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Effect of *Tribulus terrestris* (Gokshura) on muscle gain in male body builders of Bangalore Urban district

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Abstract

Purpose of the study: The aim of the current study was to know the effect of *Tribulus terrestris* on muscle gain in male body builders. The participants of the study included 40 male body builders from Bangalore urban district.

Materials and Method: Forty bodybuilders of the body weight (± 75.7 to 76.8kgs) from different gyms across Bangalore urban district, and they were divided into two groups, Experimental group and placebo group, both the group followed the same exercise routine, but experimental group was given gokshura (*Tribulus terrestris*). A Common training programme for a period of 12 weeks was formed for all the participants of the study, 70% of their 1rm was initially suggested for the subjects and after 4 weeks of training an increase in 5% of 1RM was prescribed, a pre test of 1 repetition maximum in, Dead lift, bench press, and barbell squat were conducted and recorded. Subjects of the experimental group were advised to take 3gms twice a day with meal, $\frac{2}{3}$ portion of the dose was taken half an hour before work out and remaining $\frac{1}{3}$ portion of the dose being taken as post work supplement. After 12 weeks of training post test of 1 repetition maximum was conducted for both the groups and

Statistical techniques: Statistical analysis included calculation of means, SD and the results of the tests were correlated one tailed 't' test was calculated between the pre-test and post-test of both the group.

Results: The results of the study indicated, that experimental group had moderate improvement in their muscle mass for the training schedule prescribed and the food supplement Gokshura (*Tribulus terrestris*) given as treatment, but the placebo group as compared to experimental group, had relatively less changes in their muscle mass.

Keywords: *Tribulus terrestris*, body builders, Bangalore urban district

Introduction

Now a day, for the better performance in sports, the new generation athletes train harder and smarter, all of this might result in an elevated level of physical fitness; enhanced level of performance, and the attainment of social recognition. All those athletes who are training to have a great leap in their performance are pushing themselves to the extreme. The extensive training might need extra boost to take out the wear tear on the various muscles relating to the parts of the body. As everyone knows muscles play a key role in enhancing performance of an athlete, without optimum muscle percentage enhancement of the performance is not all possible, and the moment quality is also not possible. And it may lead to injuries which might permanently hamper the performance.

As in bodybuilding training, having food supplement to enhance once performance, Tribulus is hard to define. It contains protodioscin-which is understood to be the active potent nutrient responsible for this herb to be a popular one amongst athletes.

Specifically, protodioscin promotes the release of nitric oxide (does the work of Vasodilation) which increases the flow of oxygen rich blood to muscles and tissues, and enables better utilization of nutrients such as protein, carbohydrates for the better workout. At the same time protodioscin helps to stimulate the pituitary gland resulting in it producing LH or interstitial cell-stimulating hormone (ICSH) thus promoting higher testosterone level to get increased. Apart from contributing to a boost in testosterone levels of an Individual, *Tribulus terrestris* might also boost stamina during a workout and helping post workout muscle recovery.

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Hard muscle gainers are often in search of supplements that may give them an extra help in the gym and in competition. *Tribulus terrestris* is also called as puncture vine commonly used in most of the Ayurvedic medicines that have become a popular bodybuilding supplement in most of the places. Supplement manufacturing company's claim *T. terrestris* boosts the levels of testosterone and lean muscle mass and initiates the release of nitric oxide, a chemical that helps blood vessels to expand (Vasodilation) and deliver oxygen and other nutrients to working muscles for their efficient work. Experiments on animals showed an increase in their level of testosterone, the release of the chemical nitric oxide might be responsible for the other physiological effects leading for the muscle growth

Consumption of *T. terrestris* depends on an Individual's goal; Sturtz stated hard gainers looking forward to enhance their physical performance in the gym via increased nitric oxide production used *T. terrestris* as a pre-workout supplement. And for the said purpose, athletes typically took, 60 minutes prior to their concerned workout, in an empty stomach. Many of the bodybuilders experimented *T. terrestris* with creatine monohydrate by mixing both powders together in the same proportion in 16 ounces of juice and drinking prior to workouts. Led to the enhancement of their performance. For better results *T. terrestris* had lead to increase the percentage of lean muscle mass when gaining muscles mass and to retain lean muscle mass during gaining the required definition of muscles. For the said purpose, it is advised to take three times

daily, 30 minutes before a meal.

Methodology

Forty bodybuilders of the body weight (± 75.7 to 76.8kgs) form different gyms across Bangalore urban district, and they were divided into two groups, Experimental group and placebo group, both the group followed the same exercise routine, but experimental group was given gokshura (*Tribulus terrestris*) apparently healthy individuals participated as volunteers in this study. After being previously cleared about the objectives of the investigation and procedures they would be submitted to, the individuals signed a free and cleared consent term, they were briefed thoroughly of the effect of the study and their positive opinion was taken. A Common training programme for a period of 12weeks was formed for all the participants of the study, 70% of their 1rm was initially suggested for the subjects and after 4weeks of training an increase in 5% of 1RM was prescribed, a pre test of 1 repetition maximum in, Dead lift, bench press, and barbell squat were conducted and recorded. Subjects of the experimental group were advised to take 3gms twice a day with meal, $\frac{2}{3}$ portion of the dose was taken half an hour before work out ad remaining $\frac{1}{3}$ portion of the dose being taken as post work supplement, After 12 weeks of training post test of 1 repetition maximum was conducted for both the groups and the results of the tests were correlated one tailed 't' test was calculated between the pre-test and post-test of both the group.

Table 1: Training protocol for experimental group is as follows:

Main Goal: Build Muscle	Training Level: Intermediate
Program Duration: 12 Weeks	Days Per Week: 4 Days
Time Per Workout: 45-60 Mins	Equipment: Barbell, Bodyweight,
Designer of the programme: Author Himself	Cables, Dumbbells, EZ Bar, Machines

Table 2: 95% Two-Sided Hypothesis Test for Paired Sample Comparisons of Dead lift Pre-Post of Experimental group

Day 1: Lower Body (Hamstring & Glute Focused)		
Exercise	Sets	Reps
Deadlifts	3	6 - 12
Barbell Hip Thrusts	3	6 - 12
Nordic Ham Curls	3	6 - 12
Leg Curl	3	6 - 12
Hyperextension (Glute-Focused)	3	6 - 12
Day 2: Upper Body (Push Focused)		
Exercise	Sets	Reps
Incline Dumbbell Press	3	6 - 12
Push Up	3	6 - 12
Pec Dec Fly	3	6 - 12
Seated Dumbbell Press	3	6 - 12
Lateral Raise	3	6 - 12
Seated Overhead EZ Bar Tricep Extension	3	6 - 12
Day 3: Lower Body (Quad & Calf Focused)		
Exercise	Sets	Reps
Squat	3	6 - 12
Dumbbell Lunge	3	6 - 12
Leg Press	3	6 - 12
Leg Extension	3	6 - 12
Seated Calf Raise	3	6 - 12
Day 4: Upper Body (Pull Focused)		
Exercise	Sets	Reps
Bent Over Row	3	6 - 12
Seated Cable Row	3	6 - 12
Lat Pull Down	3	6 - 12
Standing Cable Reverse Fly	3	6 - 12
Barbell Curl	3	6 - 12
Reverse Dumbbell Curl	3	6 - 12

The subjects were instructed to a five-minute warm up exercises in cross trainer with medium load at velocity of 54 rpm. Furthermore, each exercise was preceded of a series of warm up exercises (8-12 RM) with approximately 70% of the load estimated for the first attempt in the 1-RM test. The testing started five minutes after specific warm up exercise. The load registered as the 1-RM was that in which the individual could complete only one single repetition maximum. It is worth stating that the execution proper form and exercise technique were standardized and continuously monitored in an attempt to assure the test efficiency. After 4 weeks of training 5% of improvisation in 1rm was done. All exercises were performed in three sets of 6-12 repetition maximums (RM). The rest interval was between series was of 1-1.5 mints and the recovery between exercises was of 2mints to 3mints, the subjects were told to try to perform each movement in the concentric phase within two to three seconds and in the eccentric phase within three to five seconds.

Data analysis and results

Statistical analysis

We used paired t test to compare pre and post test results of experimental as well as placebo group. Shapiro-Wilk test was used to test the assumption of normal distribution. Study results was interpreted to be significant at $P < 0.05$.

Paired t test results Experimental group

Twenty male body builders were (50%) progressed with 12 weeks of weight training along with Gokshura (*Tribulus terrestris*) and table-3 of paired t-test results showed, t stat value of Bench press (-7.474) was greater than t critical value (2.101) table-4 of Dead lift results also showed, t stat value (-13.08) was greater than the t critical value (2.101) and table-5 squat results also stated, t stat value (-11.161) was greater than the t critical value (2.101) the null hypothesis was rejected, Hence there was a significant difference found between pre and post test results of Bench press, Dead lift and squat of experimental group.

Table 3: 95% Two-Sided Hypothesis Test for Paired Sample Comparisons of Bench press Pre-Post of Experimental group

H₀: δ₀ = 0			
H₁: δ₀ <> 0			
	Difference	92	102
Mean	-13.95	96.58	110.53
Standard Deviation	8.134	4.538	7.042
Variance	66.16	20.59	49.60
Sample Size	19		
Degrees of Freedom	18		
Alpha	0.05		
t _(0.025, 18)	2.101		
Lower Confidence Level	-17.87		
Upper Confidence Level	-10.03		
t	-7.474		
p value	0.0000		

Table 4: 95% Two-Sided Hypothesis Test for Paired Sample Comparisons of Dead lift Pre-Post of Experimental group

H₀: δ₀ = 0			
H₁: δ₀ <> 0			
	Difference	142	181
Mean	-31.58	142.2	173.8
Standard Deviation	10.52	3.293	12.255
Variance	110.7	10.84	150.18
Sample Size	19		
Degrees of Freedom	18		
Alpha	0.05		
t _(0.025, 18)	2.101		
Lower Confidence Level	-36.65		
Upper Confidence Level	-26.51		
t	-13.083		
p value	0.0000		

Table 5: 95% Two-sided hypothesis test for paired sample comparisons of squat pre-post of experimental group

H₀: δ₀ = 0			
H₁: δ₀ <> 0			
	Difference	121	156
Mean	-23.68	126.5	150.2
Standard Deviation	9.250	5.026	6.836
Variance	85.56	25.26	46.73
Sample Size	19		
Degrees of Freedom	18		
Alpha	0.05		
t _(0.025, 18)	2.101		
Lower Confidence Level	-28.14		
Upper Confidence Level	-19.23		
t	-11.161		
p value	0.0000		

Twenty male body builders were (50%) progressed with only 12 weeks of weight training table-6 of paired t-test results showed, t stat value of Bench press (-11.978) was greater than t critical value (2.101) table-7 of Dead lift results also showed, t stat value (-25.342) was greater than the t critical

value (2.101) and table-8 squat results also stated, t stat value (-12.333) was greater than the t critical value (2.101) the null hypothesis was rejected, Hence there was a significant difference found between pre and post test results of Bench press, Dead lift and squat of placebo group.

Table 6: 95% Two-Sided Hypothesis Test for Paired Sample Comparisons of Bench press Pre-Post of Placebo group

H₀: δ₀ = 0			
H₁: δ₀ <> 0			
	Difference	91	105
Mean	-13.47	91.84	105.32
Standard Deviation	4.903	1.537	5.186
Variance	24.04	2.363	26.895
Sample Size	19		
Degrees of Freedom	18		
Alpha	0.05		
t _(0.025, 18)	2.101		
Lower Confidence Level	-15.84		
Upper Confidence Level	-11.11		
t	-11.978		
p value	0.0000		

Table 7: 95% Two-Sided Hypothesis Test for Paired Sample Comparisons of Dead lift Pre-Post of Placebo group

H₀: δ₀ = 0			
H₁: δ₀ <> 0			
	Difference	138	156
Mean	-13.00	143.3	156.3
Standard Deviation	2.236	1.765	1.416
Variance	5.000	3.117	2.006
Sample Size	19		
Degrees of Freedom	18		
Alpha	0.05		
t _(0.025, 18)	2.101		
Lower Confidence Level	-14.08		
Upper Confidence Level	-11.92		
t	-25.342		
p value	0.0000		

Table 8: 95% Two-Sided Hypothesis Test for Paired Sample Comparisons of squat pre-post of placebo group

H₀: δ₀ = 0			
H₁: δ₀ <> 0			
	Difference	145	156
Mean	-13.00	141.5	154.5
Standard Deviation	4.595	5.521	4.376
Variance	21.11	30.49	19.15
Sample Size	19		
Degrees of Freedom	18		
Alpha	0.05		
t _(0.025, 18)	2.101		
Lower Confidence Level	-15.21		
Upper Confidence Level	-10.79		
t	-12.333		
p value	0.0000		

Discussion

The results of the study indicated, that experimental group had moderate improvement in their muscle mass for the training schedule prescribed and the food supplement Gokshura (*Tribulus terrestris*) given as treatment, but the placebo group as compared to experimental group, had relatively less changes in their muscle mass, The changes in the muscle mass of subjects of experimental group maybe because of their better Adaptation to the training intensity and frequency. The dosage of gokshura given to subjects may not be to the optimum level to make markable changes when compared with the placebo group experimental group did not

had much changes, this might be because placebo group subjects adaptability might not been as expected. And also the absence of gokshura might have lead to the lower level of adaptation in placebo group.

Conclusion

It was concluded that, Gokshura might have influenced the growth muscle mass of the experimental group as a food supplement (Vasco-dilator) with better adaptation to the physical exercises prescribed for the study and the muscle mass of placebo group was not up to the level expected, when compared to experimental group may be because of lower

level adaptation to the training schedule prescribed for the study. Absence of Gokshura supplementation might have led to the lower level of adaptation.

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