



Contents lists available at BioMedSciDirect Publications

International Journal of Biological & Medical Research

Journal homepage: www.biomedscidirect.com

Original Article

Effect of Moringa Oleifera Leaf Extracts And Honey Supplementation For Performance Physical Fitness Atlit Pplp

Muh Said Hasan^a, Veni Hadju^b, Mashuri Masri^c, Suryani As'ad^d, Gemini Alam^e, Abraham Razak^f, Anna Khuzaimah^g

^aSport Coaching Education Faculty, State University of Makassar, Jl. Wijaya Kusuma Raya 14 Makassar, South Sulawesi, Indonesia

^bHasanuddin University, Faculty of Public Health, Jl. Perintis Kemerdekaan Km. 10 Tamalanrea Makassar, South Sulawesi, Indonesia

^cIslamic State University of Alauddin Makassar, Department of Biology, Faculty of Science and Technology, Jl. Sultan Alauddin, Samata Campus, Gowa Regency, South Sulawesi, Indonesia

^dHasanuddin University, Department of Clinical Nutrition, Faculty of Medicine, Jl. Perintis Kemerdekaan Km. 10 Tamalanrea Makassar, South Sulawesi, Indonesia

^eHasanuddin University, Faculty of Pharmacy, Jl. Perintis Kemerdekaan Km. 10 Tamalanrea Makassar, South Sulawesi, Indonesia

ARTICLE INFO

Keywords:

*Athlete PPLP,
Supplements Moringa Leaf Extract,
Honey, nutritional status,
total antioxidant levels.
Physical Fitness.*

ABSTRACT

Moringa leaf extract-containing compounds such as polyphenols, flavonoids and phenols which is an antioxidant components as free radical scavengers and Honey contains compounds which components of the antioxidant polyphenols, flavonoids and phenols. The antioxidant activity as a substance that can inhibit or slow down the process of oxidation and antioxidants that play a role in preventing and inhibiting electron leakage, oxidative damage in muscle tissue, liver, blood, and can be exhausting mitochondria which is the center of power production that have an impact on athletes who underwent sports routine. The purpose of this study was to know the effect of giving a natural antioxidant supplement (+ Moringa leaf extract honey) on physical performance in athletes PPLP Fitness in Makassar.

© Copyright 2010 BioMedSciDirect Publications IJBMR - ISSN: 0976:6685. All rights reserved.

1. Introduction

Sporting success depends primarily on the genetic potential (talent) in athletes by looking at the psychological aspect, morphological, physiological and metabolic as a special feature for performance characteristics of each sport athletes. Athletes who have the genetic potential (Talent) as well endowed should be given the maximum workout, optimized to enhance the physical ability, improve mental strength, and provide mechanical advantage. However, athletes often feel less at a given exercise every day. So many athletes try to go beyond the given exercises and techniques with the use of substances, often referred to as ergogenics, in an attempt to gain a competitive advantage. Pharmacological agents, such as steroi and abolik and amphetamines, have been used in the past, but the practice with athletes has led to the establishment of law and the anti-doping test results are effective to help prevent its use. Thus, many athletes have turned control every aspect of diet strategies, including the use of various food supplements (sports supplements), which they consider to be an effective, safe and legal. (Andrew W Subudih et al, 2001).

Proper use of supplements is an important prerequisite for the effectiveness of the increase in performance athletes, for recovery from fatigue, to avoid injury. Although athletes need natural foods consumed normally, but there are several nutritional factors that are difficult to get at an adequate level in normal diet. Because athletes need more nutrition to support the performance of exercise each day is recommended. Thus an athlete really needs to be given additional nutrients in the form of a supplement which contains few nutrients. (Kreider, et al 2010).

Moringa leaf extract-containing compounds such as polyphenols, flavonoids and phenols which is an antioxidant components as free radical scavengers and Honey contains compounds which components of the antioxidant polyphenols, flavonoids and phenols. The antioxidant activity as a substance that can inhibit or slow down the process of oxidation and antioxidants play a role in preventing and inhibiting electron leakage, oxidative damage in muscle tissue, liver, blood, and can be exhausting mitochondria which is the center of power production that have an impact on athletes who underwent routine exercise.

Material And Method

This type of research is a quasi experiment research. With a randomized study design Group pre test - post test design. On this design Intervention group A and group B. The number of samples Intervention in each group is at least 20 athletes, so it takes 40 teenage athletes who are following the practice of coaching from an early age.

All athletes who meet the criteria of the sample was divided into two groups by simple random sampling. The first group is a group of athletes who received the supplement Moringa leaf extract 2000 mg / day and honey 40 mg / day. The second group are the athletes who received placebo and Honey 40 mg / day. Medical examinations before and after the intervention, routine blood sampling as much (5^oc) for total antioxidant level examination requirements. Antopometri measurements (weight and height).

Moringa leaves are selected in this study came from Gowa and Takalar. Moringa leaves that have been picked and then washed, drained by way aerate for 2 hours, then threshed in order to separate from the stalk. Furthermore, Moringa leaf is dried using an oven with a temperature of 30-40 ° C for 3-4 hours or until dry to

* Corresponding Author : **Muh Said Hasan**

State University of Makassar,
Sport Coaching Education Faculty,
Jl. Wijaya Kusuma Raya 14 Makassar,
South Sulawesi, Indonesia.

©Copyright 2010 BioMedSciDirect Publications. All rights reserved.

a moisture content <10%, the process of maceration is dried Moringa leaves soaked with 30% ethanol for 1x 24 hours, repeated for 3 times. Then squeezed and filtered using gauze to separate and extract the dregs. Extract in a rotary evaporator to remove ethanol for 48 hours at a temperature of 30-40 ° C, freeze dried in the dryer freezer for 24 hours. Grinding done to obtain flour extract. Furthermore, the quality control is done through the examination of water content, microbial, and organoleptic. Subsequently mix the dry extract + Moringa powder with a ratio of 4: 1, then carried the capsule filling. Each capsule of 400 mg + 100 mg extract of Moringa flour. The dose given 2000 mg / day in 2 doses per day.

Results And Discussion

Table 1. Results of the difference in average levels of total antioxidants (TCA) pretest and posttest for both groups Intervention.

| Total Concentration of Antioxidan (mol/ml) | Pre test X±SD | Pos test X±SD | Value (p) | Δ(T3 TO) X±SD | Mann U witney (p) |
|--|---------------------|---------------------|-------------|--------------------|-------------------|
| KM | 16.69 ±13.21 | 19.28 ±12.80 | 0.00 | 2.59 ±2.79 | 323 |
| PM | 18.01 ±17.37 | 24.61 ±24.74 | 0.00 | 6.59 ±17.50 | |

The primary data source in 2015

Total antioxidant levels in both groups ; Moringa leaf extract and Honey (KM), Placebo and Honey (PM). Both groups are on average increased before and after the intervention. For KM 16.69 ± 12.80 ± 13:21 and 19:28 nmol / ml, (p <0.05), and For PM 18:01 ± 17:37 and 24.61 ± 24.74, p <0.05. (table 1).

Table 2. Results of the difference in average body mass index (BMI) pretest-posttest for both groups Intervention

| Body Mass Index (BMI) | Pre test X±SD | Pos test X±SD | Value (p) | Δ(T3 TO) X±SD | Mann U Witney |
|-----------------------|--------------------|-------------------|-------------|------------------|---------------|
| KM | 20.81 ±1.34 | 21.2 ±1.40 | 0.00 | .402±.582 | .839 |
| PM | 21.41 ±2.98 | 21.8 ±3.01 | 0.00 | .407±.708 | |

The primary data source in 2015

Nutritional status in both groups are increase before and after the intervention, For KM 20.81 ± 1:40 ± 1:34 and 21:21, (p <0.05), and for PM 21:41 ± 2.98 and 21.81 ± 3:01 , (p <0.05) (table 2).

Table 3. Results of the difference in average performance physical fitness (physical fitness) for both intervention groups

| Bleep Test (Minute) | Pre test X±SD | Pos test X±SD | Value (p) | Δ(T3 TO) X±SD | Mann U Whitney |
|---------------------|-------------------|--------------------|-------------|-------------------|----------------|
| KM | 9.80 ±1.63 | 11.15 ±1.37 | 0.00 | 1.34 ±.984 | 0.194 |
| PM | 9.10 ±1.52 | 9.96±1.51 | 0.00 | .86±.777 | |

The primary data source in 2015

Physical fitness in both groups are increase before and after the intervention. For KM 9.80 ± 1.63 and ± 1:37 11:15, (p <0.05), and for PM 9:10 ± 1:52 and 1:51 ± 9.96 (p <0.05) (table 3).

DISCUSSION

Protection of the body from free radicals needed a strong defense that form a substance that can prevent and stop the destruction caused by free radicals. Research shows that the body forming the necessary antioxidants to counteract the adverse effects of oxidants. However, if the number of oxidants / free radicals greatly exaggerated it is necessary also antioxidants that come from outside the body (Exogenous). Notable among them are Vitamin C, vitamin E and beta-carotene (pro-vitamin A), (Karakilcik et al., 2014) and (Mankowski et al., 2015)

Benefits of antioxidants are very large, so the need for supply of antioxidants is very high, especially for men require more antioxidants than in women, and at that age already half a century also require more antioxidants than at a young age, but the athlete with high activity and weight require more antioxidants.

Athletes with high intensity until exhaustive (vigorous exercise) produce oxidants / free radicals in large quantities can cause oxidative damage to muscle tissue, liver, blood and other tissues. In the event of over-training, the production of oxidants / free radicals increases beyond the ability of endogenous antioxidants which can cause damage to the muscle and skeletal. Therefore heavy sportsmen require additional exogenous antioxidants. (Konig et al., 2001) and (Hadzovic-Dzuvo et al., 2014).

Based on the results of statistical analysis proved that the antioxidant effect on the performance of physical fitness athletes before and after the intervention in the KM group. So this is a proof that the intervention of Moringa leaf extract and honey can increase total antioxidant levels so that we can draw the conclusion that the total antioxidant can improve athletic performance physical fitness through the intervention of Moringa leaf extract and honey.

Mechanism of the formation of oxidants / free radicals during exercise is the first occurrence of leakage of electrons in athletes undergoing regular exercise (weight), the oxygen consumption may increase 10 s / d 20 times or more breaks. While most burdened muscle fibers (most active) can consume O_2 100 s / d 200 times that of normal (Cooper, 1994) use the extraordinary O_2 will trigger the release of oxidants in the network and can be tiring mitochondria is central to the formation of energy. Second. Ischemic reperfusion (Cooper, 1994) in strenuous exercise, blood to organs that are inactive for example the liver, kidneys, stomach and intestines, switch to the active muscles (legs and heart). This leads to a shortage of O_2 (hypoxia) acutely in these organs. When the exercise is stopped, the blood will quickly flow back into the organs. This process is called reperfusion. And this is attributed to the release of large amounts of oxidants. It thus also occur in the muscles that are involved in strenuous exercise. Over load especially when approaching or reaching the level of exhaustion.

The exercises are strength (anaerobic dominant) also produce large amounts of free radicals; it will also be very beneficial antioxidants. In this case antioxidant supplements speed recovery and muscle regeneration after sports (Tiidus, 1998). In the athletes mountaineers and rock climbing are athletes who require a large force that must have trained muscles in the entire body. In the jungle gym at altitude, pentane levels in air expirasinya increased, which means the formation of oxidants / free radicals in large quantities. But if athletes consume supplements of vitamin E 200 mg / day for four weeks, then the formation of pentane decreased while increasing its capabilities. Vitamin E also prevents muscle soreness and muscle spasms (Cramps). This is consistent with the results of research conducted on athletes of antioxidant status and oxidative stress in elite alpine ski racers, suggesting that the antioxidant status of elite alpine skiing may decrease during the period of intensive training, (Subudhi AW, et al, 2001).

Antioxidants are chemicals that help protect body cells from damage by free radicals. Moringa leaf extract supplementation containing 46 powerful antioxidants, compounds that protect the body against the damaging effects of free radicals by neutralizing them before they can cause damage to cells and become disease.

Antioxidant compounds contained in extracts of Moringa leaves are Vitamin A, Vitamin C, Vitamin E.

Optimal nutritional status can ensure increased physical ability, intelligence and work productivity. Setting a balance between intake and nutritional needs of the body is very important because of the tendency or excess nutrients effect on the physical fitness of an athlete.

Nutritional status in both groups are increase before and after the intervention, For KM $20.81 \pm 1.40 \pm 1.34$ and $21:21$, ($p < 0.05$), and for PM $21:41 \pm 2.98$ and $21.81 \pm 3:01$, ($p < 0.05$) (table 2).

Based on the results of statistical analysis proves that good nutrition status affects the performance of physical fitness athletes before and after the intervention of Moringa leaf extract and honey. it became evident that the intervention of Moringa leaf extract and honey can improve the nutritional status of athletes so that we can draw the conclusion that a good nutritional status can improve athletic performance physical fitness through the intervention of Moringa leaf extract and honey.

Nutritional status of a person closely related to the nutrient intake of food consumed both quantity and quality. (Mc Williams, 1980). In adolescence, the body needs nutrients very high reaching the maximum level, the need for very high nutrient is necessary to meet the developmental needs of the body so that the body is accelerating growth (peak velocity). If the nutritional needs are not met, it will cause delays in the development of the body that the body ultimately did not reach the growth and development perfectly, (Goddess of 1996).

Antioxidants and physical fitness performance.

Routine activities are carried out every day as a menu of exercise in order to provide adaptation to the body / muscle early on, so that the body can be the optimal training zone. Exercise programs are given every day, in the form of training techniques and tactics are regulated by intensity, duration, and frequency of exercise. Athletes who have the genetic potential (talent) and able to optimize themselves, resistant to the imposition of the exercise. The athlete has a great chance to improve the performance to a higher level. Great potential possessed by an athlete should be coupled with a self-protection from various diseases, particularly injury that often haunt an athlete caused by an inflammatory reaction caused by the infiltration of phagocytes which is triggered by excessive mechanical stress.

That requires a supplement that has a role that can prevent, inhibit and reduce the role of free radicals that have the potential occurrence of muscle damage and other cellular networks. Natural antioxidant supplements that are free of chemicals and has a role in preventing muscle damage, delaying muscle fatigue.

Physical fitness in both groups are increase before and after the intervention. For KM 9.80 ± 1.63 and $\pm 1:37$ 11:15, ($p < 0.05$), and for PM $9:10 \pm 1:52$ and $1:51 \pm 9.96$ ($p < 0.05$) (table 3).

Based on the results of statistical analysis proved that physical fitness athletes on average had increased before and after the intervention of Moringa leaf extract and honey. This is a proof that the intervention of Moringa leaf extract and honey can improve physical fitness athletes so that we can draw the conclusion that the antioxidants found in Moringa leaf extract content + honey can improve physical fitness performance athletes.

Studies show that antioxidants play a role in preventing, inhibiting the rate of free radicals and prevent muscle kerusan. Moringa leaf extract and honey is a supplement that possess a high content of natural antioxidants. The benefits of the natural antioxidant content contained in extracts of leaves of Moringa + honey is comparable to the synthetic antioxidant supplements. So that the function of Moringa leaf extract honey + is equal to the product of antioxidants synthetic (manufactured) and safe when consumed for a long time.

Conclusion

Moringa leaf extract supplementation + honey on the athlete can increase the levels of total antioxidants that play a role in preventing and inhibiting the oxidation process and play a role in preventing oxidative damage to muscle tissue, liver and blood that could potentially affect the athlete's performance improvement of physical fitness. Moringa leaf extract + honey is a supplement that has a high content of natural antioxidants. Comparable to the synthetic antioxidant supplements. So that the function of Moringa leaf extract honey + is equal to the product of artificial antioxidants and plant extracts of the leaves of Moringa + honey is safe if taken for a long time.

REFERENCES :

1. Almitsier Sunita, Prinsip Dasar Ilmu Gizi. PT Gramedia Pustaka Utama Jakarta : 2003.
2. Abdulrahman, M.A., Mekawy, M.A., Awadalla, M.M., and Mohamed, A.H. 2010. Bee Honey Added to Oral Rehydration Solution in Treatment of Gastroenteritis in Infants and Children. *J. Med Food*. 13. (3): 605-609.
3. Abramson, J.L. and Vaccarino, V. 2002. Relationship Between Physical Activity and Inflammation Among Apparently Healthy Middle-aged and Older US Adults. *Arch Intern Med* Vol. 162 No. 11, June 10, 2002. p:1286-1292.
4. Al-Waili, N.S., Akmal, M, Al-Waili, F.S., Saloom, Kh.Y. and Ali, A. 2005. The Antimicrobial Potential of Honey from United Arab Emirates on Some Microbial Isolates. *Medical Science Monitor*. 11. (12) : BR433 - 438.
5. Bloomer, R.J. 2007. The role of nutritional supplements in the prevention and treatment of resistance exercise-induced skeletal muscle injury. Available from :<http://www.ncbi.nlm.nih.gov/pubmed/17503877>. Accessed August 21, 2010.
6. Bogdanov, S. 2009. Honey Composition, (Online), (Bee Product Science, www.bee-hexagon.net, diakses 1 Oktober 2012).
7. Clarkson, P.M., and Thompson, H.S. 2000. Antioxidants: what role do they play in physical activity and health?. *Am J Clin Nutr* 2000;72(suppl):637S- 46S.
8. Erguder, B.I., Kilicoglu, S.S., Namuslu, M., Kilicoglu, B., Devrim, E. and Kismet, K. 2008. Honey Prevents Hepatic Damage Induced by Obstruction of The Common Bile Duct. *World Journal of Gastroenterology*. 14 (23): 3729 - 3732.
9. Fiorani, M., Accorsi, A., Blasa, M., Diamantini, G., and Piatti, E. 2006. Flavonoids from Italian Multifloral Honeys Reduce the Extracellular Ferricyanide in Human Red Blood Cells. *J. Agric Food Chem*. 54: 8328 - 8334.
10. Fuglie, L. J. 2007. The Moringa Tree :A local Solution to malnutrition. Unpublished manuscript.<Effectofsupplementing crossbred Xhosa lop-eared goat.pdf>.
11. Gardiner, P., et al. 2008. Factors and common conditions associated with adolescent dietary supplement use: an analysis of the National Health and Nutrition Examination Survey (NHANES). *BMC Complement Altern Med* 8:9.
12. Heikkinen, A., et al. 2011. Use of dietary supplements in Olympic athletes is decreasing: a follow-up study between 2002 and 2009. *J Int Soc Sports Nutr* 8:1.
13. Mason, B. C., and M. E. Lavallee, 2012, Emerging Supplements in Sports. *Sports Health* 4(2):142-6.
14. Petroczi, A., and D. P. Naughton, 2007. Supplement use in sport: is there a potentially dangerous incongruence between rationale and practice? *J Occup Med Toxicol* 2:4.
15. Rodek, J., D. Sekulic, and M. Kondric, 2012. Dietary supplementation and doping-related factors in high-level sailing. *J Int Soc Sports Nutr* 9:51.
16. BRINKMANN, C. & BRIXIUS, K. 2013. Peroxiredoxins and sports: new insights on the antioxidative defense. *J Physiol Sci*, 63, 1-5.
17. DJORDJEVIC, D. Z., CUBRILO, D. G., BARUDZIC, N. S., VULETIC, M. S., ZIVKOVIC, V. I., NESIC, M., RADOVANOVIC, D., DJURIC, D. M. & JAKOVLJEVIC, V. 2012a. Comparison of blood pro/antioxidant levels before and after acute exercise in athletes and non-athletes. *Gen Physiol Biophys*, 31, 211-9.
18. DJORDJEVIC, D. Z., CUBRILO, D. G., PUZOVIC, V. S., VULETIC, M. S., ZIVKOVIC, V. I., BARUDZIC, N. S., RADOVANOVIC, D. S., DJURIC, D. M. & JAKOVLJEVIC, V. 2012b. Changes in athlete's redox state induced by habitual and unaccustomed exercise. *Oxid Med Cell Longev*, 2012, 805850.
19. GARDINER, P., BUETTNER, C., DAVIS, R. B., PHILLIPS, R. S. & KEMPER, K. J. 2008. Factors and common conditions associated with adolescent dietary supplement use: an analysis of the National Health and Nutrition Examination Survey (NHANES). *BMC Complement Altern Med*, 8, 9.
20. HADZOVIC-DZUVO, A., VALJEVAC, A., LEPARA, O., PJANIC, S., HADZIMURATOVIC, A. & MEKIC, A. 2014. Oxidative stress status in elite athletes engaged in different sport disciplines. *Bosn J Basic Med Sci*, 14, 56-62.
21. HEIKKINEN, A., ALARANTA, A., HELENIUS, I. & VASANKARI, T. 2011. Use of dietary supplements in Olympic athletes is decreasing: a follow-up study between 2002 and 2009. *J Int Soc Sports Nutr*, 8, 1.
22. KARAKILCIK, A. Z., HALAT, R., ZERIN, M., CELIK, H. & NAZLIGUL, Y. 2014. Effects of vitamin C and exercise on lipid profile, platelet and erythrocyte indices in young soccer players. *J Sports Med Phys Fitness*, 54, 665-71.
23. KONIG, D., WAGNER, K. H., ELMADFA, I. & BERG, A. 2001. Exercise and oxidative stress: significance of antioxidants with reference to inflammatory, muscular, and systemic stress. *Exerc Immunol Rev*, 7, 108-33.
24. MANKOWSKI, R. T., ANTON, S. D., BUFORD, T. W. & LEEUWENBURGH, C. 2015. Dietary Antioxidants as Modifiers of Physiologic Adaptations to Exercise. *Med Sci Sports Exerc*.
25. MASON, B. C. & LAVALLEE, M. E. 2012. Emerging Supplements in Sports. *Sports Health*, 4, 142-6.
26. PETROCZI, A. & NAUGHTON, D. P. 2007. Supplement use in sport: is there a potentially dangerous incongruence between rationale and practice? *J Occup Med Toxicol*, 2, 4.
27. RODEK, J., SEKULIC, D. & KONDRIC, M. 2012. Dietary supplementation and doping-related factors in high-level sailing. *J Int Soc Sports Nutr*, 9, 51.
28. THIDUS, P. M. 1998. Radical species in inflammation and overtraining. *Can J Physiol Pharmacol*, 76, 533-8.
29. ZIVKOVIC, V., LAZAREVIC, P., DJURIC, D., CUBRILO, D., MACURA, M., VULETIC, M., BARUDZIC, N., NESIC, M. & JAKOVLJEVIC, V. 2013. Alteration in basal redox state of young male soccer players after a six-month training programme. *Acta Physiol Hung*, 100, 64-76.