المجلة العراقية
لبحوث السوق وحماية المستهلك

المجلد (8) العدد (2)
لسنة 2016

تأثير استهلاك المكملات البروتينية في المعايير الكيموحيوية لدى بعض الشباب بناة العضلات

زهراء اسماعيل عبد الكاظم[1] ، سهيلة خالد محمد[2] ، لمياء شاكر عاشور[3]
[1] قسم تقنيات التحليلات المرضية ،كلية اليرموك الجامعة ،بغداد،العراق ،zahraa_chemistry@yahoo.com
[2] شعبة العلوم الاساسية،كلية الزراعة،جامعة بغداد،بغداد،العراق،Suhayla_81@yahoo.com
[3] شعبة العلوم الاساسية،كلية الزراعة،جامعة بغداد،بغداد،العراق،alaa_hufdy@yahoo.com

تاريخ استلام البحث: 2016/1/5 تاريخ قبول النشر: 2016/3/22

الخلاصة

يتناول الكثير من الشباب المكملات البروتينية في محاولة لاكتساب المزيد من العضلات، ومع ذلك، هناك بعض الجدل حول ما إذا كان هذا هو فعال حقا. هناك أدلة تشير إلى أن استهلاك كميات عاليه من البروتين في الواقع قد يكون له آثار جانبية سلبية على الصحة. شملت الدراسة الحالية 29 شابا عراقيا يقومون ببناء العضلات ضمن مجموعتين مختلفتين (يتناولون ولايتناولون المكملات البروتينيه) (الفئة العمرية =17-31 سنة)، وقد تم اختيار العينات من بعض افراد الأسرة والأصدقاءو طلاب الجامعات والنادي الرياضي في الفترة من تشرين الثاني 2014 لغاية اذار 2015. تم الحصول على المعلومات الدقيقه من كل متطوع بما في ذلك السن، مدة مزاولة الرياضة، نوع المكملات الغذائية، والتاريخ العائلي للأمراض، وتم قياس بعض المعايير الكيموحياتيه مثل (الكلوكوز واليوريا وحامض اليوريك والكرياتينين البيليروبين والبروتين في الدم و الزلال في الدم والدهون الثلاثية وأنزيم (ALT)، وكذلك هرمونات الغدة الدرقية (TSH، T3، T4)) في امصال المجموعتين قيد الدراسة.

اظهرت النتائج عدم وجود فروق معنوية في المعايير المدروسه لدى كلا من المجموعتين (متخذة وغير متخذه مكملات بروتينيه)، بينما اظهرت النتائج اختلافات كبيرة في مؤشركتلة الجسم لدى الشبان بناة العضلات الذين يتناولون مكملات البروتين من مصادر مختلفة (الولايات المتحدة وماليزيا وسويسرا والمملكة المتحدة) عند مقارنتهم بالمجموعه التي لا تتناول اي مكمل بروتيني.

الكلمات المفتاحية: بناة العضلات، المكملات البروتينية، النين امينوترانسفيريز، وضائف الكلى، معيار كتلة الجسم.

CONSUMPTION EFFECT OF PROTEIN SUPPLEMENTS IN THE BIOCHEMICAL PARAMETER FOR SOME YOUNG MUSCLE BUILDERS

Zahraa I. Abudal Kadhum [1], Suhayla K. Mohammed [2], Lamia shaker Ashoor [3].
1.Department of medical Laboratories techniques, Al Yarmouk University collage,Baghded,Iraq,Zahraa_chemistry@yahoo.com
2. Basic sciences section, College of Agriculture, University of Baghdad, Baghdad, Iraq, suhayla_81@yahoo.com
3. Basic sciences section, College of Agriculture, University of Baghdad, Baghdad, Iraq , alaa_hufdy@yahoo.com

ABSTRACT

Many people take protein supplements in an effort to gain muscle. However, there is some controversy as to whether this is really effective. There is evidence suggesting that consuming high level s of protein may in fact have negative side effects for health. The current study included 29 young Iraqi building muscles in two different groups (taken and not protein supplements) (age range=17-31 years), the cases were selected from family, friends, college students, and Gyms), from November 2014 to March 2015. A careful history was obtained from each volunteer including age, duration of sports, type of supplements, and family history of diseases. Some biochemical parameters like (glucose, urea, uric acid, creatinine, bilirubin, serum protein, serum albumin, triglyceride and alanine aminotransferase (ALT), as well as thyroid hormones (TSH, T3, and T4)) were estimated in the sera of the groups under study. The results indicated non- significant differences in the studied parameters in both groups (taken and not protein supplements), and significant differences in the body mass of young men building muscles that taken protein supplements from different origins (USA, Malaysia, Swiss, UK) when compared with the group that not taken any supplements.

Key words: Building muscles, Protein supplements, Alanine amino transferase, Kidney function, Body mass index.

INTRODUCTION

Bodybuilding supplements are dietary supplements commonly used by those involved in bodybuilding and athletics **(Powers and Howley 2001).** Bodybuilding supplements may be used to replace meals, enhance weight gain, promote weight loss or improve athletic performance **(King, 1999; Mansky and Strauss, 2002).**

Among the most widely used are vitamin supplements, protein,branched-chain amino acids (BCAA),glutamine, essential fatty acids, meal replacement products, creatine, weight loss products and testosterone boosters. Supplements are sold either as single ingredient preparations or in the form of "stacks" - proprietary blends of various supplements marketed as offering synergistic advantages. While many bodybuilding supplements are also consumed by the general public, their salience and frequency of use may differ when used specifically by bodybuilders **(Powers and Howley 2001).** Consuming high levels of protein in the form of protein powders or even from food alone can be detrimental for our health **(Morales, 1998; Kolasinski, 2003)**. There are some side effects of protein supplements like: Fat gain, Bone loss, Kidney damage, and Dehydration **(Lemon, 1991).**

PATIENTS AND METHODS

Patients

Inclusion criteria

Twenty nine consecutive young Iraqi building muscles were selected from family, friends, college students, and Gyms, from November 2014 to March 2015 were included in the present study, with mean age value of (22.75± 5.5) and age range between (17-31) years. Sixteen young men volunteers from the cases under study were taken protein supplements while the other thirteen were not taken protein supplements. Careful information was obtained from each volunteer in this study including age, duration of sport, and body mass index (BMI).

Methods

A sufficient amount (7-10 ml) of venous blood was obtained from each subject included in this study. The blood was allowed to clot in serum tube naturally at room temperature, and then separated by centrifugation at (1500 ×g) for 10 minutes. Haemolysis was avoided and the sera was divided into 5 aliquots, all samples were labeled by a serial number and the person's name, immediately frozen at -34C for further processing, once thawed, refreezing was avoided. Fasting blood glucose, urea, creatinine, Alanine aminotransferase (ALT), serum albumin, and serum total protein were determined based on the procedure given by randox reagent kit manufacturer while serum triaceylglycerol, uric acid, total billirubin, were determined by linear kit manufacturer. Total Thyroxine T_4, Triiodothyronine T_3, and Thyroid Stimulating Hormone TSH were estimated by Micro ELISA redder Biokit (U.S.A).

Statistical Analysis

The data were analyzed by Duncan's multiple range test at ($p \leq 0.05$) was accepted as statistically significant, and highly significant when ($p \leq 0.001$), using the SPSS software. All the analyses were repeated three times.

RESULTS AND DISCUSSION

The mean ages of the volunteers included in the current study were (22.75± 5.5 years) with age range between (17-31 years), the mean duration of exercises was (2.28±3.33 years) with duration range between (2 month-10 years), and the body mass index (BMI) of young men building muscles under study was (27.39± 5.12 Kg/m^2) with range (from 17 to 37.96 Kg/m^2). The results in table (1) showed the distribution of young men building muscles groups according to taken or not taken protein supplements.

Table (1): Mean values ±SD (Range) of age, duration of sport, and body mass index (BMI) of young men building muscles under study according to taken or not taken protein supplements.

Young men building muscles	Samples number (n)	Mean Age ±SD (Range)	Mean Duration of Sport ±SD (Range)	Mean BMI ±SD (Range)
Taken protein supplements	16	22.4± 2.5 (17-28)	0.97±1.27 (2month- 4 years)	28.06± 5.24 (21.5-37.96)
Not taken protein supplements	13	23.23± 3.4 (18-31)	2.28±3.8 (3month- 10 years)	26.5± 5.07 (17-34.85)

The mean values of thyroid gland hormones concentrations TSH, T_3 and T_4 showed non-significant differences between volunteers taken protein supplements group when compared with volunteers not taken protein supplements group as table (2) presented thyroid gland hormones concentrations.

Table (2): Mean values of serum TSH,T3&T4 in young men building muscles under study according to taken or not taken protein supplements.

Group	Samples number (n)	TSH mIU/ml	T3 ng/ml	T4 nmol/l
Taken protein supplements	16	2.57±0.7 (1.6-3.1)	2.4±0.85 (1.7-3.6)	11.2± 2.7 (8.6-14.3)
Not taken protein supplements	13	2.5±1.1 (0.9-4.6)	2.7±0.49 (2-3.3)	9.15±3.36 (5.2-14)
P value	P>0.05	P>0.05	P>0.05	P value

The alterations in some biochemical markers that have been measured in the current study were illustrated in table (3); where no significant increases (p>0.05) were obtained in the studied parameters (Fasting blood glucose, triglyceride, creatinine, urea, uric acid, serum albumin, serum total protein and ALT) when compared between young men building muscles groups taken or not taken protein supplements.

Table (3): Mean values ±SD (Range) of some biochemical markers of young men building muscles under study according to taken or not taken protein supplements.

	Taken protein supplements	Not taken protein supplements	P value
Glucose (mg/dl) mean ±SD (Range)	86±11 (60-109)	102.92±32 (72-174)	P>0.05
Triglyceride (mg/dl) mean ±SD (Range)	84.8±33 (42-170)	77.6±33.1 (30-149)	P>0.05
Creatinine (mg/dl) mean ±SD (Range)	1.1±0.5 (0.5-2.4)	0.86±0.27 (0.6-1.5)	P>0.05
Urea (mg/dl) mean ±SD (Range)	27.9±7.1 (12-40)	28.08±6.1 (17-42)	P>0.05
S.uric acid (mg/dl) mean ±SD (Range)	4.9±2.1 (1.9-8.4)	4.6±1.34 (2.5-6.5)	P>0.05
T.bilirubin (µmol/L) mean ±SD (Range)	0.83±0.29 (0.3-1.2)	0.96±0.5 (0.4-2.4)	P>0.05
S.albumin (g/dl) mean ±SD (Range)59	4.5±0.89 (3.5-6.5)	4.4±0.42 (3.9-5.1)	P>0.05
T.protien (g/dl) mean ±SD (Range)	8.4±1.6 (4-10)	7.6±1.1 (6.3-10.6)	P>0.05
ALT (IU/L)	23.1±11.3 (9-43)	23.8±9.7 (9.9-45)	P>0.05

Arginine, ornithine, histidine, lysine, methionine, and phenylalanine are purported to have anabolic effects. Two studies reported that ingestion of arginine and ornithine in conjunction with strength training significantly increased body mass and decreased body fat compared to a placebo **(Nissen, 1996; Volpi, 2013)**. However, body composition was only estimated from skinfold measure, and diet was not controlled. It is claimed that these amino acids stimulate a release of growth hormone and insulin, and thereby increase muscle mass **(Van leemputte *et al*.,1999; Welle *et al*., 1990; Breen, 2013).** The protein requirement of athletes during strength training is 1.4 to 1.8 g along with adequate energy; this protein can be obtained through the normal diet without protein supplements. Although "high tech" protein supplements include a variety of additives purported to boost weight gain, they have never been tested to evaluate their efficacy, and it seems unlikely they would be more effective than diet alone or a supplement such as casein (milk powder) (**Wagenmakers, 1999; Frisoli ,2011)**.

Several formulations of amino-acid supplements have been claimed to increase blood levels of growth hormone and insulin, thereby resulting in increased muscle mass, but studies have not systematically confirmed these effects **(Berrut, 2013).** The results in (Figure1) showed significant increases $p<0.05$ in the body mass index of young men building muscles that taken protein supplements (29.02Kg/m^2) from different origins (USA, Malaysia, Swiss, UK) when compared with the group that not taken any supplements**.**

.

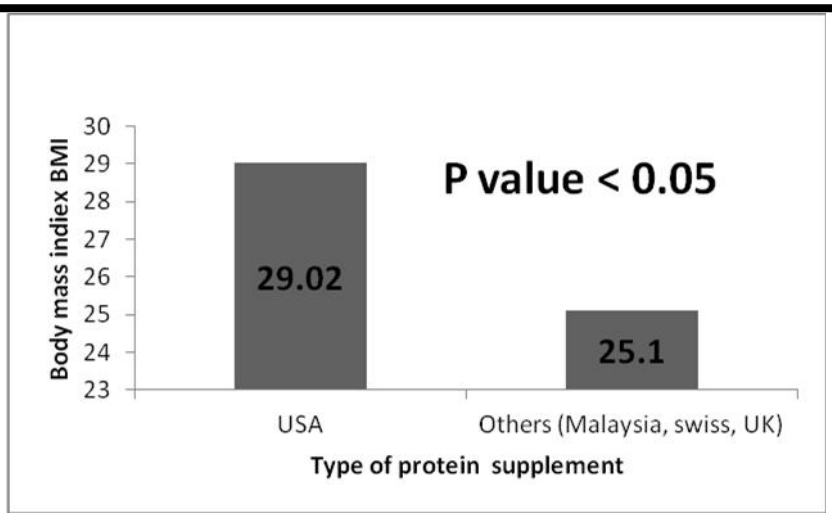

Figure (1): Mean values of body mass index (BMI) of young men building muscles that taken protein supplements from different origins (USA, Malaysia, Swiss and UK).

Nutritional supplements are often advertised using deceptive and/or misleading claims. They can be marketed without the US Food and Drug Administration (FDA) review of safety or effectiveness, and many claims are unsubstantiated. The concentration of active ingredients cans differ markedly from product to product due to the lack of regulatory control **(Morley *et al*., 2010; Wall and van Loon ,2013).** Studies of the effects of nutritional supplements on muscle mass have predominantly used male subjects. There is a lack of information on female responses to these supplements and on their effectiveness in individuals with different initial physiological status of the nutrient in question **(Elam, 1988; Burd, 2013; Beasley *et al*, 2013)**. Although some studies indicate that creatine and HMB may increase body weight, their effects on strength and performance remain unclear, the amount of gain is relatively small, and the results are yet to be adequately replicated. Nutritional supplements will not convert the 97-pound weakling into Charles Atlas. Moreover, nutritional supplements, even combined with strength training, will not give even Charles Atlas the physique of bodybuilders that grace the covers of today's "muscle" magazines **(Prentice, 2011; Tieland *et al*., 2012; Elam *et al*., 1989).**

CONCLUSION

To our knowledge few reports are available in the literatures concerning studying the biochemistry changes in young men building muscles who taken protein supplements. Our present study highlights the relationship between some chemical parameters and building muscles in young Iraqi men. Further study must carry out with large number of cases to investigate this relationship more deeply in these men.

REFERENCES

Beasley et al.. (2013). Biomarker- calibrated protein intake and physical function in the women's health initiative. *J Am Geriatr Soc*, 61(11), 1863-1871.. Retrieved 2013 Oct 28., from http://dx.doi.org/ 10.1111/jgs.12503.

Berrut et al.. (2013). Promoting access to innovation for frail old persons. *J. Nutr Health Aging*, 17(8), 688-693. Retrieved , from http://dx.doi.org/ 10.1007/s12603-013-0039-2.

Bray & George, A. (2012). Effect of Dietary Protein Content on Weight Gain, Energy Expenditure, and Body Composition During Overeating: A Randomized Controlled Trial. *Journal of the American Medical Association*, 307(1), 47–55. Retrieved, from http://dx.doi.org/10.1001/jama.2011.1918.

Breen et al. (2013). Two weeks of reduced activity decreases leg lean mass and induces "anabolic resistance" of myofibrillar protein synthesis in healthy elderly. *J Clin Endocrinol Metab* 98(6),2604-2612. Retrieved, from http://dx.doi.org/ 10.1210/jc.2013-1502.

Burd NA, Gorissen SH& van Loon L J.(2013). Anabolic resistance of muscle protein synthesis with aging. *Exerc sport Sci Rev* 41(3),169-173.

Elam, R. P. (1988). Morphological changes in adult males from resistance exercise and amino acid supplementation. *J Sport Med Phys Fit*, 28(0), 35 - 39.

Elam et al.(1989). Effects of arginine and ornithine on strength, lean body mass and urinary hydroxyproline in adult males. *J. Sports Med. Phys. Fit*. 29,52-56.

Frisoli et al.(2011) .Severe osteopenia and osteoporosis, sarcopenia, and frailty status in community-dwelling older women: results from the women's health and aging study (WHAS) II. *Bone* 48(4),952-957. Retrieved , fromhttp://dx.doi.org/10.1016/j.

King et al. (1999). Effect of oral androstenedione on serum testosterone and adaptations to resistance training in young men. *The Journal of the American Medical Association* 281(21), 2020-8.

Kolasinski S. L. (2003). Glucosamine for Osteoarthritis. *Alternative Medicine Alert* 6,121-125.

Lanza *et al*. (2008). Endurance exercise as a countermeasure for aging. *Diabetes* 57(11), 2933-2942. Retrieved, from http://dx.doi.org/10.2337/db08-0349

Lemon, PW. (1991). Protein and amino acid needs of the strength athlete. *Int. J. Sport Nutr.* 1(2), 1 2 7 - 1 4 5 .

Morley *et al*. (2010). Nutritional recommendations for the management of sarcopenia. *J Am Med Dir Assoc* 11(6), 391- 396. Retrieved, from http: dx.doi.org/ 10.1016/j.jamda.2010.04.014

Morales et al. (1998). The effect of six months treatment with a 100 mg daily does of dehydroepiandrosterone (DHEA) on circulating sex steroids, body composition, and muscle strength in age-advanced men and women. *Clin. Endocrinol*. 49, 421 - 432.

Nissen et al. (1996). Effect of leucine metabolite beta-hydroxy-beta-methylbutyrate on muscle metabolism during resistance-exercise training. *J. Appl. Physiol*. 81(5), 2095 – 104.

Mansky & Strauss S. E. (2002). St. John's Wort: More Implications for Cancer Patients, *Journal of the National Cancer Institute* 94(16),1187-1188. Retrieved, from http://dx.doi.org/ 10.1093/jnci/94.16.1187.

Powers & Howley ET. (2001). Body composition and nutrition for health. In: *Exercise Physiology: Theory and Application to Fitness and Performance*. New York: McGraw-Hill, pp. 328-372.

Prentice R. (2011). Dietary protein and exercise training in ageing. *Proc Nutr Soc* 70(1),104-113. Retrieved, from http://dx.doi.org/10.1017/S0029665110003927.

Spencer, J. (2004). The Risks of Mixing Herbs and Drugs. *The Wall Street Journal*, June 22.

Tieland et al. (2012). Dietary protein intake in community-dwelling, frail, and institutionalized elderly people: scope for improvement. *Eur J. Nutr* 51(2),173-179. Retrieved, from http://dx.doi.org/ 10.1007/s00394-011-0203-6.

Vandenbe rghe et al.(1997). Long-term creatine intake is beneficial to muscle performance during resistance training. *J. Appl . Physiol* .83, 2055 - 2063.

Van leemputte, M. K, Va n d e n b e rghe & Hespel, P. (1999). Shortening of muscle relaxation time after creatine loading. *J App l Physiol*, 86(1), 840-4.

Volpi *et al.* (2013). Is the optimal level of protein intake for older adults greater than the recommended dietary allowance? *J Gerontol A Biol Sci Med Sci* 68(6),677-681. Retrieved, from http://dx.doi.org/ 10.1093/gerona/gls229.

Wagenmakers, A. J. M. (1999). Nutritional supplements: effects on exercise performance and metabolism. In: D.R. Lamb and R. Murray (eds.) Perspectives in Exercise Science and Sports Medicine, Vol. 12, The Metabolic Basis of Performance in Exercise and Sport . C a r m e l , IN: *Cooper Publishing Group*, pp. 207-252.

Wall & van Loon LJ.(2013). Nutritional strategies to attenuate muscle disuse atrophy. *Nutr Rev* 71(4),195-208. Retrieved, from http://dx.doi.org/ 10.1111/nure.12019.

Welle, S., Jozefowicz, R. & Statt M. (1990). Failure of dehydroepiandrosterone to influence energy and protein metabolism in humans. *J. Clin. Endocrinol . Metab.* 71, 1259-1264.