

## **Dietary intake of soccer players before, during and after an official game: Influence of competition level and playing position**

**Costas Chryssanthopoulos <sup>1,2,\*</sup>, Athanasios Souglis <sup>1</sup>, Sofia Tsalouhidou <sup>3</sup>, Andrew T. Hulton <sup>4</sup>, Gregory C. Bogdanis<sup>1</sup>, Anatoli Petridou <sup>3</sup>, Anastassios Philippou <sup>2</sup>, Maria Maridaki <sup>1</sup>, and Apostolos Theos <sup>5</sup>**

<sup>1</sup> Department of Physical Education and Sport Science, School of Physical Education and Sport Science, National and Kapodistrian University of Athens, 17237 Athens, Greece

<sup>2</sup> Department of Physiology, Medical School, National and Kapodistrian University of Athens, 11527 Athens, Greece

<sup>3</sup> Laboratory of Evaluation of Human Biological Performance, School of Physical Education and Sports Science at Thessaloniki, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece

<sup>4</sup> Department of Nutrition, Food and Exercise Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford GU2 7XH, UK

<sup>5</sup> Section of Sports Medicine, Department of Community Medicine & Rehabilitation, Umeå University, 901 87 Umeå, Sweden

\*Correspondence: chryssan@phed.uoa.gr; Tel.: +30-210-7462612

Table S1: Macronutrient intake during the 3-day recording period for all (n=123) subjects (mean  $\pm$  SD) .

Macronutrient	Day 1	Day 2 (Match Day)	Day 3
Energy (MJ)	12.3 $\pm$ 3.6 <sup>1</sup>	12.0 $\pm$ 3.2 <sup>1</sup>	13.3 $\pm$ 4.8
Energy (kcal)	2940 $\pm$ 860 <sup>1</sup>	2868 $\pm$ 765 <sup>1</sup>	3179 $\pm$ 1147
Energy (Kj/Kg BM)	163 $\pm$ 45 <sup>1</sup>	158 $\pm$ 41 <sup>1</sup>	175 $\pm$ 60
CHO (g/Kg BM)	4.9 $\pm$ 1.6	4.7 $\pm$ 1.4	5.0 $\pm$ 2.0
Protein (g/Kg BM)	1.9 $\pm$ 0.6 <sup>2</sup>	1.8 $\pm$ 0.7 <sup>1</sup>	2.0 $\pm$ 0.7
Fat (g/Kg BM)	1.3 $\pm$ 0.5 <sup>1</sup>	1.3 $\pm$ 0.5 <sup>1</sup>	1.5 $\pm$ 0.06
% CHO	50 $\pm$ 8	50 $\pm$ 9	48 $\pm$ 9
% Protein	20 $\pm$ 5	20 $\pm$ 5	19 $\pm$ 6
% Fat	30 $\pm$ 7 <sup>1</sup>	30 $\pm$ 7 <sup>1</sup>	33 $\pm$ 9

<sup>1</sup>Different from Day 3 (p< 0.05); <sup>2</sup>Different from Day 2 (p< 0.05).

Table S2: Macronutrient intake during the 3-day recording period for all (n= 118) subjects excluding the goalkeepers (mean  $\pm$  SD).

Macronutrient	Day 1	Day 2 (Match Day)	Day 3
Energy (MJ)	12.2 $\pm$ 3.5 <sup>1</sup>	12.0 $\pm$ 3.2 <sup>1</sup>	13.4 $\pm$ 4.8
Energy (kcal)	2916 $\pm$ 837 <sup>1</sup>	2868 $\pm$ 765 <sup>1</sup>	3203 $\pm$ 1147
Energy (Kj/Kg BM)	162 $\pm$ 45 <sup>1</sup>	160 $\pm$ 41 <sup>1</sup>	177 $\pm$ 60
CHO (g/Kg BM)	4.9 $\pm$ 1.6	4.7 $\pm$ 1.4	5.1 $\pm$ 2.0
Protein (g/Kg BM)	1.9 $\pm$ 0.6	1.8 $\pm$ 0.7 <sup>1</sup>	2.0 $\pm$ 0.7
Fat (g/Kg BM)	1.3 $\pm$ 0.5 <sup>1</sup>	1.3 $\pm$ 0.5 <sup>1</sup>	1.6 $\pm$ 0.7
% CHO	50 $\pm$ 8	50 $\pm$ 9 <sup>1</sup>	48 $\pm$ 9
% Protein	20 $\pm$ 5	19 $\pm$ 5	19 $\pm$ 6
% Fat	30 $\pm$ 7 <sup>1</sup>	30 $\pm$ 7 <sup>1</sup>	32 $\pm$ 9

<sup>1</sup>Different from Day 3 (p< 0.05)

Table S3: Average of the 3-day micronutrient intake in the four categories.

The numbers in parentheses indicate the percentage of the Dietary Reference Values by the European Food Safety Authority (mean  $\pm$  SD).

Micronutrient	All Subjects (n=123)	Super League (n=33)	2 <sup>nd</sup> Category (n=30)	3 <sup>rd</sup> Category (n=30)	4 <sup>th</sup> Category (n=30)
Vitamin A ( $\mu$ g)	1006 $\pm$ 1009 (134%)	860 $\pm$ 419 (115%)	920 $\pm$ 508 (123%)	963 $\pm$ 686 (128%)	1306 $\pm$ 1811 (174%)
Thiamin (mg/MJ)	0.24 $\pm$ 0.08 (240%)	0.25 $\pm$ 0.07 (250%)	0.23 $\pm$ 0.08 <sup>1</sup> (230%)	0.23 $\pm$ 0.08 <sup>1</sup> (230%)	0.23 $\pm$ 0.08 <sup>1</sup> (230%)
Riboflavin (mg)	2.5 $\pm$ 0.8 (156%)	3.0 $\pm$ 0.6 (188%)	2.5 $\pm$ 0.8 <sup>1</sup> (156%)	2.1 $\pm$ 0.7 <sup>1</sup> (131%)	2.2 $\pm$ 0.7 <sup>1</sup> (138%)
Niacin (mg/MJ)	3.4 $\pm$ 1.0 (213%)	3.7 $\pm$ 0.6 (231%)	3.4 $\pm$ 0.9 <sup>1</sup> (213)	3.4 $\pm$ 1.3 <sup>1</sup> (213%)	3.1 $\pm$ 1.0 <sup>1</sup> (194%)
Pantothenic Acid (mg)	8.1 $\pm$ 2.6 (162%)	10.1 $\pm$ 2.2 (202%)	7.8 $\pm$ 1.9 <sup>1</sup> (156%)	7.5 $\pm$ 2.8 <sup>1</sup> (150%)	6.8 $\pm$ 1.8 <sup>1</sup> (136%)
Vitamin B6 (mg)	3.6 $\pm$ 1.2 (212%)	4.6 $\pm$ 1.1 (271%)	3.4 $\pm$ 1.1 <sup>1</sup> (200%)	3.2 $\pm$ 1.1 <sup>1</sup> (188%)	3.1 $\pm$ 0.9 <sup>1</sup> (182%)
Biotin ( $\mu$ g)	43 $\pm$ 17 (108%)	55 $\pm$ 13 (138%)	45 $\pm$ 14 (113%)	37 $\pm$ 20 <sup>1,2</sup> (93%)	35 $\pm$ 13 <sup>1,2</sup> (88%)
Folate ( $\mu$ g)	461 $\pm$ 177 (140%)	608 $\pm$ 112 (184%)	450 $\pm$ 176 <sup>1</sup> (136%)	381 $\pm$ 158 <sup>1</sup> (115%)	388 $\pm$ 151 <sup>1</sup> (118%)
Cobalamin ( $\mu$ g)	7.8 $\pm$ 3.1 (195%)	8.3 $\pm$ 1.8 (208%)	7.7 $\pm$ 3.0 (193%)	6.8 $\pm$ 2.6 <sup>1</sup> (170%)	7.8 $\pm$ 4.4 (195%)
Vitamin C (mg)	159 $\pm$ 112 (145%)	206 $\pm$ 117 (187%)	147 $\pm$ 138 <sup>1</sup> (134%)	147 $\pm$ 101 (134%)	132 $\pm$ 61 (120%)
Vitamin D ( $\mu$ g)	2.5 $\pm$ 1.4 (17%)	2.9 $\pm$ 1.2 (19%)	2.9 $\pm$ 1.5 (19%)	2.0 $\pm$ 0.9 <sup>1</sup> (13%)	2.4 $\pm$ 1.6 (16%)
Vitamin E (mg)	10.4 $\pm$ 4.5 (80%)	12.0 $\pm$ 3.7 (92%)	10.6 $\pm$ 4.2 (82%)	9.6 $\pm$ 4.4 (74%)	9.4 $\pm$ 5.0 <sup>1</sup> (72%)
Calcium (mg)	1293 $\pm$ 352 (136%)	1489 $\pm$ 294 (157%)	1291 $\pm$ 358 (136%)	1242 $\pm$ 327 <sup>1</sup> (131%)	1131 $\pm$ 320 <sup>1</sup> (119%)
Iron (mg)	17 $\pm$ 5 (155%)	22 $\pm$ 4 (200%)	16 $\pm$ 5 <sup>1</sup> (145%)	15 $\pm$ 5 <sup>1</sup> (136%)	15 $\pm$ 5 <sup>1</sup> (136%)
Sodium (mg)	4142 $\pm$ 1597 (216%)	5565 $\pm$ 1574 (278%)	3529 $\pm$ 1081 <sup>1</sup> (177%)	3684 $\pm$ 1535 <sup>1</sup> (184%)	3648 $\pm$ 1280 <sup>1</sup> (182%)
Potassium (mg)	4322 $\pm$ 1272 (124%)	5562 $\pm$ 1006 (159%)	4129 $\pm$ 1041 <sup>1</sup> (118%)	3823 $\pm$ 1039 <sup>1</sup> (105%)	3649 $\pm$ 934 <sup>1</sup> (104%)
Magnesium (mg)	406 $\pm$ 126 (116%)	517 $\pm$ 103 (148%)	395 $\pm$ 107 <sup>1</sup> (113%)	369 $\pm$ 118 <sup>1</sup> (105%)	332 $\pm$ 85 <sup>1</sup> (95%)
Phosphorus (mg)	2091 $\pm$ 573 (380%)	2601 $\pm$ 446 (473%)	2055 $\pm$ 512 <sup>1</sup> (374%)	1915 $\pm$ 512 <sup>1</sup> (348%)	1745 $\pm$ 391 <sup>1</sup> (317%)
Copper (mg)	1.8 $\pm$ 1.0 (113%)	2.3 $\pm$ 0.8 (144%)	1.5 $\pm$ 0.4 <sup>1</sup> (94%)	1.7 $\pm$ 0.7 <sup>1</sup> (107%)	1.9 $\pm$ 1.7 <sup>1</sup> (119%)
Zinc (mg)	16 $\pm$ 5 (114%)	20 $\pm$ 4 (143%)	16 $\pm$ 4 <sup>1</sup> (114%)	15 $\pm$ 5 <sup>1</sup> (107%)	15 $\pm$ 5 <sup>1</sup> (107%)
Chloride (mg)	6805 $\pm$ 2619 (220%)	9191 $\pm$ 2502 (296%)	5866 $\pm$ 1785 <sup>1</sup> (189%)	5966 $\pm$ 2204 <sup>1</sup> (193%)	5956 $\pm$ 2094 <sup>1</sup> (192%)
Manganese (mg)	4.5 $\pm$ 2.1 (150%)	6.2 $\pm$ 2.0 (207%)	4.3 $\pm$ 2.0 <sup>1</sup> (143%)	4.1 $\pm$ 1.7 <sup>1</sup> (137%)	3.4 $\pm$ 1.3 <sup>1</sup> (113%)
Iodine ( $\mu$ g)	211 $\pm$ 95 (141%)	240 $\pm$ 92 (160%)	203 $\pm$ 89 (135%)	208 $\pm$ 102 (139%)	189 $\pm$ 85 (126%)
Selenium ( $\mu$ g)	79 $\pm$ 25 (113%)	88 $\pm$ 21 (126%)	77 $\pm$ 17 (110%)	75 $\pm$ 24 (107%)	76 $\pm$ 33 <sup>1</sup> (109%)

<sup>1</sup>Different from Super League (p< 0.05); <sup>2</sup>Different from 2<sup>nd</sup> Category (p< 0.05)

Table S4: Average of the 3-day micronutrient intake in the five playing positions excluding the goalkeepers. The numbers in parentheses indicate the percentage of the Dietary Reference Values by the European Food Safety Authority (mean  $\pm$  SD).

Micronutrient	All Subjects (n=118)	FB (n=24)	CD (n=23)	CM (n=24)	WM (n=24)	A (n=23)
Vitamin A ( $\mu$ g)	982 $\pm$ 995 (131%)	942 $\pm$ 1214 (126%)	831 $\pm$ 687 (111%)	932 $\pm$ 503 (125%)	1315 $\pm$ 1553 (175%)	892 $\pm$ 521 (119%)
Thiamin (mg/MJ)	0.24 $\pm$ 0.08 (240%)	0.24 $\pm$ 0.06 (240)	0.24 $\pm$ 0.08 (240%)	0.23 $\pm$ 0.09 (230%)	0.23 $\pm$ 0.08 (230%)	0.25 $\pm$ 0.07 (250%)
Riboflavin (mg)	2.5 $\pm$ 0.8 (156%)	2.4 $\pm$ 0.8 (150%)	2.4 $\pm$ 0.7 (150%)	2.4 $\pm$ 0.8 (150%)	2.5 $\pm$ 0.7 (156%)	2.7 $\pm$ 0.9 (169%)
Niacin (mg/MJ)	3.4 $\pm$ 0.9 (213%)	3.2 $\pm$ 1.0 (200%)	3.7 $\pm$ 1.0 (231%)	3.2 $\pm$ 0.8 (200%)	3.2 $\pm$ 0.9 (200%)	3.7 $\pm$ 0.9 (231%)
Pantothenic Acid ( $\mu$ g)	8.2 $\pm$ 2.5 (164%)	7.4 $\pm$ 3.3 (148%)	8.0 $\pm$ 2.1 (160%)	8.5 $\pm$ 2.8 (170%)	8.3 $\pm$ 1.7 (166%)	8.6 $\pm$ 2.5 (172%)
Vitamin B6 (mg)	3.7 $\pm$ 1.2 (218%)	3.4 $\pm$ 1.1 (243%)	3.6 $\pm$ 1.1 (212%)	3.5 $\pm$ 1.4 (206%)	3.7 $\pm$ 1.0 (218%)	4.1 $\pm$ 1.4 (241%)
Biotin ( $\mu$ g)	44 $\pm$ 17 (110%)	39 $\pm$ 15 (98%)	43 $\pm$ 21 (108%)	44 $\pm$ 18 (110%)	45 $\pm$ 12 (113%)	46 $\pm$ 20 (115%)
Folate ( $\mu$ g)	466 $\pm$ 177 (141%)	486 $\pm$ 216 (147%)	430 $\pm$ 136 (130%)	443 $\pm$ 194 (134%)	475 $\pm$ 140 (144%)	497 $\pm$ 190 (151%)
Cobalamin ( $\mu$ g)	7.7 $\pm$ 3.1 (193%)	7.1 $\pm$ 3.0 (178%)	7.3 $\pm$ 2.7 (183%)	7.1 $\pm$ 2.1 (178%)	9.0 $\pm$ 4.2 (225%)	7.8 $\pm$ 2.5 (195%)
Vitamin C (mg)	160 $\pm$ 111 (145%)	163 $\pm$ 107 (148%)	131 $\pm$ 78 (119%)	199 $\pm$ 175 (173%)	153 $\pm$ 89 (139%)	154 $\pm$ 70 (140%)
Vitamin D ( $\mu$ g)	2.5 $\pm$ 1.4 (17%)	2.0 $\pm$ 0.9 (13%)	2.3 $\pm$ 1.2 (15%)	2.5 $\pm$ 1.2 (17%)	3.4 $\pm$ 2.0 <sup>1</sup> (23%)	2.4 $\pm$ 1.2 (16%)
Vitamin E (mg)	10.5 $\pm$ 4.5 (81%)	9.6 $\pm$ 4.9 (74%)	10.2 $\pm$ 5.1 (79%)	11.0 $\pm$ 4.4 (85%)	11.9 $\pm$ 4.1 (92%)	9.4 $\pm$ 4.0 (72%)
Calcium (mg)	1289 $\pm$ 353 (136%)	1134 $\pm$ 276 (119%)	1254 $\pm$ 387 (132%)	1363 $\pm$ 359 (144%)	1393 $\pm$ 338 (147%)	1300 $\pm$ 366 (137%)
Iron (mg)	17 $\pm$ 5 (155%)	17 $\pm$ 5 (155%)	16 $\pm$ 4 (145%)	17 $\pm$ 6 (155%)	18 $\pm$ 5 (164%)	18 $\pm$ 6 (164%)
Sodium (mg)	4179 $\pm$ 1617 (209%)	3532 $\pm$ 1646 (177%)	3822 $\pm$ 1325 (191%)	4269 $\pm$ 1678 (213%)	4697 $\pm$ 1627 (235%)	4579 $\pm$ 1596 (229%)
Potassium (mg)	4358 $\pm$ 1266 (125%)	4079 $\pm$ 1190 (117%)	4123 $\pm$ 1205 (118%)	4642 $\pm$ 1613 (133%)	4467 $\pm$ 1030 (128%)	4474 $\pm$ 1222 (128%)
Magnesium (mg)	409 $\pm$ 127 (117%)	383 $\pm$ 109 (109%)	400 $\pm$ 124 (114%)	427 $\pm$ 159 (122%)	423 $\pm$ 121 (121%)	414 $\pm$ 124 (118%)
Phosphorus (mg)	2096 $\pm$ 577 (381%)	1859 $\pm$ 532 (338%)	2071 $\pm$ 534 (377%)	2179 $\pm$ 676 (396%)	2217 $\pm$ 501 (403%)	2156 $\pm$ 602 (392%)
Copper (mg)	1.9 $\pm$ 1.0 (119%)	1.9 $\pm$ 1.2 (119%)	1.6 $\pm$ 0.6 (100%)	2.0 $\pm$ 1.1 (125%)	2.1 $\pm$ 1.5 (131%)	1.9 $\pm$ 0.5 (119%)
Zinc (mg)	16 $\pm$ 5 (114%)	16 $\pm$ 5 (114%)	16 $\pm$ 4 (114%)	16 $\pm$ 5 (114%)	18 $\pm$ 4 (129%)	17 $\pm$ 5 (121%)
Chloride (mg)	6872 $\pm$ 2649 (222%)	5857 $\pm$ 2695 (189%)	6230 $\pm$ 2201 (201%)	6996 $\pm$ 2809 (226%)	7780 $\pm$ 2627 (251%)	7494 $\pm$ 2558 (242%)
Manganese (mg)	4.6 $\pm$ 2.1 (153%)	4.4 $\pm$ 2.0 (147%)	4.2 $\pm$ 1.6 (140%)	4.6 $\pm$ 2.7 (153%)	5.1 $\pm$ 2.1 (170%)	4.7 $\pm$ 2.0 (157%)
Iodine ( $\mu$ g)	214 $\pm$ 94 (143%)	197 $\pm$ 75 (131%)	229 $\pm$ 113 (153%)	204 $\pm$ 97 (136%)	226 $\pm$ 94 (151%)	213 $\pm$ 100 (142%)
Selenium ( $\mu$ g)	79 $\pm$ 25 (113%)	70 $\pm$ 21 (100%)	81 $\pm$ 25 (116%)	78 $\pm$ 23 (111%)	84 $\pm$ 29 (120%)	84 $\pm$ 28 (120%)

A= Attackers/Strikers; CD= Central Defenders; CM= Central Midfielders; FB= Full Bucks; WM= Wide Midfielders

<sup>1</sup>Different from FB (p< 0.05)

Table S5: **Basic** characteristics of the five goalkeepers (mean  $\pm$  SD).

Basic Characteristics	
Age (yrs)	27.0 $\pm$ 4.1
Weight (kg)	85.1 $\pm$ 5.3
Height (cm)	187.0 $\pm$ 4.5
BMI (kg/m <sup>2</sup> )	24.4 $\pm$ 1.7
Years of Playing Soccer	9.6 $\pm$ 2.7
Official Games Played	121 $\pm$ 82

Table S6: Macronutrient intake during the 3-day recording period for the five goalkeepers (mean  $\pm$  SD).

Macronutrient	Average of 3 Days	Day 1	Day 2 (Match Day)	Day 3
Energy (MJ)	11.8 $\pm$ 3.2	15.0 $\pm$ 6.4	10.3 $\pm$ 1.9	10.0 $\pm$ 2.5
Energy (kcal)	2820 $\pm$ 765	3585 $\pm$ 1530	2462 $\pm$ 454	2390 $\pm$ 598
Energy (Kj/Kg BM)	137 $\pm$ 28	174 $\pm$ 64	121 $\pm$ 21	116 $\pm$ 23
CHO (g/Kg BM)	3.7 $\pm$ 0.6	5.1 $\pm$ 1.6	2.9 $\pm$ 1.2	3.0 $\pm$ 0.8
Protein (g/Kg BM)	1.7 $\pm$ 0.6	1.9 $\pm$ 0.7	1.8 $\pm$ 0.5	1.4 $\pm$ 0.8
Fat (g/Kg BM)	1.2 $\pm$ 0.6	1.5 $\pm$ 0.9	1.1 $\pm$ 0.5	1.1 $\pm$ 0.7
% CHO	46 $\pm$ 8	50 $\pm$ 6	40 $\pm$ 13	45 $\pm$ 12
% Protein	21 $\pm$ 9	20 $\pm$ 10	25 $\pm$ 7	20 $\pm$ 13
% Fat	33 $\pm$ 10	30 $\pm$ 7	35 $\pm$ 14	35 $\pm$ 17

Table S7: Average of the 3-day micronutrient intake in the five goalkeepers. The numbers in parentheses indicate the percentage of the Dietary Reference Values by the European Food Safety Authority (mean  $\pm$  SD).

Micronutrient		Micronutrient	
Vitamin A ( $\mu$ g)	1497 $\pm$ 1324 (200%)	Calcium (mg)	1394 $\pm$ 353 (147%)
Thiamin (mg/MJ)	0.24 $\pm$ 0.16 (240%)	Iron (mg)	15 $\pm$ 4 (136%)
Riboflavin (mg)	2.0 $\pm$ 0.9 (125%)	Sodium (mg)	3265 $\pm$ 571 (163%)
Niacin (mg/MJ)	3.7 $\pm$ 2.1 (230%)	Potassium (mg)	3465 $\pm$ 1244 (99%)
Pantothenic Acid ( $\mu$ g)	7.3 $\pm$ 3.2 (146%)	Magnesium (mg)	333 $\pm$ 72 (95%)
Biotin ( $\mu$ g)	36 $\pm$ 12 (90%)	Copper (mg)	1.6 $\pm$ 0.7 (100%)
Folate ( $\mu$ g)	326 $\pm$ 129 (99%)	Zinc (mg)	14 $\pm$ 4 (100%)
Cobalamin ( $\mu$ g)	8.2 $\pm$ 4.3 (205%)	Chloride (mg)	5224 $\pm$ 795 (169%)
Vitamin B6 (mg)	2.8 $\pm$ 1.1 (165%)	Phosphorus (mg)	1981 $\pm$ 485 (360%)
Vitamin C (mg)	125 $\pm$ 145 (114%)	Manganese (mg)	3.3 $\pm$ 0.9 (110%)
Vitamin D ( $\mu$ g)	3.5 $\pm$ 1.0 (23%)	Iodine ( $\mu$ g)	143 $\pm$ 95 (95%)
Vitamin E (mg)	10.4 $\pm$ 4.1 (125%)	Selenium ( $\mu$ g)	77 $\pm$ 24 (110%)