

183 - COMPARATIVE ANALYSIS OF THE INFLUENCE OF VEGETARIAN AND NON VEGETARIAN DIETS IN TRIATHLETES PERFORMANCE, EVALUATING VO₂ MAXIMUM USING CYCLING FIELD TEST

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INTRODUCTION

Given the existing highly competitive in today's high performance sport, we are faced with various aspects of the complexity of the athlete that should be taken into account to achieve peak performance. Today, we look and work the athlete as a whole from the training itself, technical and tactical, as their psychology, stress, rest and food, that is, their individuality. Within this context, several questions arise in relation to the nutrition of these population.

A growing number of people who choose a vegetarian diet (lacto ovo vegetarian) (American Dietetic Association - ADA, 2003), whether for religious, idealistic, environmental issues or simply looking for a decrease in saturated fat intake and cholesterol content in red meats. Included in this group of people are a lot of athletes, and high end amateurs. According to the ADA in 2000, approximately 2.5% of the adult population of the United States (4.8 million) took a vegetarian diet and claimed they had never eaten meat, poultry or fish.

An omnivorous diet is based on meat, especially beef, pork, poultry and fish all other varieties of food are considered 'accompaniment'. A vegetarian diet is characterized by completely excluded all sources of meat animal products and by-products of the same. (MCARDLE; KATCH; KACTH, 2003).

It is vital to athletic performance, the maintenance of energy balance. For athletes, the total caloric intake is based on assessing the type, intensity, frequency and duration of exercise. The goal of feeding before, during and after exercise is to maintain and restore the glycogen, so carbohydrates are key in all stages (Ferreira, BURINI, MAIA, 2006)

In view of the foods that fuel the human body primarily energy, carbohydrates play a vital role to maintain and re-establish the muscle and liver glycogen.

Triathlon is a sport that covers three different modes: swimming, cycling and running. They all have a preference aerobic energy demand. Thus, the triathlete should improve their aerobic capacity (Burke, 2003; LOPEZ, ALONSO, 2003). For the purpose of this study only cycling was evaluated. Muscle glycogen is the preferred energy substrate for aerobic metabolism in high intensity. Therefore, the carbohydrate is vital for the restoration of glycogen and maintenance of performance (MCARDLE; KATCH; KATCH, 2003).

As the sources of vegetarian protein are mostly associated with carbohydrates adopt a vegetarian diet have a higher amount of the essential substrate for endurance exercise, the carbohydrate.

This study is contributing to the scientific community and athletes on nutritional aspects most favorable to achieve the desired performance and help clarify the questions about the influence of vegetarian and non vegetarian diets in the performance of triathletes, analyzing the data of VO₂ maximum (Lopez & Alonso, 2003), using cycling field test.

Given this discussion: What is the influence of vegetarian and non vegetarian diets in triathletes performance?

MATERIAL & METHODS

This study is characterized as to be a field, indirect, descriptive and comparative, as the results obtained in the tests were evaluated and compared in relation to the parameters of VO₂ max (Thomas and Nelson, 2006).

Participants were 4 athletes of the "Ironman" held in Florianopolis in May 2007, 2 elite male and 2 category M 4044 (male between 40 and 44 years. One from each category was classified as a vegetarian, through diet recall 24 hours and 3 days registration (PEREIRA & KOIFMAN, 1999).

Before the test were applied inquiry of health history and PAR-Q. Armed with the PAR_Q negative volunteers were tested.

We carried out field test according to the following preparation: We used the roll brand Blackburn (Defender model), which stood at the rear wheel of the bicycle of each athlete. The roll was caught on resistance 2. The cycle sensor (Cateye - Enduro 2) was installed in the rear wheel of the bicycle. Athletes used the cardiac frequency counter (Polar - 610). The athletes made a 20 min warm up on the bike. The gear ratios of the bike could normally be modified during the heating and testing and were determined by the athlete evaluated.

The incremental test started at a speed of 24 km / h. Every km increased the speed in 2 km / h until voluntary exhaustion or until no longer possible to maintain the prescribed speed The heart rate was recorded every km. The value of the last kilometer was validated when the athlete was able to maintain speed until the final kilometer, otherwise the previous stage was considered as the maximum achieved. (adapted from Triathlete'S TRAINING BIBLE, 2004). The wheels used by athletes had 210 cm in circumference.

The data collected were used to predict VO₂ max by calculating the work done in Watts using the equivalence of 1 watt = 6.12 kgm / min and 1 Watt = 1.8 mlO₂ / kg / min (ACSM, 2007), so getting the VO₂ max of each athlete.

This study meets the Standards for the Conduct of Human Research, Resolution 196/96 of the National Health Council, 10/10/1996.

After data collection, we used descriptive statistics (mean and standard deviation) in order to identify the core values of the groups and subsequently verified the existence of significant differences (p < 0.05) between groups using the differential analysis by T test of Student.

ANALYSIS AND DISCUSSION OF RESULTS

We tested four (4) athletes and by analysis of dietary surveys, were categorized into vegetarians and non-vegetarians. The data are shown in table A.

	Group	Vegetarian	Nonvegetarians
Age	34.75 ± 8.42	34.00 ± 9.90	35.50 ± 10.61
Body Mass	76.50 ± 8.19	83.50 ± 2.12	69.50 ± 0.71
Height	1.175 ± 0.05	1.80 ± 0.04	1.71 ± 0.01
Baseline HR	44.50 ± 7.68	40.50 ± 10.61	48.50 ± 0.71
Resting HR	61.25 ± 6.08	57.50 ± 2.12	65.00 ± 7.07
Years of training	8.25 ± 6.70	10.00 ± 9.90	6.50 ± 4.95

TABLE A. Mean and standard deviation of the group, vegetarians and non vegetarians in relation to age, weight, height, baseline HR, FC home and years of training.

The vegetarians had a higher body mass compared with non-vegetarians, but this difference may be related to a greater height. The vegetarians had a percentage difference of 16.49% and 11.53% lower compared to baseline HR and resting respectively, the difference was not significant in absolute terms.

Years of training have not been taken into account because the athletes who reported more training time, interrupted this training several times, so we can flush them regarding the continuity of training.

After the tests, we obtained the mean and standard deviation of the group, mean and standard deviation of vegetarians and non-vegetarians. The data collected are shown in Table B.

	Group	Vegetarian	Nonvegetarians
HR max.		180.00 ± 2.83	182.00 ± 5.66
VO2 max.	64.83 ± 2.20	65.50 ± 3.01 *	64.17 ± 1.90
Km total test	24.25 ± 2.22	25.00 ± 2.83	23.50 ± 2.12
Total time on test (min)	33.98 ± 1.85	34.60 ± 2.33	33.36 ± 1.82

TABLE B Comparison of maximum heart rate, VO2 max, total mileage reached during the test time and the testing of athletes and non-vegetarians vegetarians. * Vegetarians have obtained a 3.71% higher performance compared to the group of non-vegetarians using as the VO2 max.

VO 2 max found as expected for top athletes of this type of procedure (Carpi et al, 2005; LOPEZ, ALONSO, 2003; DENADAI, B., CRUZ, I. & Russo, 1994).

The results obtained in field tests, the vegetarian athletes achieved a 3.71% higher performance to the group of non-vegetarian athletes, comparing the parameter of VO 2 max. This difference was not significant ($p < 0.05$).

This result is in line with the work of Ferreira, Burini and Maia (2003), showing that there is no significant difference in aerobic performance related to the vegetarian and non vegetarian diets.

CONCLUSIONS AND RECOMMENDATIONS

According to Nieman (1999), a vegetarian diet is not associated with better endurance performance, but other benefits of this type of diet should be taken into account by the athletes. Vegetarians often eat a greater amount of carbohydrate, which is essential for the maintenance of endurance exercise, dietary fiber, potassium, folate, antioxidants and photochemical (ADA, 2003), which may help decrease oxidative stress associated with strenuous exercise.

The vegetarian diet, if well structured and varied supplies all the nutritional needs of the athlete and do not affect aerobic performance.

is recommended that more studies be undertaken in this area by evaluating a larger number of athletes in order to standardize the type of training the day before the test, preferably that day off and collecting the data of 1 and 5 minutes recovery time.

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COMPARATIVE ANALYSIS OF THE INFLUENCE OF VEGETARIAN AND NON VEGETARIAN DIETS IN TRIATHLETES PERFORMANCE, EVALUATING VO₂ MAXIMUM USING CYCLING FIELD TEST

ABSTRACT:

Given the existing highly competitive in today's high performance sport, we are faced with various aspects of the complexity of the athlete that should be taken into account to achieve peak performance. The nutrition and exercise physiology are a natural link. Proper nutrition is the foundation for physical performance, and provides the fuel for biological work and the chemicals to extract and use the potential energy in this fuel. The sources of vegetarian protein are mostly associated with carbohydrate and non vegetarian associated with fats, so it is expected that people who adopt a vegetarian diet have a higher amount of essential substrate for endurance exercise, carbohydrate. This study is to contribute to the scientific community, coaches and athletes on nutritional aspects most favorable to achieve the desired performance and help clarify the questions about the influence of vegetarian and non vegetarian diets in the performance of triathletes, analyzing the data of VO₂ maximum, using field test. Participants were 4 athletes of the "Ironman" held in Florianópolis in 2007 (34.75 ± 8.42 years, 76.5 ± 8.19 kg body weight, 1.75 ± 0.05 m in height), 2 elite male and 2 category M 4044 (male between 40 and 44 years) Of these, one in each category was classified as vegetarian. There was no significant difference (p < 0.05) in aerobic performance related to vegetarian diets (65.50 ± 3.01 mlO₂ / kg / min VO₂ max) and non vegetarian (64.17 ± 1.90 mlO₂ / kg / min VO₂ max) A vegetarian diet is not associated with better endurance performance, but other benefits of this type of diet should be taken into account by the athletes. The vegetarian diet, if well structured and varied supplies all the nutritional needs of the athlete and not affect your aerobic performance.

KEYWORDS: vegetarian diet, aerobic performance, triathlon

ANALYSE COMPARATIVE DE L'INFLUENCE DES RÉGIMES VÉGÉTARIENS ET NON-VÉGÉTARIENS TRIATHLÈTES PERFORMANCE, EVALUATION VO₂ MAX TEST DE PRATIQUE DANS LE CYCLISME

RÉSUMÉ:

Compte tenu des très compétitif dans le sport de haute performance d'aujourd'hui, nous sommes confrontés à divers aspects de la complexité de l'athlète sont pris en compte afin d'obtenir un rendement maximum. La nutrition et la physiologie de l'exercice sont un lien naturel. Une bonne alimentation est le fondement de la performance physique, et fournit le combustible pour les travaux biologiques et les produits chimiques pour extraire et utiliser l'énergie potentielle dans le carburant. Les sources de protéines végétales sont pour la plupart associés à l'alimentation riche en glucides et non Végétarien associé à des graisses, il est donc s'attendre à ce que les gens qui adoptent un régime végétarien ont une plus grande quantité de substrat indispensable à l'exercice d'endurance, les glucides. Cette étude est de contribuer à la communauté scientifique, les entraîneurs et les athlètes sur les aspects nutritionnels les plus favorables pour atteindre l'efficacité souhaitée et aider à clarifier les questions sur l'influence des végétariens et non végétariens à la performance des triathlètes, en analysant les données de la VO₂, essai sur le terrain en utilisant au maximum. Les participants ont été de 4 athlètes de la "Ironman" s'est tenu à Florianópolis en 2007 (34,75 ± 8,42 années, 76,5 ± 8,19 kg de poids corporel, de 1,75 ± 0,05 m de hauteur), 2 de l'élite masculine et 2 de M 4044 (de sexe masculin entre 40 et 44 ans). Parmi eux, un dans chaque catégorie a été classé comme végétarien. Il n'y avait pas de différence significative (p < 0,05) de la performance aérobie liés à l'alimentation végétarienne (65.50 ± 3.01 mlO₂ / kg / min, VO₂ max) et non végétarien (64,17 ± 1,90 mlO₂ / kg / min, VO₂ max). Un régime végétarien n'est pas associée à une meilleure performance d'endurance, mais d'autres prestations de ce type de régime alimentaire doit être pris en compte par les athlètes. Le régime végétarien, s'il est bien structuré et varié fournit tous les besoins nutritionnels de l'athlète et ne pas affecter les performances de votre aérobie.

MOTS-CLÉS: alimentation végétarienne, les performances aérobies, triathlon

ANALISIS COMPARATIVO DE LA INFLUENCIA DE DIETAS VEGETARIANOS Y NO VEGETARIANOS EM EL DESEMPEÑO DE TRIATLETAS, EVALUANDO VO₂ MAXIMO EM PRUEBAS DE CICLISMO SIMULADO

Este estudio tiene la finalidad de contribuir con la comunidad científica, los entrenadores y los atletas en los aspectos nutricionales más favorables para lograr el desempeño deseado y ayudar a clarificar las preguntas sobre la influencia de los vegetarianos y no vegetarianos en el rendimiento de los triatletas, el análisis de los datos del VO₂ máximo, utilizando el campo de prueba. Los participantes fueron 4 atletas del "Ironman" que se celebró en Florianópolis, en 2007 (34,75 ± 8,42 años, 76,5 ± 8,19 kg de masa corporal, 1,75 ± 0,05 m de altura), 2 de la "élite" masculina y 2 da categoría M 4044 (de sexo masculino entre 40 y 44 años). De ellos, uno en cada categoría se clasifican como vegetarianos. No hubo diferencias significativas (p < 0,05) en el rendimiento aeróbico relacionados con las dietas vegetarianas (65,50 ± 3,01 mlO₂/kg/min de VO₂ máximo) y no vegetarianos (64,17 ± 1,90 mlO₂/kg/min de VO₂ máximo). La dieta vegetariana no está asociado con un mejor rendimiento de la resistencia, pero otros beneficios de este tipo de dieta se debe tener en cuenta por los atletas. La dieta vegetariana, si bien estructurado y variada suministra todas las necesidades nutricionales del deportista y no afecta a su rendimiento aeróbico.

PALABRAS CLAVE: dieta vegetariana, el rendimiento aeróbico, triatlón

ANÁLISE COMPARATIVA DA INFLUÊNCIA DAS DIETAS VEGETARIANAS E NÃO VEGETARIANAS NO DESEMPENHO DE TRIATLETAS, AVALIANDO VO₂ MÁXIMO EM TESTE SIMULADO DE CICLISMO

RESUMO:

Diante da grande competitividade existente hoje no esporte de alto rendimento, nos deparamos com vários aspectos da complexidade do atleta que são levados em consideração para atingir o pico máximo de performance. A nutrição e a fisiologia do exercício constituem um elo natural. A nutrição apropriada é o alicerce para o desempenho físico; proporciona o combustível para o trabalho biológico e as substâncias químicas para extrair e utilizar a energia potencial existente dentro desse combustível. As fontes protéicas da dieta vegetariana estão, em sua maioria associadas a carboidratos e as da dieta não vegetariana associadas a gorduras, assim, é de se esperar que as pessoas que adotam uma dieta vegetariana tenham um maior aporte do substrato essencial para o exercício de resistência, o carboidrato. Este estudo vem a contribuir com a comunidade científica, técnicos e atletas sobre os aspectos nutricionais mais favoráveis para atingir o desempenho desejado e ajudar a elucidar os questionamentos sobre a influência das dietas vegetarianas e não vegetarianas no desempenho de triatletas, analisando os dados de VO₂ máximo, utilizando teste de campo. Participaram do estudo 4 atletas participantes do "Ironman" realizado em Florianópolis em maio de 2007 (34,75 ± 8,42 anos; 76,5 ± 8,19 kg de massa corporal; 1,75 ± 0,05 m de estatura), 2 da categoria Elite masculina e 2 da categoria M 4044 (masculina entre 40 e 44 anos). Destes, um de cada categoria foi classificado como vegetariano. Não houve diferença significativa (p < 0,05) no desempenho aeróbico relacionada com as dietas vegetarianas (65,50 ± 3,01 mlO₂/kg/min de VO₂ máximo) e não vegetarianas (64,17 ± 1,90 mlO₂/kg/min de VO₂ máximo). A dieta vegetariana não está associada com melhor desempenho aeróbico, porém outros benefícios deste tipo de dieta devem ser levados em consideração pelos atletas. A dieta vegetariana, desde que bem estruturada e variada supre todas as necessidades nutricionais do atleta e não prejudica seu desempenho aeróbico.

PALAVRAS-CHAVE: dieta vegetariana; desempenho aeróbico; triatlo