03 - EFFECT OF SUPPLEMENTATION WITH FLAXSEED ON LIPID PROFILE AND HEMOGLOBIN LEVELS AND TESTOSTERONE IN ATHLETES AND NONATHLETES

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INTRODUCTION

The intense effort and energy expenditure in sports training and competition require an unusual demand on the diet of athletes. Some sports such as race, the long distance can cause problems for the energy balance and caloric demands of the training, especially in competitions beyond as the marathon (42.195m). In this context, the predominant metabolism is via oxidative (Wilmore, HJ, Costill, DL 2001), with the predominance of carbohydrate (HC). The source of sustainable energy in running long distance from the HC is sufficient to run 32 km between 75% and 85% of VO2max (Bucci, 1993). Therefore, for these individuals, you must obtain energy through fatty acids (FFA), an excellent substrate for energy production. Distance runners use FFA in large amounts can conserve glycogen stores for much longer. The main dietary concern of many athletes is the amount of food they eat, and the role of diet in development has focused on balance and quality of the source of proteins, lipids and carbohydrates, is removed from the diet would justify the drop in performance. Currently available information suggests that consumption of various foods such as fruits, whole grains, fish and others, have a protective action and integrator for the proper performance of specific and general body (Editorial, 2004). Foods that, in addition to providing nutrients and substances that prevent collapse of organic resistance, are called functional foods and their constituents have shares as nutraceutical, phenolic compounds, vitamins and minerals with antioxidant (vitamins A, E and C, selenium), acidic fatty acids (linoleic acid, eicosapentaenoic acid, docosahexaenoic acid) (Esteves Monteiro, 2001; Mertens-Talcott, Percival, 2005; Lapointe; Couillard, Lemieux 2006). As the nutrients provide energy and regulate the physiological processes involved in the exercise, many individuals relate to athletic performance enhancing dietary modifications. The ability to extract energy from food macro nutrients and transfer them to continually skeletal muscle largely determines the possibilities of exercising for long periods (Wilmore, HJ, Costill, DL 2001). The development of functional foods has allowed its use in actions that go beyond the treatment of primary deficiency syndromes, making this food group is understood as any food or food ingredient that can bring health benefits, beyond the traditional nutrients they contain. Several studies have been conducted with flaxseed (FS) and the completion of much of it is that FS reduces the risk of cardiovascular disease, lowers levels of LDL-cholesterol, total cholesterol among others. A FS (Linum usitatissimum) which belongs to the family Linaceae and is cultivated by a source of oil and fiber. It contains about 55% of its constituents composed of α-linolenic acid as well as a rich source of omega 3 and 6 (ADA, 2004, Balk, EM, Lichtenstein AH, Chung, M.; Kupelnick, B., Chew, P. Lau, J, 2006). The fiber in flaxseed is rich in R-linolenic acid soluble and insoluble, is a source of lignan precursors in mammals (Vijaimohan, K.; Jainu, M., Sabitha, KE, Subramaniyam, S.; Anadhan, C., Shyamala Devi, C. S, 2006). The objective of this study was to evaluate the effects of supplementation with flaxseed on lipid profile and hemoglobin levels and testosterone in athletes and non athletes.

SUBJECTS

The subjects were formed by elite athletes, trained, male, and 9 men with a mean age of 25.1, and eight physical education students, males with a mean age of 23.6.

PROCEDURES

Before collecting all participants were informed of the purpose of research and the procedures that would be submitted. All signed a consent form. This research was submitted to and approved by the ethics committee of CESUMAR-University Center of Maringá (Case No 453/2007, 21/11/2007). The method in this research was to collect blood at times: baseline, 15, 30 and 45 consecutive days. During the forty-five days, the subjects ingested along with their normal diet 30 g / day (116 kcal) of flaxseed gold micronized (Linolive, Cisbra-RS) blended to taste with some solid food or liquid during dinner. All were instructed not to consume any additional supplement or any medicine. We evaluated blood levels of LDL-HDL-cholesterol, triglycerides, total cholesterol and testosterone in the samples. Were identified in blood values of all series red and white. All biochemical parameters were performed within the routine laboratory procedures. We assessed height and weight through Filizolla platform scale with a precision of 0.1 kg in weight and 0.1 cm in length, according to the procedures described by Pollock and Wilmore (1993). All subjects were measured and weighed barefoot with little clothing as possible. The assessment of body composition was performed before and after the start of the diet with flaxseed. Based on measurements of weight and height was calculated using Quetelet index or body mass index (BMI) according to the following Estatura2 (m).equation: BMI = body weight (kg).

DATA ANALYSIS

We used the Shapiro-Wilk test to determine the framework of numerical variables in a Gaussian distribution being analyzed homoscedasticity of the variances of the variables. The sphericity was verified by testing Maucly's. The results showed that not all numerical variables have normal distribution, so it was done calculating the percentage difference delta between the baseline sample and the average of other samples (15,30 and 45 days) was applied Student's t test for data analysis. P <0.05 was considered significant. The analysis was developed using the software GraphPrism version 4.0 2003, and has established an alpha of 5% statistical significance

RESULTS

TABLE 1: BMI before and after 45 days of use of FL (P<0,05)

	PRÉ	PÓS	p
Atletas	20,8	20,6	0,66
Não atletas	28,2	28,1	0,92

BMI: Body Mass Index

Table 2: Parameters assessed at baseline, 15, 30 and 45 days after diet with FL .

Parâmeter	Base line	Average 15-30-45dias	?%	(P)
Testosterone (ng/dl)				
athletes	630.7±239.9	730.1±232.5	15.7	0.03*
non-athletes	571.3±207.5	590.9±177.5	3.4	0.42
Hemoglobin (g/L)				
athletes	13.88±1.14	14.04±1.15	1.1	0.14
non-athletes	14.54±0.79	14.46±0.75	-0.5	0.80
Triglicerides (mg/dl)				
athletes	79.11±17.57	74.7±10.3	-0.05	0.57
non-athletes	125.8±66.5	120.1±41.2	-0.04	0.73
HDL (mg/dl)				
athletes	48.1±8.6	45.03±6.5	-0.06	0.03*
non-athletes	43.2±8.3	39.1±8.9	-0.09	0.01*
TC (mg/dl)				
athletes	165.5±18.07	158.03±22.1	-0.04	0.01*
non-athletes	168.8±24.1	155.1±20.4	-0.08	0.01*

All values are expressed as mean ± standard deviation, Δ%, P <0.05. Diet basal values of 15, 30, and 45 days with use of flaxseed meal (FL). HDL = high density lipoprotein. TC = total cholesterol

The Body Mass Index (BMI) did not change at the end with FS diet (Table 1), indicating that consumption of 30 g / d of FS for 45 days did not affect body composition in both groups. Hemoglobin levels did not change significantly with supplementation of FS, the results of the baseline sample were compared with the average value of 15, 30 and 45 days in the group of athletes and nonathletes (Table 2). The effect of supplementation with FS on the levels of testosterone (T) in both groups (Table 2). There was a significant increase in average 15.7% in the group of athletes, which differs from the group of non-athletes (3.4%), indicating that consumption of FS changed the T in individuals exposed to systematic training. There was a significant reduction in TC and HDL in both groups when compared to the average from the consumption compared to baseline (Table 2). There was no change in levels of TRG in both groups.

DISCUSSION

In this study we observed that the consumption of 30 g / day of FS for 45 days alter the lipid profile except triglycerides in both groups. Previous studies in humans show mixed results, consumption of 32 g / d of FS for 4 weeks significantly alter triglycerides in a group of 15 adults (Prassad, K, 2003). The consumption of 15 g daily of FS for 3 months reduced the TC in 18% (Bierrenbaun, ML, 1993). The consumption of FS (30 g / day) for 4 weeks reduced TC by 11% (Cunnane, SC et al, 1995). FS (50gr / d) for 4 weeks decreased by 9% TC (Cunnane, SC et al, 1993). FS (40 g / d) for 3 months reduced triglyceride levels in 12.8% (Lucas, EA et al, 2002). These variations may be due to the dosages, time, activity of the subjects evaluated. There was no change in levels of hemoglobin, this important parameter for the group of athletes. In experimental studies, dietary supplementation with FS significantly increased hematocrit (Babu, U.S. et all, 2000). However, biological effects of omega-3 (W-3), are characterized by reduced adhesion of platelets, reduced triglycerides, improving the fluidity of the membrane, increasing the flow of oxygen and nutrients to muscle tissue during exercise (Bucci, 1993). This study found significant changes in testosterone levels in the group of athletes in 15.7% (P <0.05) and the increase in the non-athletes not be significantly increased by 3.4% in the diet with FS. Because it is an anabolic hormone testosterone acts predominantly during exercises of medium and high intensity (Wilmore, HJ, Costill, DL 2001). Very little research has been carried on hormonal factors related to diet with FS. Demark-Wahnefried W et al, 2001 conducted a pilot study involving 25 men with prostate cancer. The intervention consisted of a diet low in fat and supplemented with oil, FS (30 mg / day) among the parameters measured were testosterone levels, which fell to 85% of pre-treatment values. But when the sample is composed of animals, the results are still controversial. A study in rats showed that the use of oil, FS, may have antagonistic effects, raising or lowering the hormone levels, depending on time of use and dose (TOU et al, 1999). The differences between the groups of athletes and non athletes may have been intensified by physical exercise, especially in the two weeks following the beginning of treatment with flaxseed.

CONCLUSION

The use of FS for 45 days did not alter the BMI measurements, increases T levels in athletes has a positive effect on the parameters TC and HDL cholesterol without affecting TRG levels and hemoglobin in both groups. The supplementation of athletes with the FS affects the levels of T when combined with systematic practice of physical exercises.

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EFFECT OF SUPPLEMENTATION WITH FLAXSEED ON LIPID PROFILE AND HEMOGLOBIN LEVELS AND TESTOSTERONE IN ATHLETES AND NONATHLETES.

ABSTRACT:

Several studies have been conducted with flaxseed (FS) and the realization of much of this is that FS reduces the risk of cardiovascular disease, decreased levels of HDL cholesterol, total cholesterol, among others. The aim of this study was to investigate the effects of supplementation with flax flour on lipid profile (TC, HDL and TRG) and hemoglobin (HMB) and testosterone (T) in nine elite athletes (A), mean age 25.1 and eight non-athletes (NA), with a mean age of 23.5. The participants consumed 30 g / day of LF for 45 days em dinner. Each subject performed a blood sample prior to consumption in 15, 30 and 45 days, without changing the regular diet. The subjects were instructed not to take supplements and medications. The factors analyzed were: HMB, T, HDL and TC. The analysis was performed according to routine procedures of the laboratories. The results: an increase of 15.7% for T in the trained group (P <0.05). HDL increased in both groups of 0.06 and 0.09% (P <0.05). CT decreased in both groups at 0.04 and 0.08% (P <0.05). Other factors in both groups were not significantly changed. Consumer FL for 45 days performed in this study does not change the measurements of body mass index, increased levels of T and athletes had a positive effect on the parameters of TC and HDL cholesterol in both groups. No effect was found in the parameter of hemoglobin in both groups. Our results suggest that T may be changed when the diet is associated with FL in the systematic practice of physical exercises.

KEYWORDS: linseed, elite athletes, supplementation.

EFFET DE LA SUPPLÉMENTATION EN GRAINES DE LIN SUR LE PROFIL LIPIDIQUE ET LE TAUX D'HÉMOGLOBINE ET DE TESTOSTÉRONE CHEZ LES ATHLÈTES ET LES NON-ATHLÈTES.

RÉSUMÉ:

Plusieurs études ont été menées avec les graines de lin (GL) et la réalisation d'une grande partie de cela est que GL réduit le risque de maladies cardio-vasculaires, diminution du taux de cholestérol HDL, cholestérol total, parmi d'autres. L'objectif de cette étude était d'étudier les effets de la supplémentation avec de la farine de lin sur le profil lipidique (CT, HDL et TRG) et de l'hémoglobine (HMB) et de testostérone (T) dans neuf athlètes d'élite (A), âge moyen: 25.1 et huit non - athlètes (NA), avec un âge moyen de 23,5. Les participants ont consommé 30 g / jour de la GL pour le dîner de 45 jours em. Chaque sujet a effectué une prise de sang avant d'être consommées en 15, 30 et 45 jours, sans changer le régime alimentaire normal. Les sujets ont consigne de ne pas prendre des suppléments et des médicaments. Les facteurs analysés ont été: HMB, T, HDL et TC. L'analyse a été effectuée conformément aux procédures de routine des laboratoires. Les résultats: une augmentation de 15,7% pour T dans le groupe formé (p <0,05). HDL a augmenté dans les deux groupes de 0,06 et de 0,09% (P <0,05). CT a diminué dans les deux groupes à 0,04 et 0,08% (P <0,05). D'autres facteurs dans les deux groupes n'étaient pas significativement changé. GL consommateurs pendant 45 jours effectuée dans cette étude ne modifie pas les mesures de l'indice de masse corporelle, augmentation du taux de T et les athlètes ont eu un effet positif sur les paramètres du TC et le HDL cholestérol dans les deux groupes. Aucun effet n'a été trouvé dans le paramètre de l'hémoglobine dans les deux groupes. Nos résultats suggèrent que T mai être modifié lorsque le régime alimentaire est associé à des GL dans la pratique systématique d'exercices physiques.

MOTS-CLÉS: les graines de lin, les athlètes d'élite, la supplémentation.

EFECTO DE LA SUPLEMENTACIÓN CON HARINA DE LINO SOBRE EL PERFIL LIPÍDICO Y LOS NIVELES DE HEMOGLOBINA Y LA TESTOSTERONA EN ATLETAS Y NO ATLETAS.

RESUMEN:

En varios estudios se han realizado con harina de lino (FL) y la realización de gran parte de ello es que LF se reduce el riesgo de enfermedad cardiovascular, disminuye los niveles de colesterol LDL, colesterol total, entre otros. El objetivo de este estudio fue investigar los efectos de la suplementación con harina de lino sobre el perfil lipídico (CT, HDL y TRG) y hemoglobina (SMA) y la testosterona (T) en nueve atletas de élite (A), edad media de 25,1 y ocho no atletas (NA), con una edad media de 23,5. Los participantes consumieron 30 g / día de la FL por 45 días em la cena. Cada sujeto realizó una muestra de sangre antes de su consumo en 15, 30 y 45 días, sin cambiar la dieta regular. Los sujetos fueron instruidos a no consumir suplementos y medicamentos. Los factores analizados fueron: HMB, T, HDL y TC. El análisis se realiza de acuerdo a los procedimientos de rutina de los laboratorios. Los resultados fueron: un incremento del 15,7% de T en el grupo entrenado (P <0,05). HDL aumentó en ambos grupos de 0,06 y 0,09% (P <0,05). CT disminuyó en ambos grupos en el 0,04 y 0,08% (P <0,05). Otros factores en ambos grupos no se modificaron significativamente. Consumo FL durante 45 días, realizado en este estudio no cambia las mediciones índices de masa corporal, aumento de los niveles de los atletas T y tuvo un efecto positivo en los parámetros de TC y el colesterol HDL en ambos grupos. Ningún efecto fue identificado en el parámetro de hemoglobina en ambos grupos. Nuestros resultados sugieren que T puede ser cambiado, cuando la dieta se asocia con FL a la práctica sistemática de ejercicios físicos.

PALABRAS CLAVE: harina de linaza, los atletas de elite, la suplementación.

EFEITO DA SUPLEMENTAÇÃO COM FARINHA DE LINHAÇA SOBRE O PERFIL LIPÍDICO E NÍVEIS DE HEMOGLOBINA E TESTOSTERONA EM ATLETAS E NÃO ATLETAS.

RESUMO:

Vários estudos têm sido conduzidos com farinha de linhaça (FL) e a conclusão de grande parte deles é que a FL reduz o risco de doenças cardiovasculares, diminui os níveis de LDL-colesterol, colesterol total entre outros. O objetivo deste estudo foi verificar os efeitos da suplementação com farinha de linhaça sobre o perfil lipídico (CT, HDL e TRG) e níveis de hemoglobina (HMB) e testosterona (T), em nove atletas de elite (A), com idade média de 25,1 e oito não atletas (NA), com idade média de 23,5. Os participantes consumiram 30 gr/dia de FL durante 45 dias no jantar. Cada sujeito realizou uma coleta de sangue antes do consumo, 15º, 30º e 45º dias, sem alterar a dieta regular. Os sujeitos foram orientados para não consumir nenhuma suplementação adicional e medicamentos. Os fatores analisados foram: HMB, T, HDL e CT. As análises foram feitas de acordo com os procedimentos de rotina dos laboratórios credenciados. Os resultados foram: aumento de 15,7% da T no grupo treinado (P<0,05). Aumento da HDL em ambos os grupos de 0,06 e 0,09% (P<0,05). Diminuíram o CT em ambos os grupos em 0,04 e 0,08% (P<0,05). Os demais fatores em ambos os grupos não se alteraram significativamente. O consumo FL durante 45 dias realizado neste estudo não alterou o IMC dos sujeitos avaliados, aumentou os níveis de T em atletas, bem como teve um efeito positivo nos parâmetros HDL colesterol e CT em ambos os grupos. Nenhum efeito foi identificado no parâmetro hemoglobina em ambos os grupos. Os resultados desta pesquisa sugerem que a T pode ser alterada, quando dieta com FL for associado à pratica sistemática de exercícios físicos

PALAVRAS-CHAVE: Farinha de linhaça, atletas de elite, suplementação.

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