International Journal Of

Recent Scientific Research

ISSN: 0976-3031

Volume: 7(6) June -2016

ENERGY AND MACRONUTRIENTS INTAKES OF SOME PROFESSIONAL SOCCER (FOOTBALL) PLAYERS IN CAMEROON

Fabrice W. Fokou., Benoît B. Koubala., Christelle O. T. Fomou., Elvis A. Mbolifor., Rachel Fadi and Elie Fokou

THE OFFICIAL PUBLICATION OF
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH (IJRSR)
http://www.recentscientific.com/ recentscientific@gmail.com

ISSN: 0976-3031

Available Online at http://www.recentscientific.com

International Journal of Recent Scientific Research
Vol. 7, Issue, 6, pp. 11822-11825, June, 2016

International Journal of Recent Scientific Research

Research Article

ENERGY AND MACRONUTRIENTS INTAKES OF SOME PROFESSIONAL SOCCER (FOOTBALL) PLAYERS IN CAMEROON

Fabrice W. Fokou[1]., Benoît B. Koubala*[1,2]., Christelle O. T. Fomou[1]., Elvis A. Mbolifor[1]., Rachel Fadi[1] and Elie Fokou[3]

[1]Department of Life and Earth Sciences, Higher Teachers' Training College, University of Maroua, P.O. Box 55, Maroua, Cameroon
[2]Department of Chemistry, Faculty of Science, University of Maroua, P.O. Box 814, Maroua, Cameroon
[3]Department of Biochemistry, Faculty of Science, University of Yaounde I, P.O. Box 812, Yaounde, Cameroon

ARTICLE INFO

Article History:

Received 11th March, 2016
Received in revised form 14th April, 2016
Accepted 18th May, 2016
Published online 28th June, 2016

Key Words:

Soccer (Football), Nutritional status, Championship, Energy intake.

ABSTRACT

Whatever the practiced sport, a balanced diet is required to provide the necessary nutrients in adequate proportions in order to ensure an excellent physical performance, recovery and maintenance of the health of the athlete. This study aimed at diagnosing the feeding and the nutritional status of the male "soccer (football)" teams in Maroua town, Cameroon. Data from food diary and body measurement were used to measure food consumption and to determine the nutritional status of the players. It comes out that players have unbalanced diet (85.19%), lower energy (62.96%) and water (75.93%) intakes. According to the Quetelet's index, although the average BMI falls within the normal range, 31.2% of the respondents present a bad nutritional status in favor of moderate malnutrition (24.04%) and overweight (11.1%). However, 45.45% of players who exhibiting a moderate malnutrition, had a sufficient energy intake indicating a physical effort above their capacities. In the same way, 33.33% who presenting overweight had a sufficient energy intake indicating a physical effort below their capacity. These results underline the need for a dietician in the teams and good balancing of the physical effort during training sessions which opens prospects with the improvement of the measurement of food consumption.

INTRODUCTION

Whenever talented, motivated and well-trained athletes meet in competition, the margin between victory and defeat is small. The attention to details can make the crucial difference. Diet is one of the factors that affects performance [1]. The mastery of diet is possible if a varied food menu, balanced and especially adapted to each class of athlete is established [2]. Based on scientific evidences, many dieticians have outlined some principles that must be observed by a soccer player to have a beneficial effect of his diet on his performance. These include, time of the last meal before competition (2 to 3 hours), balanced diet in which 55 to 60% of total ingested energy is provided by carbohydrates, 25 to 30% by lipids and 10 to 15% by proteins and sufficient Energy intake (2033 - 4000 kcal) [3,4]. Energy and water expenditures during training and competition are huge and need to be restored during resting period. We observed that in the Cameroonian context, Coaches and physical trainers, search for physical and technical integrity of their players i.e. the perfect structural and functional state of muscles, through a suitable training but not always for appropriate diet. Priority is given to biometric monitoring before and during training sessions because these characteristics have direct influence on the performance [5]. Recent decades, most soccer-related biomedical research has focused on three main areas: the physiological demands of the game, the anthropometric characteristics and performance capabilities of the players and the use and bioavailability of energy substrates during training and match-play [6, 7, 8]. To our best knowledge there are no published data on the nutrient intake of soccer players in Cameroon. This study therefore aimed at diagnosing nutrients intake and nutritional status of male soccer players from two teams based in Maroua-Cameroon.

MATERIAL AND METHODS

Data were collected from soccer players playing in two clubs of Maroua town (Far-North, Cameroon) during national and

*Corresponding author: **Benoît B. Koubala***
Department of Life and Earth Sciences, Higher Teachers' Training College, University of Maroua, P.O. Box 55, Maroua, Cameroon

regional competing seasons. All measurements were done when players had a training session or a competitive game in the town. Players prevented by injury or illness from training or competing at the time of the study, as well as those who joined the team within the previous week were excluded from the study. A total of 54 volunteered players who signed individual consent form were included, 25 players coming from Team A (A) and 29 from Team B (B).

Anthropometric indicators including age, weight, height, mid upper arm circumference, waist circumference (WC) and hip circumference (HC) were measured according to Cogill [9]. Ratios including body mass index (BMI), waist-to-hip ratio and fatty mass index (FMI) were subsequently calculated.

Food intake was evaluated using seven days diary intakes registration by participants coupled with a 24 hours food recall implemented by the investigators. A table of food composition of local dishes used in the laboratory for food science and metabolism of University of I, compiled from publications on local food composition was used to compute nutrient intakes from food intakes [10, 11, 12, 13, 14].

Data were analyzed using SPSS software version 10.1. Chi-Square and U Mann-Whitney tests were used to compare non-parametric variables. Independent-Samples t-test allowed comparison between the two groups of players while One-Sample t-test allowed their comparison against standard values ($p < 0.05$).

to macronutrient and water intakes. It reveals that less than 30% of players had a sufficient carbohydrate and lipid intakes. In respect with protein intake where 72.22 % of players respected norms only 14.81% had a balanced diet. Same results were obtained with water consumption where 75.93p% of the players drank less than 2 liters against 24.07% who insured their good rehydration.

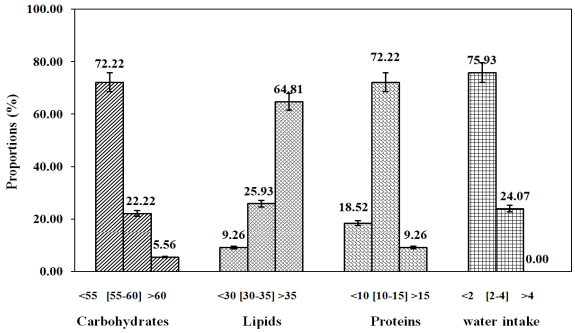

Figure 1 Repartition of players according to the macronutrient and water intakes

Results for daily energy and macronutrient intakes of players from the two clubs are shown in Table 4. Although there was no difference in the average composition of the diet of the two clubs, their macronutrient intake's proportion were different from the FIFA [2] average excluding the case of protein which was normal; players favoured hyperlipidic diet than the hyperglucidic diet prescribed by FIFA.

Table 1 Physical characteristics of soccer players from two Cameroonian teams

Statistic	Age (years)			Height (m)			Weight (kg)		
	A	B	Ref.*	A	B	Ref.*	A	B	Ref.*
Mean	20.36^b	21.41^b	24.5^a	1.80^b	1.78^a	1.775^a	69.60^b	72.21^a	75^a
N	25	29	/	25	29	/	25	29	/
S.D.	2.87	2.96	/	0.06	0.08	/	8.08	9.37	/

S.D: Standard deviation; N: Number of participants; Ref: Reference*; Africa football (2004).

RESULTS

Table 1 presents the physical characteristics of the players. The 54 players who composed samples A and B had their age between 15 to 33 years. Players from A are as older, less heavy and taller than those from B. The nutritional status prevalence of the players is shown in Table 2. Whatever the considered index, 51.85% of players presented a bad fatty body content dispersion in favor of an accumulation on the level of hips (WC/HC) and too thin profile (FMI).

Table 2 Frequency of nutritional status of players according their WC/HC and FMI

Index	Nutritional status	Teams		Total
		A	B	
WC/HC ratio	Gynoid Obesity (WC/HC < 0,85)	13	15	28
	Normal (0,85<= WC/HC <=1)	12	14	26
Fatty Mass Index (FMI)	Too thin (FMI < 15%)	10	12	22
	Normal (15% < FMI < 20%)	12	14	26
	Too fat (FMI > 20%)	3	3	6

A classification based on BMI also revealed a bad nutritional status at 31.2% of soccer players (Table 3). There was no difference in the repartition of body fat content of players of the two clubs. Figure 1 shows repartition of players according

Despite the lower body mass of players in A, there was a normal total energy intake in these players ($P < 0.05$).

Table 3 Nutritional status of players according to their BMI

Teams	Nutritional status	Frequency	Pourcentage
A	Moderate malnutrition	6	24.0
	Normal	18	72.0
	Overweight	1	4.0
	Total	25	100.0
B	Moderate malnutrition	5	17.2
	Normal	19	65.5
	Overweight	5	17.2
	Total	29	100.0

Table 4 Daily energy and macronutrient intakes of players from the two clubs

	A*	B**	A + B	FIFA (2005)
Carbohydrates (%)	49.19 ± 8.07^b	51.00 ± 7.74^b	50.02 ± 7.72^b	58^a
Lipids (%)	38.29 ± 6.40^a	37.55 ± 8.38^a	37.99 ± 7.38^a	30^b
Proteins (%)	12.52 ± 3.29^a	11.44 ± 2.26^a	11.94 ± 2.81^a	12^a
Energy (Kcal)	2821.20 ± 897.48^a	2650.03 ± 779.36^b	2742.39 ± 831.22^b	3000^a

Values are mean from 25*, 29** or 54 measurements ± standard deviation. Values in the same line followed by different superscripts are significantly different ($p < 0.05$).

Table 5 Cross table of malnutrition over Daily energy intake

Malnutrition	Frequencies	recommended energy intake	Lower energy intake
Overweight	6	2	4
Moderate malnutrition	11	5	6
Total	17	7	10

Table 5 crossing the anthropometric data with total energy intake data reveals that 45.45% of players presenting a moderate malnutrition had a sufficient energy intake. In the same way, 33.33% of players presenting overweight had a normal energy intake.

DISCUSSION

Players concerned by this study were professional's male soccer players evolving in national (A) and regional (B) competing season. Of course, players from A are less heavy and taller than those from B but these parameters are not essential factors for success in soccer. Many studies suggest that players vary widely in body size [15, 16, 17, 18, 19]. A particular body size may be an advantage in certain match-play situation while disadvantage in other. According to Africa football [20] data, years, height and weight range were respectively 21 to 28 years, 1.75 to 1.80 m and 70 to 80 kg. Although players were younger (A+B) and less heavy (A) with respect to mean of recommended parameters ($P < 0.01$), these parameters were not different to the lower value of respective range. Body fat content was also considered like non-essential factors; however mean body fat values in high-level adult male soccer players using a variety of methods (dual-energy X-ray absorptiometry; skinfold thicknesses) and prediction equations have been reported to range from 8.2 to 13.0% [15, 21, 22, 23, 24]. There is no adequate information regarding good body fat percentage during entire season but Ostojić and Zivanic [22] found that body fat content of top-level Serbian professional soccer players was significantly decreased during the training and competitive season and increased during the off-season; this reduction in body fat content improved the sprint time of players. Thus, less is body fat content, fast are players.

Burke *et al*. [25] reported that energy intake of the typical male player is about 3120 - 3840 Kcal per day. Despite the fact that mean value for energy intake of players from our investigated clubs was comprised in that range, there were considered much less than the energy requirement of the soccer players, based on body mass and activity profiles [26]. The use of mean values in these reports does, however, obscure the extremely large individual variability that was observed and can lead to misinterpretation of results obtained in terms of absolute macronutrient intake, hindering comparisons between studies [27]. Percentage of 68.51 of players had their energy intake lower than 3120 Kcal while 14.81 had more than 3840 Kcal. On the other hand when we reported energy intake per kilogram of fat-free mass (KgFFM), 53.70% of players showed less than 45 Kcal (mean energy balance for healthy adults); up to 12.96% had their energy intake less than the daily energy availability (About 30 KCAL per kilogram of fat-free mass). These alarming findings comforted many authors and Maughan's assertion which suggest the result of deliberate or inadvertent underreporting of intake.

Certainly, no correlation between body mass and energy intake was found but certain players presenting a moderate malnutrition had a sufficient energy suggesting a physical effort above their capacities. In the same way, others presenting overweight had a normal energy intake indicating a physical effort below their capacities.

CONCLUSION

At the end of this study which aimed at diagnosing the feeding and the nutritional status of the male soccer teams in Maroua town (Cameroon), it comes out that players from two clubs had unbalanced and lower energy diet. There were some small differences in the body content which suggested unbalanced physical effort during training. These results underline the need for a dietician in the teams and good balancing of the physical effort during training sessions which opens prospects with the improvement of measurement for food consumption by the players.

Acknowledgment

We thank the assistance of the management and playing staff of the two clubs where this work was carried out.

Authors Contribution

FWF and COTF contributed in data collection, data analysis, conception, drafting and revision. EAM and RF contributed in data collection, data analysis and revision. BBK supervised data collection, conception, drafting, revision and publishing correspondence. FE supervised data analysis, conception, drafting and revision.

References

1. Chaudhary K., Sukhwal I. 2016. Nutrition for Optimal Sports Performance-A review. *Int J Recent Sci Res*., 7(4): 9988-9992.
2. FIFA. 2005. Guide pratique de l'alimentation pour un corps sain et une performance optimale. Rapport de la conférence internationale de consensus de la FIFA et du F-MARC sur la nutrition dans le football. FIFA, Zurich, Suisse, 24 pp.
3. Don MacLaren 2003. Nutrition. In: Reilly T. and Williams A.M. (2003). Sciences and Soccer, second edition. *Routledge Taylor and Francis group*. London and New York. 6: 73-95.
4. Ruiz F., Irazusta A., Gil S., Irazusta J., Casis L., Gil J. 2005.Nutritional intake in soccer players of different ages. *Journal of Sports Sciences*, 23: 235-242.
5. IAAF. 2007. L'alimentation en athlétisme. Rapport de la Conférence Internationale du Consensus de l'IAAF, Monaco, France, 38 pp.
6. Bangsbo J. 2004. Fitness training in football: A scientific approach, Reedswain Inc. *HO & Storm*, *Bagsvaerd*, Copenhagen. 336 p
7. Le Gall F., Carling C., Williams M., Reilly T. 2010. Anthropometric and fitness characteristics of international, professional and amateur male graduate soccer players from an elite youth academy. *J. Sci. Med. Sport,* 13: 90-95. PMID: 18835220
8. Osgnach C., Poser S., Bernardini R., Rinaldo R., Di Prampero P.E. 2010. Energy cost and metabolic power

in elite soccer: A new match analysis approach. *Med. Sci. Sports Exerc.*, 42(1): 170-178. PMID: 20010116
9. Cogill B. 2003. Guide de mesure des indicateurs anthropométriques. Projet d'Assistance Technique pour l'Alimentation et la Nutrition, Académie pour le développement de l'Education, Washington, D.C., 104p. www.fantaproject.org
10. Teugwa C., Mbiapo Tchouanguep F., Fokou E., Fotso M. 1997. Potentiel nutritionnel de quelques plats traditionnels consommés dans une zone rurale de l'Extrême-Nord Cameroun. *Cam. J. Biol. Bioch. Sci.,* VI: 61-66.
11. Teugwa Mofor C., Mbiapo F., Fokou E., Fotso M. 1992. Composition chimique de quelques plats traditionnels de l'extrême-Nord Cameroun: Gniri/Follere, Gniri/Lalo et Gniri/Tasba. *Cam. J. Biol. Bioch. Sci.*, III: 76-88.
12. Ponka R., Fokou E., Fotso M., Achu M.B., Tchouanguep F.M. 2004. Methods of preparation and the energy, protein and mineral values of three Cameroonian dishes: 'Corn chaff', 'Nnamowondo/Ebobolo' and 'NnamNgon/Ebobolo'. *African Journal of Food, Agriculture, Nutrition and Development* (AJFAND), 5(1), 1-14.
13. Ponka R., Fokou E., Leke R., Fotso M., Souopgui J., Achu M.B., MbiapoTchouanguep F. 2005. Methods of preparation and nutritional evaluation of dishes consumed in malaria endemic zone in Cameroon (Ngali II). *Afr. J. Biotechnol.*, 4(3): 273-278.
14. Fokou E., Ponka R., Tchinda Dimofo P.H., Domguia Kenmogne H. B., Tchouba L.B., Achu Bih M., Fotso M. 2009. Methods of preparation and nutritive value of some dishes consumed in west region of Cameroon. *Pakistan J. Nutr.*, 8 (8): 1190-1195.
15. Maughan RJ.1997. Energy and macronutrient intakes of professional football (soccer) players. *Br. J. Sports Med.*, 31: 45-7. PMCID: PMC1332475.
16. Shephard R.J. 1999. Biology and medicine of soccer: An update. *J. Sports Sci*., 17: 757-786.
17. Ostojić S.M. 2002. Changes in body fat content of top-level soccer players. *J. Sports Sci. Med.*, 1(2): 54-55. PMCID: PMC3963243.
18. Ostojić S.M. 2003. Seasonal alterations in body composition and sprint performance of elite soccer players. *J. Exer. Physiol*., 6: 11-14.
19. Nikolaidis P.T., Theodoropoulou E. 2014. Relationship between nutrition knowledge and physical fitness in semi-professional soccer players. *Scientifica*, Volume 2014, Article ID 180353, 5 pages http://dx.doi.org/10.1155/2014/180353.
20. Africa Football 2004. The 647 Africans soccer players of the European Elite. Available from URL: http://www.afrik-foot.com/article7966.html [Accessed 30 Mai 2010].
21. Wittich A., Oliveri M. B., Rotemberg E., Mautalen C. 2001. Body composition of professional football (soccer) players determined by dual x-ray absorptiometry. *J. Clin. Densitom.*, 4(1), 51-55. PMID: 11393146
22. Ostojić S.M., Zivanic S. 2001. Effects of training on anthropometric and physiological characteristics of elite Serbian soccer players. *Acta Biol. Med. Exp.,* 27: 48.
23. Kraemer W.J., French D.N., Paxton N.J., Hakkinen K., Volek J.S., Sebastianelli W.J. *et al*. (2004). Changes in exercise performance and hormonal concentrations over a big ten soccers season in starters and non-starters. *J. Strength Cond. Res*., 18(1): 121-128. PMID: 14971972
24. Reilly T., Gregson W. 2006. Special populations: The referee. *J. Sports Sci*., 24: 795-801.
25. Burke L.M., Loucks A.B., Broad N. 2006. Energy and carbohydrate for training and recovery. *J. Sports Sci*., 24(7): 675-685. PMID: 16766497.
26. Bangsbo J., Iaia F.M., Krustrup P. 2007. Metabolic response and fatigue in soccer. *Int. J. Sports Physiol. Perform.*,2(2): 111-127. PMID: 19124899.
27. García-Rovés P.M., García-Zapico P., Patterson Á. M., Iglesias-Gutiérrez E. 2014. Nutrient Intake and Food Habits of Soccer Players: Analyzing the Correlates of Eating Practice, *Nutrients*, *6(7)*: 2697-2717; DOI: 10.3390/nu6072697

****

How to cite this article:

Fabrice W. Fokou *et al*.2016, Energy and Macronutrients Intakes of Some Professional Soccer (Football) Players In Cameroon . *Int J Recent Sci Res.* 7(6), pp. 11822-11825.

TSSN 0976-3031