

Inbody Technology techniques used for assessing the changes in the body composition of body building trainers on dietary Protein and Protein Supplements

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ABSTRACT

Background: Competitive bodybuilders are under physique traits and extremes in diet to optimize lean mass and achieve a low body fat. The aim of the study was to compare body composition of body building trainers on dietary rich protein or supplemental protein by Inbody 270.

Methods: 140 body builder trainer were recruited from number of gyms and requested for filling up questionnaire. Body compositions were determined by Inbody 270.

Result: The body building trainers were either on dietary protein intake or supplemental protein (why protein).For both groups dietary protein and protein supplemented groups found that body fat sharply significant decrease (P < 0.05). In addition, there were numbers of body changes taken places during the course of study include sharply decreased body water, body weight, WHR. However, the muscle masses were significantly increased at the end of the study (P=0.01). Both male and female achieved higher and significant loss of body fat and significant increased muscle mass. Nevertheless, there were loss more minerals and water in male trainers. There also found that improve of serum vitamin D and hemoglobin among dietary protein groups. On the other hands there was elevated levels of creatinin among dietary supplemented groups.

Conclusion: The good physics and body building appearance has beenAchieved from dietary programs. Introduced of special dietary program led to symmetric changes in the body composition of both groups with aimed to increased body protein and muscle mass and decrease body fat and these were the goal of trainers for body building appearance.

Keywords: Nutrition, dietary Protein, protein supplement, Inbody 270, muscle mass.

INTRODUCTION

It is well-accepted that increased protein intake and physical activity are probable effectivestrategies to combat the rise in obesity, there is a paucity of well-controlled lifestyle interventions (1).

Definitely, there is less data available on lifestyle interventions combining increased protein intake above the recommended dietary allowance (RDA) and exercise training in either normal and overweight populations that quantify changes in fitness-related performance outcomes such as muscular strength and endurance, flexibility, and balance (2). Now days society is launch to show an increased interest in making health and fitness a priority in daily life especially among athletes and frequent gym users, the goal is to become the strongest, fastest, and increased endurance. Resistance training programs are beginning to replace hoursspent on the track or elliptical. Although, these experienced athletes and trainees seemto think that resistance training alone will not be enough to attain their goals(3).



Increasing protein intake above recommended levels has been found to enhance protein synthesis, postprandial thermogenesis, satiety, lean body mass, and cardio metabolic health (4).

Dietary proteinand other amino acids are being implemented into every day diets to help provide the extra building blocks that aid thegrowth of muscles and other important bodytissues. Protein is one of the macronutrients essential for the body, and is found in many different sources of food (5). In order tobuild up more muscle than is already used in daily life, a person needs to makes they have a balanced proteinintake. This is especially important whenone is participating in heavy training (6). Therefore, build muscle help burn more calories using body weight or freeweights that are found in a gym (7).

As protein intake and resistance training become one of interest topic, so that is the dietary protein enough, or as beneficial as supplemental protein for the trainers.During the last few years, an increasing attention has been given to healthy lifestyle routines that combine multiple fitness components into one training program or can be delivered with the support of computer-based technologies (8,9). Indeed, recent studies have reported training programs that combine resistance and endurance exercises are more effective at improving body composition and reducing metabolic disease risk than either training modality alone (10,11).Collectively, these data provide experimental evidence that a whey Comparative study found that supplemented protein-pacing diet combined with a multi-mode fitness program results in greater cardio-metabolic health benefits than other training and dietary regimens (12).

The recent study compared the effectiveness of dietary protein intake combined with either traditional resistance training or a regimen that included resistance exercise, interval sprint exercise, stretching, and endurance exercise, and found that protein-pacing, resistance, interval, stretching, endurance training) resulted in larger reductions in body weight, total and abdominal (including visceral) fat mass, as well as greater gains in percent lean mass (13).Furthermore, diet-exercise program combination shown improves indices of fitness-related performance outcomes in obese/overweight population (14).

Of practical relevance sources of protein intake have been investigated (whey protein supplemented vs. food protein sources only) on metabolic and physical performance outcomes. Some studies (15,16), but not all (17), have reported that whey protein is more effective at improving body composition and disease risk than other protein sources (e.g., soy, pea, casein). Therefore the aim of the present study was to investigate the changes of body composition among trainer using dietary protein program and protein supplement by using Inbody 270.

MATERIAL AND METHODS

Study population

Follow up study carried out from Beginning of end of June 2020 to beginning of November 2020 on a numbers of body building gyms and clubs in Benghazi the second largest city in Libya.

Approached of our study is aged groups between 18-50 years old of body building trainers at numbers of gyms. The samples 140 subjects (80 male and 60 female). After obtaining written consent, the subjects were requested to fill out a questionnaire and proceed to a private area to have their measured body composition by Inbody 270 machine.

In the study there were two groups of body building trainers included two groups, group one used dietary protein (food rich in proteins) and group two were supplemental proteins. Although we approached different number of subjects and the final completed questionnaires in hand were 140. Hence, our overall response rate was 99%.

Questionnaire

The questionnaire for this study based on 24 items divided into four sections. It contained questions about personal information, demographic and socioeconomic characteristics, biochemical investigations, anthropometric data and data from food intake history by FFQ and also data from Inbody measurements.

Measurements

All the body measurements and contents were done by using Inbody machine as described (18). The information gathering for Inbody were include body weight, BMI, waist hip ratio, body contents such as fat, protein , water, minerals and muscle mass.

Biochemical tests

The laboratory tests were obtained from the trainers include testing of hemoglobin, RBC, RFT, uric acid, albumin, serum electrolytes, WBC, vitamin D, calcium and lipid profiles.

Planning of Dietary programs protocol



All trainers the body content were measured four times by Inbody during the total 4 months and onemonth interval between each stage. After the first measurement dietary program was introduced for groups one on dietary protein intake trainers according to their age and requirements which include an average protein intake as follow:

1- For underweight trainers: the dietary program consists of 3000-3500 kcal include protein 20-30%, CHO 50-60% and Fat 20%.

2- For normal weight trainers: the dietary program consists of 2500-3000 kcal include protein 35-40%, CHO 50% and Fat 10-15%.

3- For overweight and obese trainers: the dietary program consists of 1200-1800 kcal include protein 40-45%, CHO 40-50% and Fat 10%

These program aimed to increased body protein, muscle massand endurance and reduced unnecessary use advertised protein supplement.

Furthermore these program was adapted from (3,4). The diets include in this study were traditional food rich in protein as mentioned in questionnaire in briefly include milk, egg, chicken, beef, lentil soup, oatmeal, yogurt, vegetable and fruits. Protein supplement in this study were used by trainer their own include Why, casein, mass, amino and creatinine.

In this study there were four stages as mentioned above and classified as following:

Stage 1= before introducing any dietary program and Inbody used for measures body composition

Stage 2, 3 and 4 one month intervals between and during these stages dietary protein program introduced for group one and body composition were measured and followed until the end of the study.

Ethical statement

This study was granted approval by the local Ethics Committee of the Benghazi province. Informed written consent was obtained through a consent form that was given to the participants along with the questionnaire.

Statistical analysis

The data from the questionnaires was entered using Excel. Data set was exported to SPSS v.22 and Epi-info for complete analysis. Statistical analysis was carried out for the complete sample which were created according to measurements in which frequencies and percentages were used. To determine the differences regarding each categorical variable in the groups, T test was performed and used for compared the mean of first stage and last stage and $p \le 0.05$ was considered to be statistically significant

RESULTS

1-Sociodemographic data and types of training programs and protein intake.

The data collected on 140 trainers include body building and fitness in which number of male and female were 80 (57.1%) and 60 (42.9%) respectively. The average age of the participant 34 years old and the age groups between 26-40 were shown predominately and present by 53.6% followed by age groups between 18-25 years old and the age groups between 41-50 being the least 3.6% (Table 1). The majorities of trainers were found on body building (97.9%) and 2.1% body fitness (Table 1). Types of protein intake has been investigated and found that 57.1% of the trainers were use dietary protein intake while 42.9% on protein supplement (51% why protein)(Table 1).

Table 1:Gender , age and types of training and protein intake:

		Ν	N %
gender of trainers	male	80	57.1%
	female	60	42.9%
	Total	140	100.0%
age of trainers	18-25	60	42.9%
	26-40	75	53.6%
	41-50	5	3.6%
Types of training	Total	140	100.0%
Types of training	Body building	137	97.9%
	Fitness	3	2.1%
Turnes of protein intelse	Total	140	100%
Types of protein intake	Dietary protein	80	57.1%
	Protein supplement	60	42.9%
	Total	140	100.0%



2-Assessing of changes in the body composition by Inbody 270.

During the time of training which include total 4 months, body composition was identified by using Inbody, in the first stage, body composition were measured before introducing any form of protein, thereafter stage 2, 3 and 4 one month intervals between each stages through introducing protein either in form of diet group 1 or supplement group 2. In general introducing of protein and introducing special dietary program to thetrainers led to changes body composition as shown in table 2. Percentages of body fat, water, minerals, body weight, and waist hip ration (WHR) decreased gradually before and after and at the end of the study . Protein contents of the body did not changes during the entire period of the study 11%. While muscle mass has been found gradually increased during the time of study from 30.67% to 33.05%. (Table 2).

	Stage 1 Mean ± SD	Stages 2 Mean ± SD	Stages 3 Mean ± SD	Stage 4 Mean ± SD	P values
body fat	*22.50 ± 13	20.84 ± 8	19.74± 7	*18.42±4	0.01
body protein	11.11 ± 3.5	11.36 ± 3.5	11.31 ± 4	11.25±2	0.08
body water	*43.58±6	40.25 ± 9	40.43 ± 4	*39.40±6	0.001
body mineral	*4.38± 1.2	3.82 ± 0.81	3.94 ± 1	*3.64±1	0.02
body weight	*77.04±16	72.41 ± 12	69.47 ± 12	*64.93±8	0.001
Body Mass Index	$*27.69 \pm 7.9$	26.12 ± 6	24.19 ± 4	*22.49±5	0.005
Waist Hip Ratio	0.92 ± 0.08	0.88 ± 0.06	0.89 ± 0.07	0.88 ± 0.06	0.09
Muscle mass	*30.67±6	31.40 ± 8	32.61 ± 5	*33.05±6	0.03

* which mean the comparison has been made between stage 1 and stage 4 for each parameter. T test was performed between groups and considered significant at $\alpha < 0.05$.

3-Differences in the body composition changes between staging of training program

During the time of study, in which one month interval for intending improve physical fitness and increased muscle mass and simultaneously decreased body fat. By using protein supplement, body fat steadily decreased from 16. 67% to 14.36 by the end of the experiment (3 months). However, great reduction have been observed in those used dietary protein intake group 1 from 26.86 to 21.7%. In compared body protein contents, it has been found not changes during the time of experiment in those on dietary protein intake (group 1) (10.12% vs 10. 51%) and on protein supplement trainers (group 2) (12.4% vs 12.15%). The amount of body water sharply decreased from stage 1 43.57% to 37.56% in stage 2 then steadily constant thereafter 37.42% in trainer on dietary protein intake and no changes have been noticed in those on protein supplement. Regarding mineral contents of the body was noticed decrease in trainer on dietary protein intake from early stage 4.54% to 3.62 % by the end of trial also decrement has been found at the end of the study on those using protein supplement (4.18% stage 1 and 3.86 % stage 4). Body weight and BMI have been found similar decrement in both dietary protein program and protein supplements in which started by 77 kg with mean BMI was 28 kg/m2 and ended by 64 kg and BMI 22 kg/m2. Furthermore, muscle mass also found increased during the time of the study in both forms of protein. (Table 3 A & B).

Table 3A:	Comparative	study of t	he effect of	using	dietary	protein of	r protein s	supplement	on body	composition:
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	S	tage 1	S	tage 2	Stage 3		Si	tage 4
	Dietary protein 1	protein supplement 2	Dietary protein 1	Protein supplement 2	Dietary protein 1	Protein supplement 2	Dietary protein 1	Protein Supplement 2
Body composition	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
fat	*26.86	#16.67	24.93	15.38	23.83	14.85	*21.73	#14.36
protein	*10.12	12.42	10.43	12.60	10.51	12.28	*10.52	12.15
water	43.57	43.58	37.56	43.92	37.45	44.11	37.42	43.33
mineral	4.54	4.18	3.62	4.10	3.54	4.43	3.48	3.86
weight	*77.61	#76.28	71.61	72.13	69.35	68.07	*64.46	#64.73



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BMI	*28.85	26.14	25.79	25.84	24.1	24	*22.05	22.73
WHR	.92	0.90	0.91	2.48	0.91	0.88	0.90	0.86
Muscle mass	*28.13	34.04	28.85	34.78	29.30	36.59	*30.04	36.75

*#Comparison has been made between stage 1 and stage 4 for each parameter. T test was performed between groups and considered significant at $\alpha < 0.05$.

Table 3 B:	Comparative	study of the	effect of using	g dietary p	rotein or	protein sup	plement on	body com	position.
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Body	Dietary protein (group 1) Stage 1	Dietary protein (group 1) Stage 4	r values	protein supplement (group 2) Stage 1	Protein Supplement (Group 2) Stage 4	P values
composition	Mean	Mean		Mean	Mean	
fat	26.86	21.73	0.001	16.67	14.36	0.05
protein	10.12	10.52	0.08	12.42	12.15	0.09
water	43.57	37.42	0.02	43.58	43.33	0.077
mineral	4.54	3.48	0.01	4.18	3.86	0.04
weight	77.61	64.46	0.000	76.28	64.73	0.03
BMI	28.85	22.05	0.00	26.14	22.73	0.01
WHR	0.92	0.90	0.088	0.90	0.86	0.09
Muscle mass	28.13	30.04	0.03	34.04	36.75	0.03

Comparison has been made between stage 1 and stage 4 for each parameter. T test was performed between groups and considered significant at $\alpha < 0.05$.

4-Assessing body composition changes among male and female trainers.

The achievement of target changes between male and female present in table 4. In the first stage, male have shown to have higher significant body content of protein, water, minerals, weight, and muscle mass than female while female has more body fat, BMI and WHR. At the end of stage. In compared body composition in male between stage 1 and 4, found that significant decreased body fat, water, minerals, weight, BMI and WHR (P < 0.05) but muscle mass significant increased from 35.9 % to 38.6 % (P=0.01).In female trainers, similar result have been found with exception of that body water and WHR not changes. Muscle mass also increased during the trial from 23.6% to 25.7% (P=0.01) (Table 4).

Table 4: Compare body composition between male and female before and after dietary program introduced:

	First stage		Fourth	stages		
	Male	Female	Male	Female	*P values	#P values
	Mean± SD	Mean± SD	Mean± SD	Mean± SD		
body fat	*16.81±3	#30.08±5	*12.62±2	#25.95±3	0.001	0.000
body protein	13.00±2	8.56±2	12.87±2.3	9.15±1		
body water	*52.75±6	31.34±6	*43.96±5	33.73±6	0.000	
body mineral	*4.91±1	#3.69±0.6	*3.99±0.9	#3.21±3	0.00	0.04
body weight	*79.59±8	#73.64±11	*71.71±4	#66.31±7	0.00	0.002



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Body Mass Index	*26.94±4	#28.69±4	*22.86±2	#21.06±2.3	0.001	0.000
Waist Hip Ratio	*0.90±0.2	0.94±0.2	*0.86±0.3	0.92±0.1	0.02	
Muscle mass	*35.95±4	#23.62±	*38.67±5	#25.74±4.5	0.01	0.01

#*Comparison has been made between stage 1 and stage 4 for each parameter between male and male, and female and female stage 1 and 4. T test was performed between groups and considered significant at $\alpha < 0.05$.

5-Blood biochemical results of the trainers on dietary protein and protein supplements

In order to know if either dietary or supplemented protein could have any affect one certain blood biochemical. Blood biochemistry were obtained as presented in table 5. There were some blood biochemical improvement at the end of the study include vitamin D (28.09 vs 42.2 ng/dl) and hemoglobin (11 vs 14 mg/dl). However, there was found some increment in serum creatinine from 0.87 to 1.16 mg/dl at the end of the study. Furthermore, the differences in between the values of blood biochemistry among dietary protein and protein supplemented trainers was presented in table 5. In the Table 5, dietary protein intake groups have found increased serum vitamin D and hemoglobin much better than supplemented protein groups. In compared to supplemented protein groups there were found higher creatinin levels. An increased levels of liver function test in both groups but still under normal levels.

Table 5: Comparisons of blood biochemistry result between dietary and supplemented protein:

	Type of pro (stage	tein intake e 1)	Types of protein intake Stage 4)		
	dietary protein group 1 group 2		dietary protein group 1	protein supplement group 2	
	Mean± SD	Mean± SD	Mean ±SD	Mean± SD	
Vitamin D (ng/dl)	28.95±5	31.27±6	41.75±5	42.87±7	
RBC (Fg)	4.24±1	4.59±0.7	4.46±0.6	4.55±0.9	
WBC (10^3)	7.16±1.1	7.23±1.4	7.61±1.8	7.15±1.9	
Platelet (Pg)	259.65±23	284.95 ± 22	261.50±30	298.33±32	
Urea (mg/dl)	33.14±3	38.12±4	32.48±2	35.60±5	
Blood Urea Nitrogen (mg/dl)	13.90±1.2	17.96±3	13.66±1	15.56±2	
Serum Creatinine (mg/dl)	0.92±0.1	0.79±0.2	1.26±0.4	0.85 ± 0.4	
Alanine aminotransferase (mg/dl)	18.10±3	19.59±4	19.53±3.5	20.69 ± 4.4	
Alkanine phosphatase (mg/dl)	99.58±11.1	111.30±13	101.56±12.3	112.13±10	
Aspartate aminotransferase (mg/dl)	17.37±2	18.04 ± 4	18.67±3	21.73±4	
Hemoglobin (mg/dl)	11±1	12±1	15±3	13±1.3	

Biochemical result found in the table 5 shown comparable values between dietary protein (1)and supplemented protein (2). As presented in table 5, number of changes taken place among which serum vitamin D, hemoglobin and serum creatinin among dietary protein groups.

DISCUSSION

During the time of training which include 4 months, body composition was determined by Inbody 270, in the first stage, body composition were measured before introducing any form of protein, thereafter stage 2, 3 and 4 one month intervals between each stages through introducing protein either in form of diet or supplement form group 1 and 2 respectively. In general introducing of protein and introducing special dietary program to the trainers led to changes body composition.

The present study investigated the changes of body composition in the groups of body building trainers using either dietary protein or supplemental protein through using new techniques for measurement which is Inbody 270. The Types of protein intake for the body building trainers shown more than 50% used food rich in dietary protein and being least used proteins supplementation. Further investigate of types of protein supplementations were shown why protein commonly used which about (53%). The finding of this study was not inconsistent with other studies by which the body building trainers preferred to use supplemental protein rather than dietary due to increasing their body performance and muscles (19,20). Those groups with body building using supplemental protein focusing on Why protein. The use of dietary supplements is abundantin bodybuilders, drugs designed to enhance the accumulation of lean mass, reduce body fat, or improve appearance are also a factor in 'sculpting' a more perfect physique (21, 22).

The present work include four time measurement of body composition for both groups by Inbody 270. In the first measurements were no dietary program introduced and all body compositions were measured. Intake of dietary protein and protein supplementations groups have lower body fat contents but significant decrement found in dietary protein



groups(P<0.05). Furthermore, Body water contents were significantly lower in dietary proteins than protein supplement groups (P<0.05). for the muscle mass proteins, in those with protein supplementation shown to have more muscle mass than groups on dietary protein (36.83% Vs 30.88%). The fact of that were similar other studies in regard fat contents of protein supplemental groups (23, 24). Interestingly, because of body fat decreased there should be increased boy water (25) but this condition was different with our result by which water content decreased to lower limits. This could be in part high protein intake or intense physical activities led to dehydration.

After introduced dietary programs for both groups the second measurement were performed at 3 weeks intervals. In the compared to the first measurements body fats were decreased in both groups and significantly lower in protein supplemented groups than dietary protein (16.89% Vs 12.69%). Furthermore, body protein increased in both groups but still high in supplemented groups. Body water contents decreased sharply in groups with dietary protein in compared first measurements and also lower than protein supplemented groups (P=0.04). Muscle mass slightly increased after introduced particular dietary programs but significantly high in protein supplemented groups (P=0.01). It was likely that introduced of special dietary program led to symmetric changes in the body composition of both groups with aimed to increased body protein and muscle mass and reduce body fat contents. On the other hands no explanation for further decreased of body water or could due to increased consumption of more protein.

The third measurements were 3 weeks interval from second measurements and 6 weeks after dietary program introduced. Body fat increased in dietary protein groups compared to protein supplemented groups (18.36% Vs 11.93%) (P=0.001). In compared to first and second measurements fat body continue to drops while increased in dietary protein intake. Body protein decreased in dietary protein groups compared to supplemented groups (P=0.03). Body water continue to decreased and lower than protein supplemented groups (42.32% Vs 48.43%) (P=0.001). In compared to supplemented groups minerals contents sharply decreased in dietary protein groups 3.98% Vs 5.74% (P=0.01). In the protein supplemented groups muscle mass significantly increased throughout the measurements and also compared to dietary protein groups 38.33% Vs 32.8% (P=0.001). There were a numbers of changes in the third measurements specially fat and water and those were aware of most body building trainers. The most probably explanation could related to the fact that high protein diet led to high fat consumption by which diet rich in protein also rich in fat (26, 27). Increased dietary protein consumption led to loss of mineral specially calcium (28, 29) therefore, why those groups dietary intake groups have lower their body minerals.

Fourth measurements have one month interval from third measurements and nine weeks after dietary program introduced. Both body fat contents were shown similar in both groups but sharply decreased compared to the previous measurements. In addition, protein contents found slightly higher but not significant in supplemented groups than dietary protein groups (11.8% Vs 12.7%). Water contents of the body continue to decline compared to previous measurements and also significant decreased in contrast to supplemented groups (40.06% Vs 45.63%). In compared to protein supplemented groups, body weight and body mass index of dietary protein groups decreased (P<0.05). achieved of slightly muscle mass increased have been noticed in dietary protein groups compared to previous measurements 33.08% Vs 31.8% first measurements, 32.60% and 32.80% for second and third measurements respectively. Still muscle mass continue for increment during all measurements from 36.83% to 37.80% and significant increased compared to dietary protein groups and this is one of the goal of dietary program but still body water sharply dropped in groups of dietary protein intake. Muscle mass have been increased in both groups with decrease of body weight and IBW in dietary protein intake.

The summaries of measurement body components between dietary protein intake and protein supplemented groups. For the dietary protein groups during the course of study found that body fat sharply significant decrease and this from first and fourth measurements which mean after special dietary program introduced. There were numbers of body changes taken places during the course of study include sharply decreased body water, body weight (normal BMI) and IBW. However, muscle masses were significantly increased at the end of the study.

During the study on protein supplemented groups the following were noticed significant decrease body fat (P=0.01). On the other hands significantly increased of body weight, body mass index and muscle mass protein (P<0.05). Increased body weight this is due to increase muscle mass and BMI is contraindicated use in body building trainers (30). And this also found through constant IBW during the entire periods of study.

In sum, It was likely that introduced of special dietary program led to symmetric changes in the body composition of both groups with aimed to increased body protein and muscle mass and decrease body fat and these were the most feature for body building appearance. During the study on protein supplemented groups the following were noticed significant decrease body fat (P=0.01). On the other hands significantly increased of body weight, body mass index and muscle mass protein (P<0.05). Introduced special dietary program consisting of 40% of protein, 10% of fat and 50% of CHO which perceived good maintain of body protein, muscle mass and keeping the body weight at optimum for group of body building trainers used dietary protein intake and these achievement found to less extent good for supplemental protein groups. The limitation of this study were lack of time and need to validated in large samples. Its highly



recommended that all body building trainers should follow balance diet in order to achieve good health. Furthermore, high quality protein diet need to be advocated to all body building trainers rather than supplemental proteins

CONCLUSION

Achievement of good physics and body building appearance could be done after an introduced good dietary programs. It was likely that introduced of special dietary program led to symmetric changes in the body composition of both groups with aimed to increased body protein and muscle mass and decrease body fat and these were the most feature for body building appearance. During the study on protein supplemented groups the following were noticed significant decrease body weight, fat, minerals, BMI, WHR and water particularly in male. Similarly was found in female with exception not changed body water, WHR. There were numbers of body weight, BMI, body fat, minerals and WHR. However, muscle masses were significantly increased at the end of the experiments.Dietary program have proved their ability to normalize blood hemoglobin and vitamin D status. In addition elevated levels of serum creatinine was confined to those on dietary protein with also LFT but still at normal levels for both groups.

Overall,Protein supplement found has effect on reduction of body fat. But dietary protein possess their great ability to reduced body fat in which can be used as alternative to advertised protein. This study achieved its goal for optimizing of dietary protein intake for increased body fitness rather than protein supplements.

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Conflict of Interest

No conflict of interest.

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