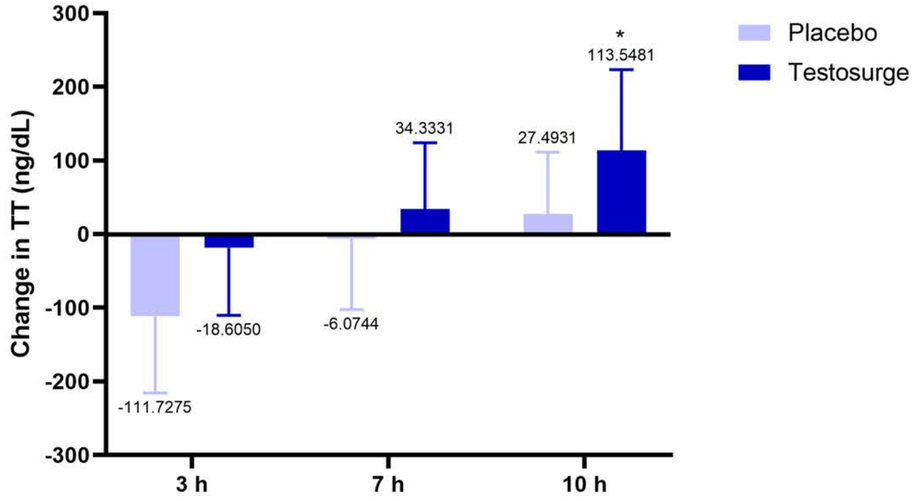
Mokashi et al. (2014). Asian Journal of Pharmaceutical and Clinical Research, 7(7), 177–181.

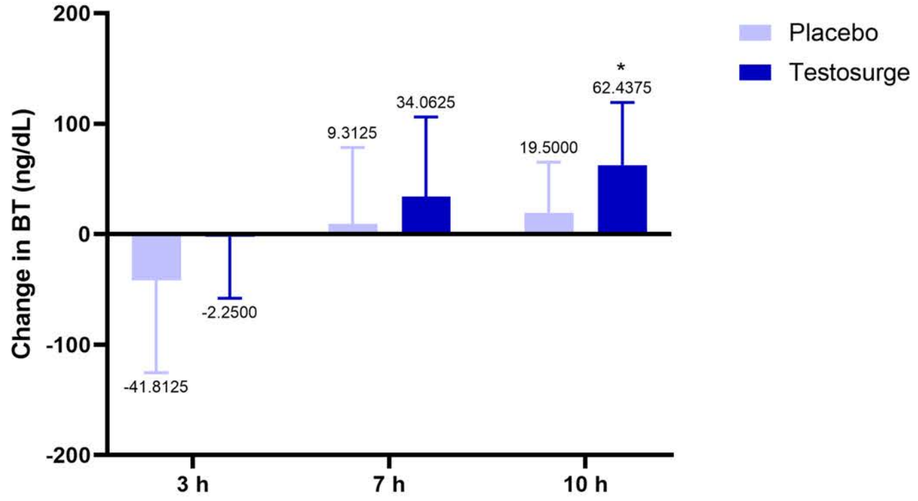
Human Clinical Study 1

A crossover study to assess the effects of TESTOSURGE® on Serum Testosterone levels of healthy sedentary male subjects

Outcomes

600 mg of TESTOSURGE resulted in a significant increase in the changes observed in calculated Free Testosterone, Bioavailable Testosterone, and Total Testosterone levels from baseline measurement after a period of 10 hours post-administration.





Human Clinical Study 2

Study Objective	To assess serum testosterone levels in healthy volunteers at a single dose of 500 mg Testosurge.
Study Design	Double-blind, randomized, placebo-controlled study
Study Centre	USA
Study Population	30 resistance-trained males.
Dosage	500 mg once daily for 8 weeks.
Outcome	Body composition, Upper and lower body one-repetition-maximum (1RM) strength, Fasting clinical blood profiles (substrates, electrolytes, muscle and liver enzymes, red cells, white cells), Anabolic hormones (total testosterone, bioavailable testosterone, dihydrotestosterone, estradiol)

International Journal of Sport Nutrition and Exercise Metabolism, 20, 2010, 457-465

Effects of a Purported Aromatase and 5 α-Reductase Inhibitor on Hormone Profiles in College-Age Men

Colin Wilborn, Lem Taylor, Chris Poole, Cliffa Foster, Darryn Willoughby, and Richard Kreider

The purpose of this study was to determine the effects of an alleged aromatase and 5-α reductase inhibitor (AI) on strength, body composition, and hormonal profiles in resistance-trained men. Thirty resistance-trained men were randomly assigned in a double-blind manner to ingest 500 mg of either a placebo (PL) or AI once per day for 8 wk. Participants participated in a 4-d/wk resistance-training program for 8 wk. At Weeks 0, 4, and 8, body composition, 1-repetition-maximum (1RM) bench press and leg press, muscle endurance, anaerobic power, and hormonal profiles were assessed. Statistical analyses used a 2-way ANOVA with repeated measures for all criterion variables ($p \le .05$). Significant Group × Time interaction effects occurred over the 8-wk period for percent body fat (AI: –1.77% ± 1.52%, PL: –0.55% ± 1.72%; $p = .048$), total testosterone (AI: 0.97 ± 2.67 ng/ml, PL: –2.10 ± 3.75 ng/ml; $p = .018$), and bioavailable testosterone (AI: 1.32 ± 3.45 ng/ml, PL: –1.69 ± 3.94 ng/ml; $p = .049$). Significant main effects for time ($p \le .05$) were noted for bench- and leg-press 1RM, lean body mass, and estradiol. No significant changes were detected among groups for Wingate peak or mean power, total body weight, dihydrotestosterone, hemodynamic variables, or clinical safety data ($p > .05$). The authors concluded that 500 mg of daily AI supplementation significantly affected percent body fat, total testosterone, and bioavailable testosterone compared with a placebo in a double-blind fashion.

Keywords: fenugreek, anabolic, resistance training

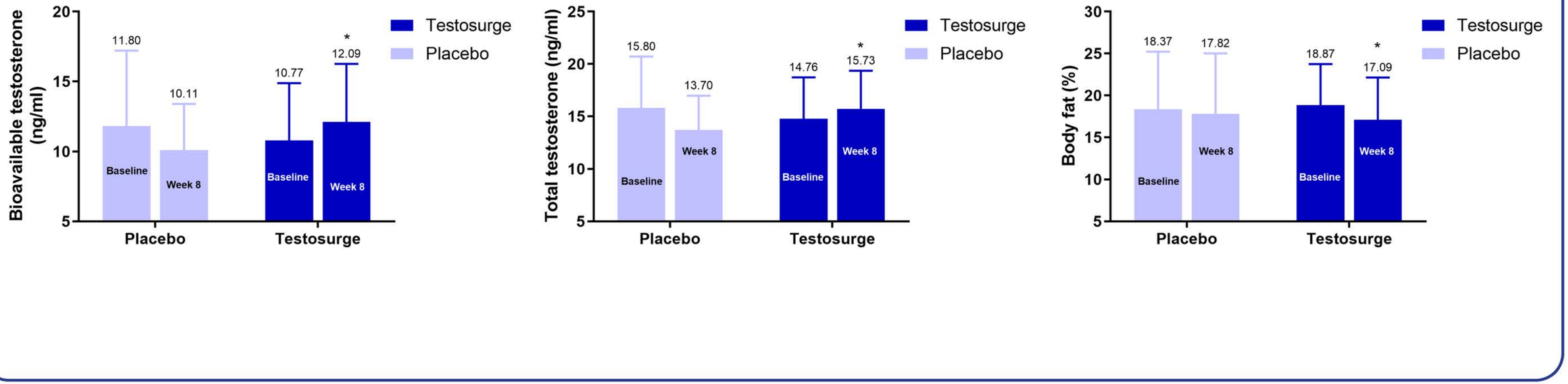
Wilborn, C., et al. (2010). International journal of sport nutrition and exercise metabolism, 20(6), 457–465.

Human Clinical Study 2

Effects of TESTOSURGE on strength, body composition and hormonal profiles during an 8-week resistance training program.

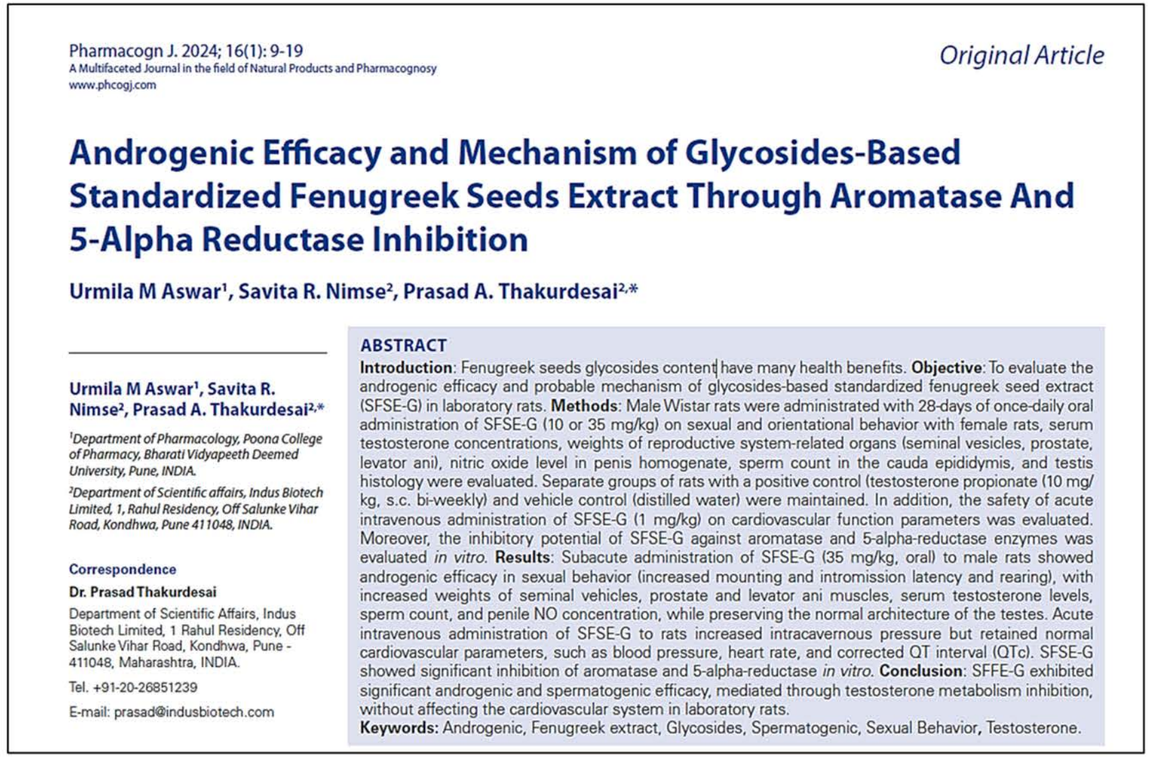
Outcomes

500 mg of daily TESTOSURGE supplementation significantly impacted Body Fat Percentage, Total Testosterone and Bioavailable Testosterone. Reduction in Body fat by 1.8% vs 0.5% in the placebo group



Pre-Clinical Study 1 - Spermatogenesis *(without stress induction)*

Study Objective	Effect of Testosurge in presence of Endogenous Testosterone	Total sperm count & motility
Animal	Male Wistar rats (non-castrated)	Male Wistar rats (non-castrated)
Dosage	Testosurge daily for 4 weeks	Testosurge daily for 4 weeks
Result	↑ serum testosterone levels in presence of endogenous testosterone	↑ total and normal sperm number (motile sperm)



Pharmacogn J. 2024; 16(1): 9-19
A Multifaceted Journal in the field of Natural Products and Pharmacognosy
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Original Article

Androgenic Efficacy and Mechanism of Glycosides-Based Standardized Fenugreek Seeds Extract Through Aromatase And 5-Alpha Reductase Inhibition

Urmila M Aswar[1], Savita R. Nimse[2], Prasad A. Thakurdesai[2,*]

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ABSTRACT

Introduction: Fenugreek seeds glycosides content have many health benefits. **Objective**: To evaluate the androgenic efficacy and probable mechanism of glycosides-based standardized fenugreek seed extract (SFSE-G) in laboratory rats. **Methods**: Male Wistar rats were administrated with 28-days of once-daily oral administration of SFSE-G (10 or 35 mg/kg) on sexual and orientational behavior with female rats, serum testosterone concentrations, weights of reproductive system-related organs (seminal vesicles, prostate, levator ani), nitric oxide level in penis homogenate, sperm count in the cauda epididymis, and testis histology were evaluated. Separate groups of rats with a positive control (testosterone propionate (10 mg/kg, s.c. bi-weekly) and vehicle control (distilled water) were maintained. In addition, the safety of acute intravenous administration of SFSE-G (1 mg/kg) on cardiovascular function parameters was evaluated. Moreover, the inhibitory potential of SFSE-G against aromatase and 5-alpha-reductase enzymes was evaluated *in vitro*. **Results**: Subacute administration of SFSE-G (35 mg/kg, oral) to male rats showed androgenic efficacy in sexual behavior (increased mounting and intromission latency and rearing), with increased weights of seminal vehicles, prostate and levator ani muscles, serum testosterone levels, sperm count, and penile NO concentration, while preserving the normal architecture of the testes. Acute intravenous administration of SFSE-G to rats increased intracavernous pressure but retained normal cardiovascular parameters, such as blood pressure, heart rate, and corrected QT interval (QTc). SFSE-G showed significant inhibition of aromatase and 5-alpha-reductase *in vitro*. **Conclusion**: SFFE-G exhibited significant androgenic and spermatogenic efficacy, mediated through testosterone metabolism inhibition, without affecting the cardiovascular system in laboratory rats.

Keywords: Androgenic, Fenugreek extract, Glycosides, Spermatogenic, Sexual Behavior, Testosterone.

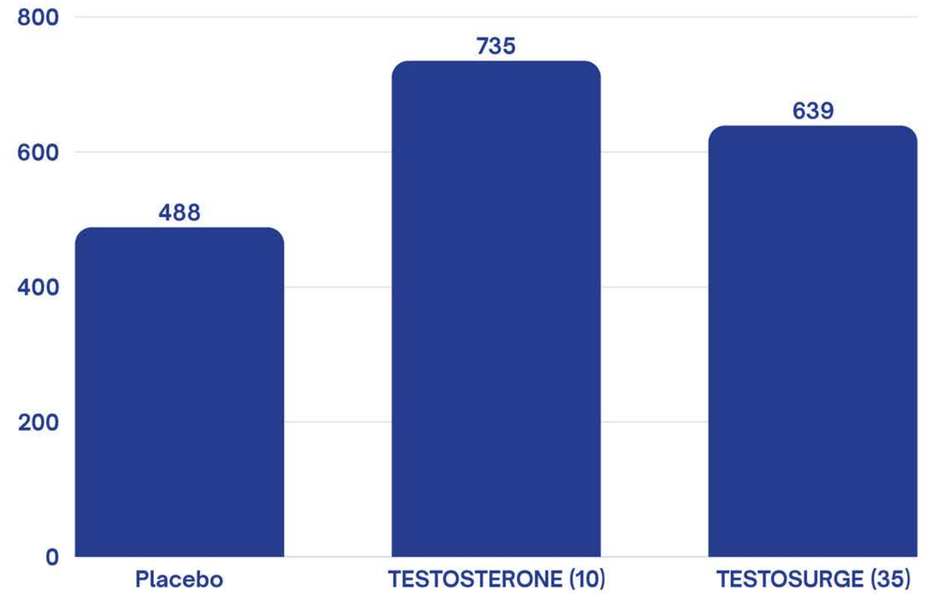
Aswar et al. (2024). Pharmacognosy Journal.16(1): 9-19.

Pre-Clinical Study 1 - Spermatogenesis *(without stress induction)*

Comparative study of Testosurge (35 mg/KG) & Testosterone (10 mg/KG) to assess the effects on total sperm count & motility.

Outcomes

Treatment with Testosurge (35 mg/KG) increased total number of sperms and the number of normal sperms was increased.



	Control	Testosterone (10)	Testosurge (35)
Total Sperm Count	488.3 ± 17.46	753.0 ± 42.91	639 ± 24.52
Normal % of Sperms (Quantitative analysis)	85%	90%	95%
Abnormal % of Sperms (Quantitative analysis)	15%	10%	5%

Pre-Clinical Study 2 - Spermatogenesis *(with stress induction)*

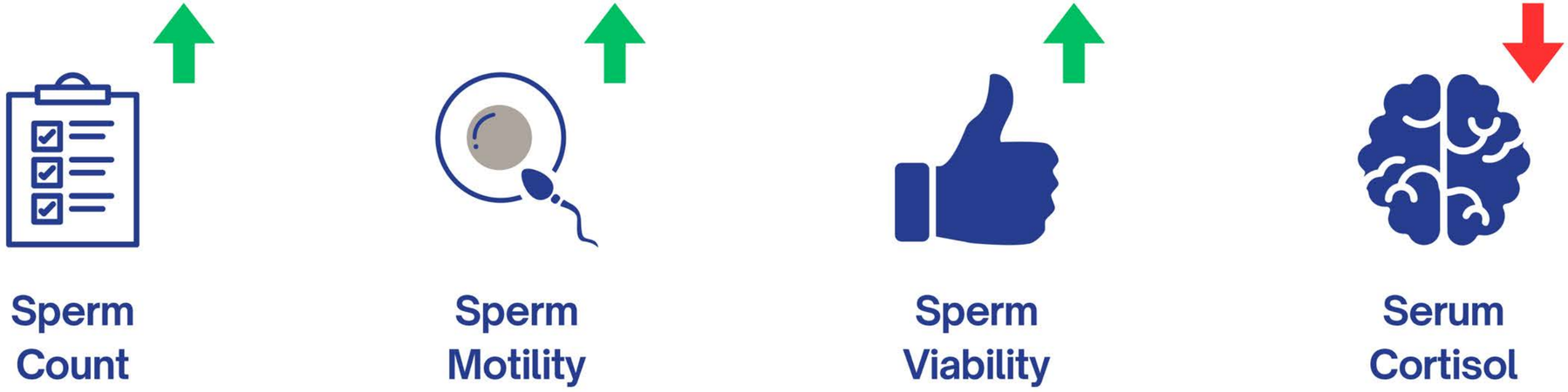
NEW SCIENCE

Effect of Testosurge on total sperm count and motility in Chronic Unpredictable Mild Stress (CUMS) induced male wistar rats

Outcomes

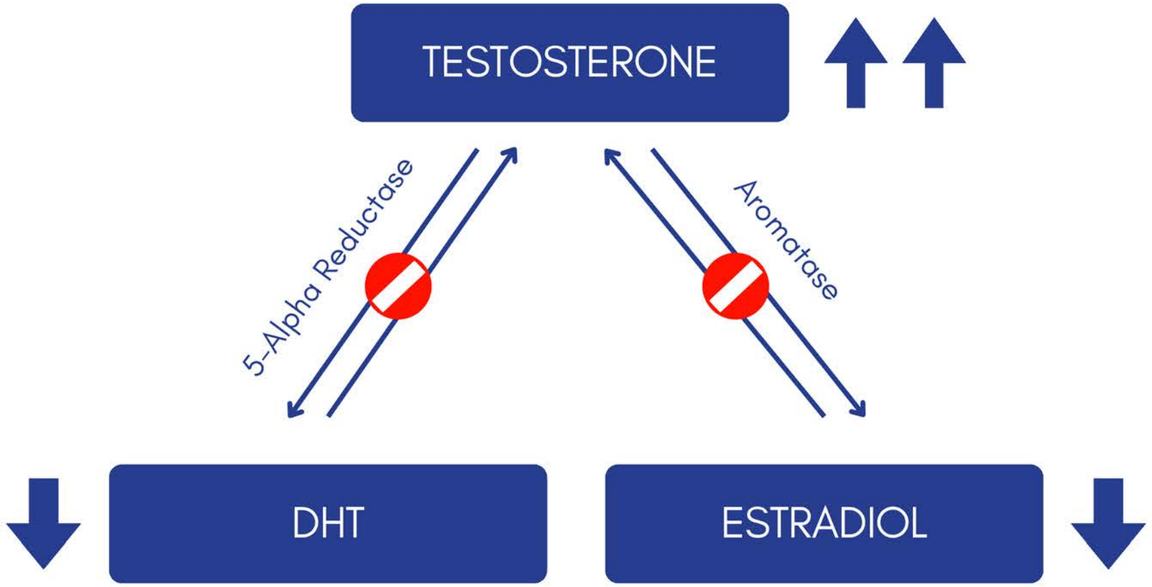
Testosurge shows significant increase in Sperm count, Motility and Viability. Also, significant reduction in Serum Cortisol levels

Study report: IBS468



In-vitro Study - Hormonal Homeostasis

Study Objective	Effect of Testosurge in inhibitory activity of 5-Alpha Reductase enzyme	Effect of Testosurge in inhibitory activity of Aromatase enzyme
Cell Model	PNT2 human prostatic epithelial cells	Human breast epithelial cells (MCF7 cell line)
Dosage	Testosurge (10 and 20µg/ml)	Testosurge (0.1 and 0.01 ng/ml)
Duration	48 Hours	48 Hours
Result	Positive inhibition of Type 2 5-Alpha Reductase	Positive inhibition of Aromatase Reductase (CYP19A1)



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Original Article

Androgenic Efficacy and Mechanism of Glycosides-Based Standardized Fenugreek Seeds Extract Through Aromatase And 5-Alpha Reductase Inhibition

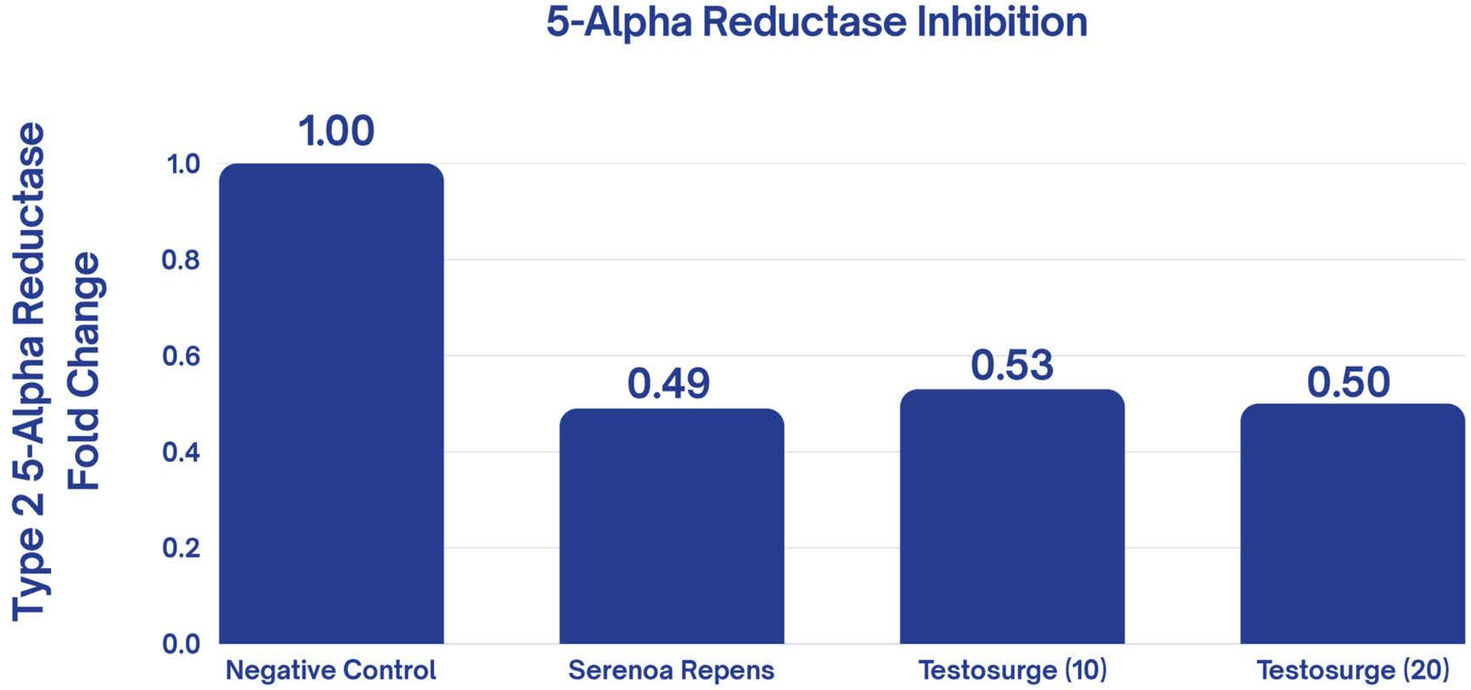
Urmila M Aswar[1], Savita R. Nimse[2], Prasad A. Thakurdesai[2,*]

Aswar et al. (2024). Pharmacognosy Journal.16(1): 9-19.

In-vitro Study - Hormonal Homeostasis *(5-Alpha Reductase Enzyme)*

Outcomes

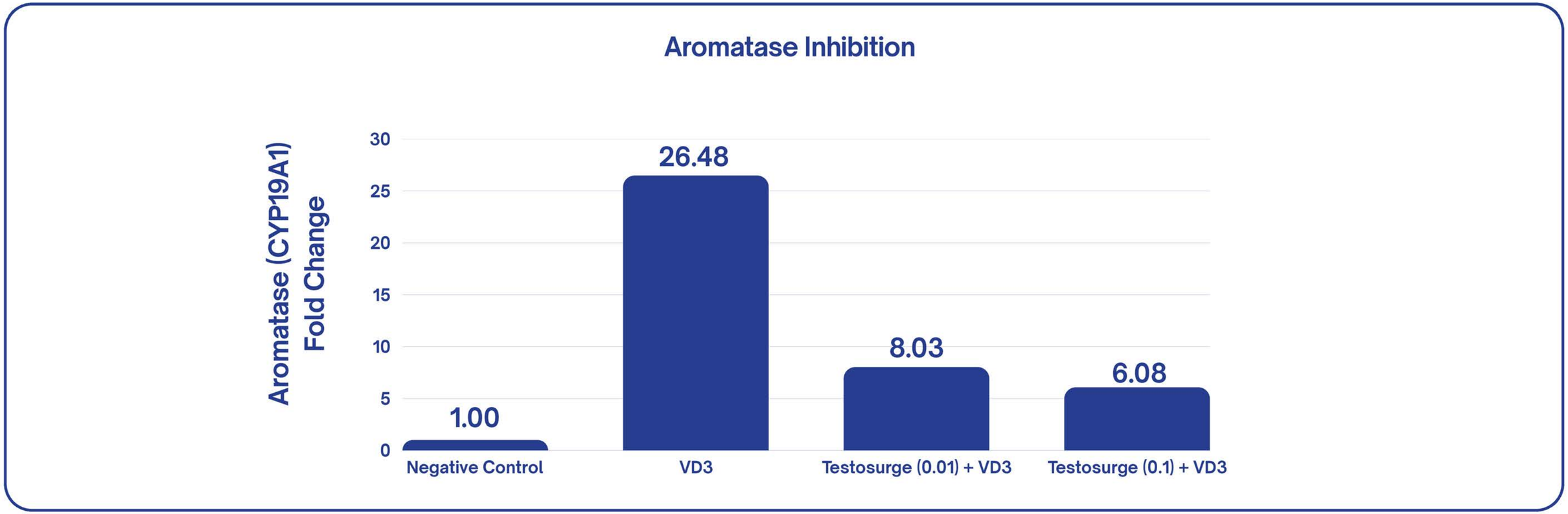
Effect of Testosurge on modulation of 5α- reductase type 2 gene expression on human prostatic epithelial cells when compared against positive control Serenoa Repens (10 µg/ml)



In-vitro Study - Hormonal Homeostasis *(Aromatase Enzyme)*

Outcomes

Effect of Testosurge on aromatase gene expression profile on human breast epithelial cells (MCF7 cell line) when compared against positive control Vitamin D3 (100 nM)



In-vitro Study - CD38+ Enzyme (NADase) Inhibitor

NEW SCIENCE

Study Objective	Comparative study of Testosurge & Apigenin (Positive control) against NAD+
Study system	Inhibition of CD38 enzyme
Dosage	0.3, 3, 30 (µg/ml)
Assessment time points	5, 15, 25, 35 minutes
Result	Positive inhibition of CD38 Testosurge (30 µg/ml) and apigenin (27 µg/ml) showed 32.51 % and 29.17 % of CD38 inhibition.

Pharmacogn J. 2023; 15(1): 90-105
A Multifaceted Journal in the field of Natural Products and Pharmacognosy
www.phcogj.com

Original Article

Characterization, Preclinical Efficacy and Toxicity Evaluations of Flavonoids Glycosides based Standardized Fenugreek Seed Extract (FEFLG)

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History

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- Review completed: 11-01-2023.
- Accepted Date: 11-01-2023.

DOI : 10.5530/pj.2023.15.13

Article Available online
http://www.phcogj.com/v15/i6

ABSTRACT

Introduction: Fenugreek seeds, a natural food chain raw material, is known to have many flavonoid glycosides. **Objective:** Characterization, preclinical efficacy, and safety evaluation of flavonoid glycoside-based standardized fenugreek seed extract (FEFLG). **Methods:** FEFLG was characterized for a group of flavonoid glycoside marker compounds by HPLC. The CD38+ enzyme inhibition efficacy was assessed *in vitro*. In addition, acute oral toxicity (AOT) and subchronic, 90-day repeated-dose oral toxicity (*in vivo*), mutagenicity (AMES test, *in vitro*) and chromosome aberration test (*in vitro*) of FEFLG were evaluated. **Results:** The FEFLG was found to have 49.85% of total flavonoid glycosides content in FEFLG (25.15% of Group 1: vitexin, isovitexin and vitexin 2-o- rhamnoside and 24.70% of Group 2 (vicenin derivatives, schaftoside, iso-schaftoside, orientin and iso-orientin). FEFLG showed CD38+ enzyme inhibition *in vitro* (IC50= 0.96 µg/ml) equivalent to the positive control, apigenin. FEFLG did not show any toxicity at an acute oral dose of more than 2000 mg/kg (median lethal dose, LD50) with a limit dose of 5000 mg/kg. The 90-day repeated-dose oral administration of FEFLG did not induce significant toxicological changes till the maximum dose of 1000 mg/kg in male and female rats, indicating no observed adverse effect level, NOAEL ≥ 1000 mg/kg. FEFLG did not show mutagenicity (up to a concentration of 5000 µg/plate) or structural chromosomal aberrations (up to 5000 µg /ml). **Conclusion:** The CD38+ enzyme inhibitor efficacy *in vitro*, oral safety *in vivo* and absence of mutagenicity or genotoxicity of FEFLG indicated its potential for anti-aging applications.

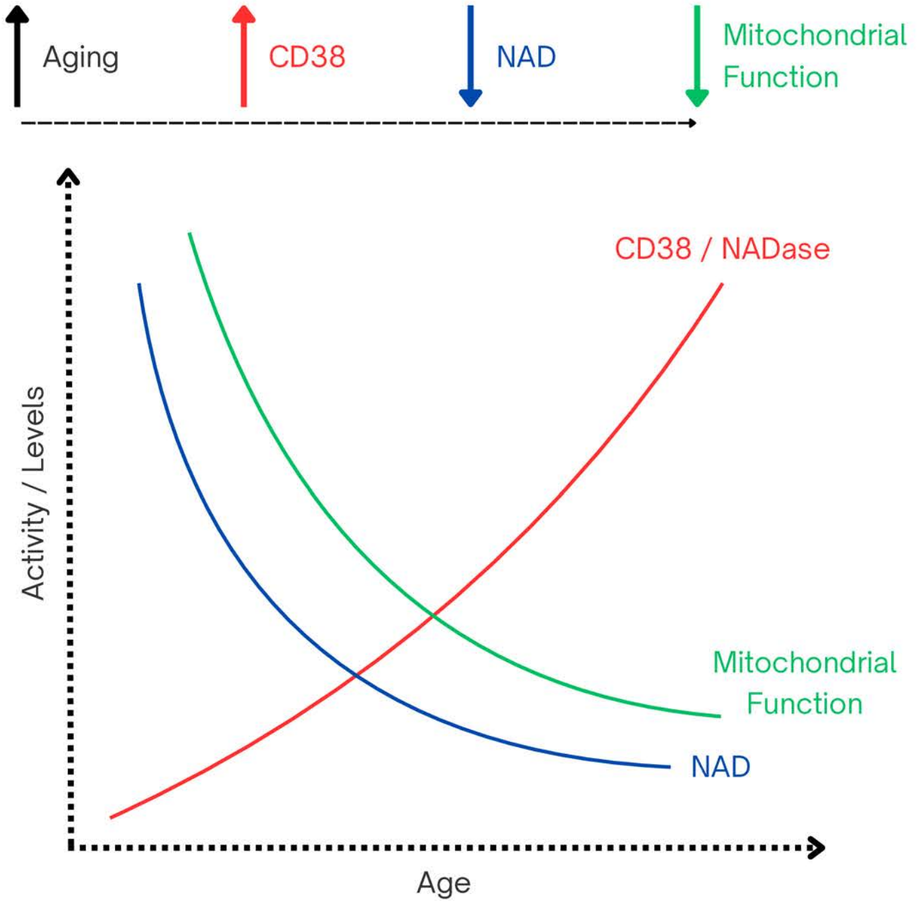
Key words: Fenugreek seeds, Flavonoid glycosides, CD38+ enzyme inhibition, Acute toxicity, Subchronic toxicity, Mutagenicity, Chromosomal aberration.

DOI : 10.5530/pj.2023.15.13

In-vitro Study - CD38+ Enzyme (NADase) Inhibitor

NEW SCIENCE

Study Objective	Comparative study of Testosurge & Apigenin (Positive control) against NAD+
Study system	Inhibition of CD38 enzyme
Dosage	0.3, 3, 30 (µg/ml)
Assessment time points	5, 15, 25, 35 minutes
Result	Positive inhibition of CD38 Testosurge (30 µg/ml) and apigenin (27 µg/ml) showed 32.51 % and 29.17 % of CD38 inhibition.



CD38 / NADase increases during aging, and causes NAD decline and subsequent mitochondrial dysfunction

Human Clinical Study 3 - Healthy Aging

NEW SCIENCE

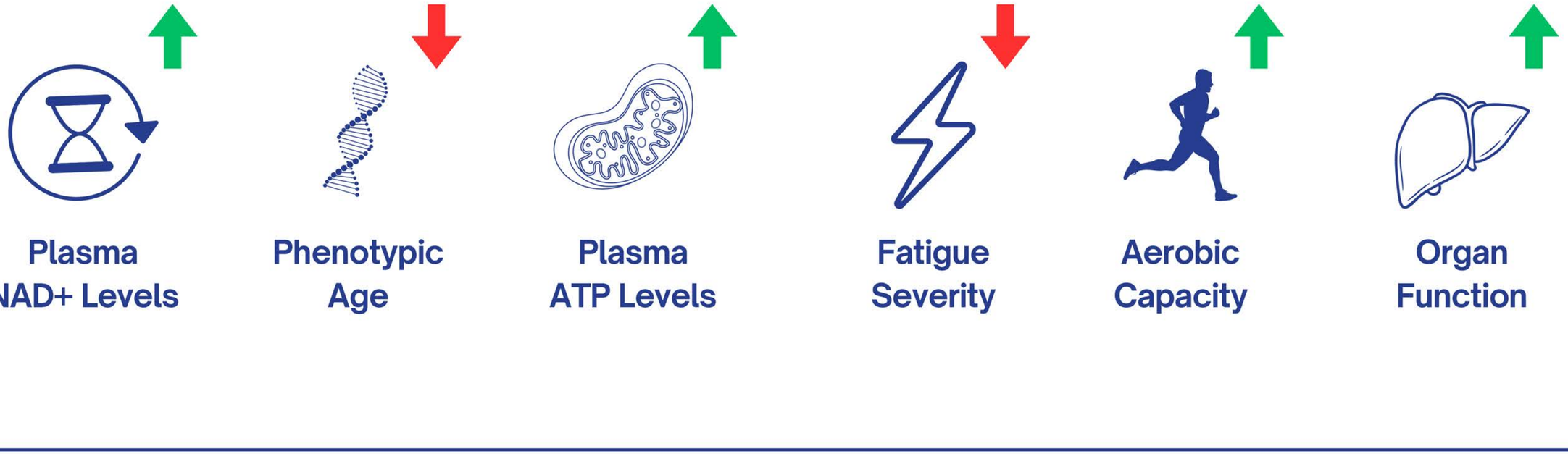
Study Objective	**To assess effect of Testosurge in aging population (45+ years)**
Study Design	Randomized, Double Blind, Placebo controlled trial, parallel arm clinical trial*
Study Centre	India
Study Population	112 participants (Men and Women) – 103 subjects completed the study
Dosage	300 mg once daily for 12 weeks
Outcome	NAD+ levels, Phenotypic age, ATP, Quality of Life (QOL), Physical fatigue, Aerobic Capacity, Leg Strength, Organ Function & Safety assessment

Human Clinical Study 3 - Healthy Aging

NEW SCIENCE

Results

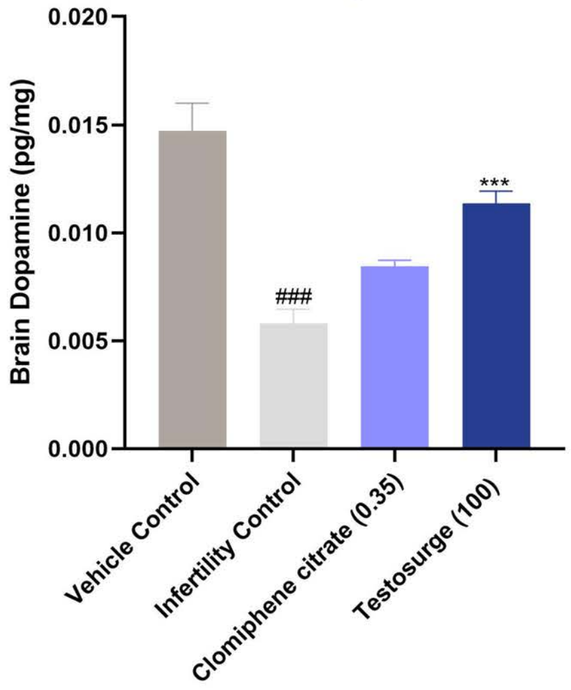
Significant increase in NAD+ and ATP levels, physical performance (6-minute walk test). Significant decrease in fatigue (Fatigue Severity Scale). Positive trend in decreasing phenotypic age (placebo showed increasing trend)

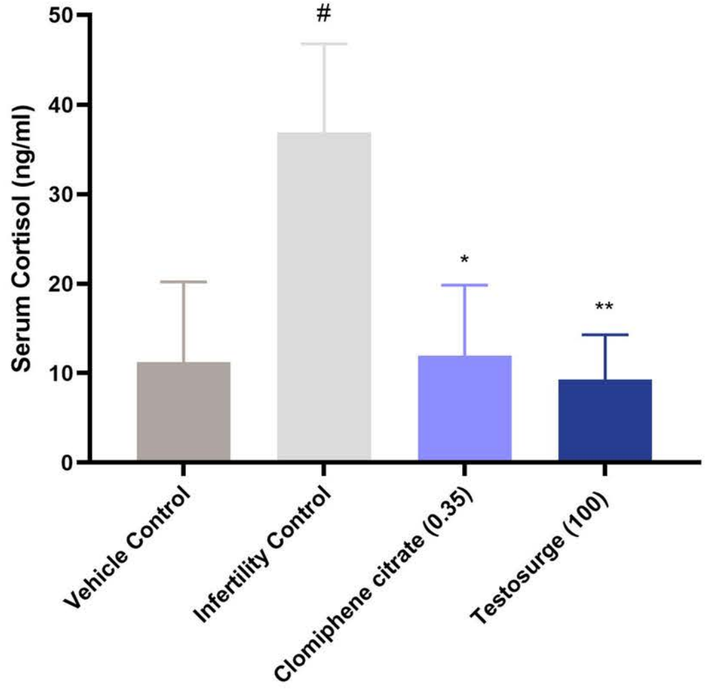


Pre-Clinical Study - Testosurge as an Adaptogen

NEW SCIENCE

- Cortisol mediates the body's immediate stress response, while dopamine regulates motivation and resilience
- Chronic Unpredictable Mild Stress (CUMS) disrupts both, causing fatigue and reduced coping ability
- Adaptogens act by normalizing HPA axis function, lowering excessive cortisol, and supporting dopaminergic signaling, thereby enhancing physiological and psychological adaptation to stress while maintaining homeostasis





Safety Evidence

Toxicity Study	Study details	Results and conclusions
Acute oral single dose toxicity (OECD No. 423)	FEFLG: 2000 mg/kg body weight oral, 14 days	Acute oral median-lethal dose (LD50) >2000 mg/rat/day.
90-day repeated dose toxicity (OECD No. 408)	FEFLG: 250, 500 and 1000 mg/kg, daily once, 28 days	No observed adverse effect level (NOAEL) > 1000 mg/kg/day in male and 500 mg/kg/day in female rats Human Equivalent Dose (HED) - 4.8 g/day
In vitro bacterial reverse mutation assay (AMES) (OECD No. 471)	FEFLG: 0, 150, 500, 1500 and 5000 µg/plate in Salmonella typhimurium	Non-mutagenic

LD50: Median lethal dose, NOAEL: No Observed Adverse Effect Level, HED: Human Equivalent Dose

Deshpande et al. (2016). Journal of Applied Pharmaceutical Science, 6(9), 179-188.

TESTOSURGE®

Holistic Approach towards Men's Health

01

EFFECTIVENESS OF TESTOSTERONE

Sex Hormone Binding Globulin

02

PRODUCTION OF TESTOSTERONE

Steroidogenesis & Spermatogenesis

03

HOMEOSTASIS MECHANISM

5-Alpha Reductase & Aromatase Inhibition

04

VASODILATION MECHANISM

PDE-5 Inhibition

05

HEALTHY AGING

CD38 Inhibition

06

ADAPTOGEN

Increase Dopamine & Reduces Cortisol

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