

Supplementary material

Figure S1. Screenshot of the MEDIPAD software illustrating the registration of 24HDR for the breakfast

The screenshot displays the MEDIPAD software interface for food registration. The top navigation bar includes the MEDIGENE MAGDB logo, menu items (Accueil, Administration des aliments, Administration), language options (EN, ES, FR, RO), and a user profile (Aide, Florin Grigorescu). The left sidebar shows a navigation menu for 'Enquête alimentaire' (Test 24032015) with sections for 'Premier jour', 'Deuxième jour', and 'Troisième jour', each containing 'Petit-déjeuner', 'Déjeuner', 'Diner', and 'Collation'. The main content area is divided into two sections: 'Premier jour | Petit-déjeuner' and 'Premier jour | Déjeuner'. The 'Petit-déjeuner' section lists three items: 'Pain, baguette, courante' (1 tranche - 30 g x3, 90 g), 'Fromage type Feta, au lait de vache' (1 portion - 30 g x2, 60 g), and 'Houmous' (1 cuillère à soupe - 20 g x1, 20 g). The 'Déjeuner' section lists one item: 'Poulet basquaise au riz' (1 portion - 300 g, 200 g). A search bar at the top of the main area contains the text 'Chercher un aliment' and a search icon. Below the search bar is a row of food category icons. At the bottom right, there are 'Annuler' and 'Sauver' buttons.

Chercher un aliment

Premier jour | Petit-déjeuner

× Pain, baguette, courante	1 tranche - 30 g x3	Q	90	g
× Fromage type Feta, au lait de vache	1 portion - 30 g x2	Q	60	g
× Houmous	1 cuillère à soupe - 20 g x1	Q	20	g

Premier jour | Déjeuner

× Poulet basquaise au riz	1 portion - 300 g ...	Q	200	g
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Annuler Sauver

Figure S2. Screenshot of the MEDIPAD software illustrating the registration of 24HDR for breakfast in the first day and possible corrections to assess quantity of foods.

The screenshot displays the MEDIPAD software interface for food registration. The top navigation bar includes the MEDIGENE MAGDB logo, language options (EN, ES, FR, RO), an 'Aide' link, and a user profile for Florin Grigorescu. The main content area is divided into a left sidebar and a central panel.

Left Sidebar (Enquête alimentaire):

- Retour
- Enquête alimentaire (Test 24032015)
- Premier jour (selected)
- Petit-déjeuner
- Déjeuner
- Dîner
- Collation
- Deuxième jour
- Petit-déjeuner
- Déjeuner
- Dîner
- Collation
- Troisième jour
- Petit-déjeuner
- Déjeuner
- Dîner
- Collation

Central Panel (Premier jour - 1272 kCal):

- Petit-déjeuner:**
 - 90 g > Pain, baguette, courante
 - 60 g > Fromage type Feta, au lait de vache
 - 20 g > Houmous
- Déjeuner:**
 - 200 g > Poulet basquaise au riz
- Dîner:**
 - 90 g > Poisson pané, frit
 - 200 g > Pâtes alimentaires cuites
- Collation:**
 - 250 g > Jus multifruit, pur jus, multivitaminé

Deuxième jour - 1320 kCal:

- Petit-déjeuner:**
 - 92 g > Oeuf au plat, frit, salé
 - 40 g > Pain grillé, domestique
- Déjeuner:**

Right Panel (Detailed View):

This panel shows a detailed view of the breakfast items with their quantities and weights:

- 1 tranche - 30 g x3 Q 90 g
- 1 portion - 30 g x2 Q 60 g
- 1 cuillère à soupe - 20 g x1 Q 20 g

At the bottom right, there is a 'Sauver' (Save) button and an 'Annuler' (Cancel) link.

Figure S3. Distribution of BCAA content by centiles in CIQUAL French database and food items from SPI surveys

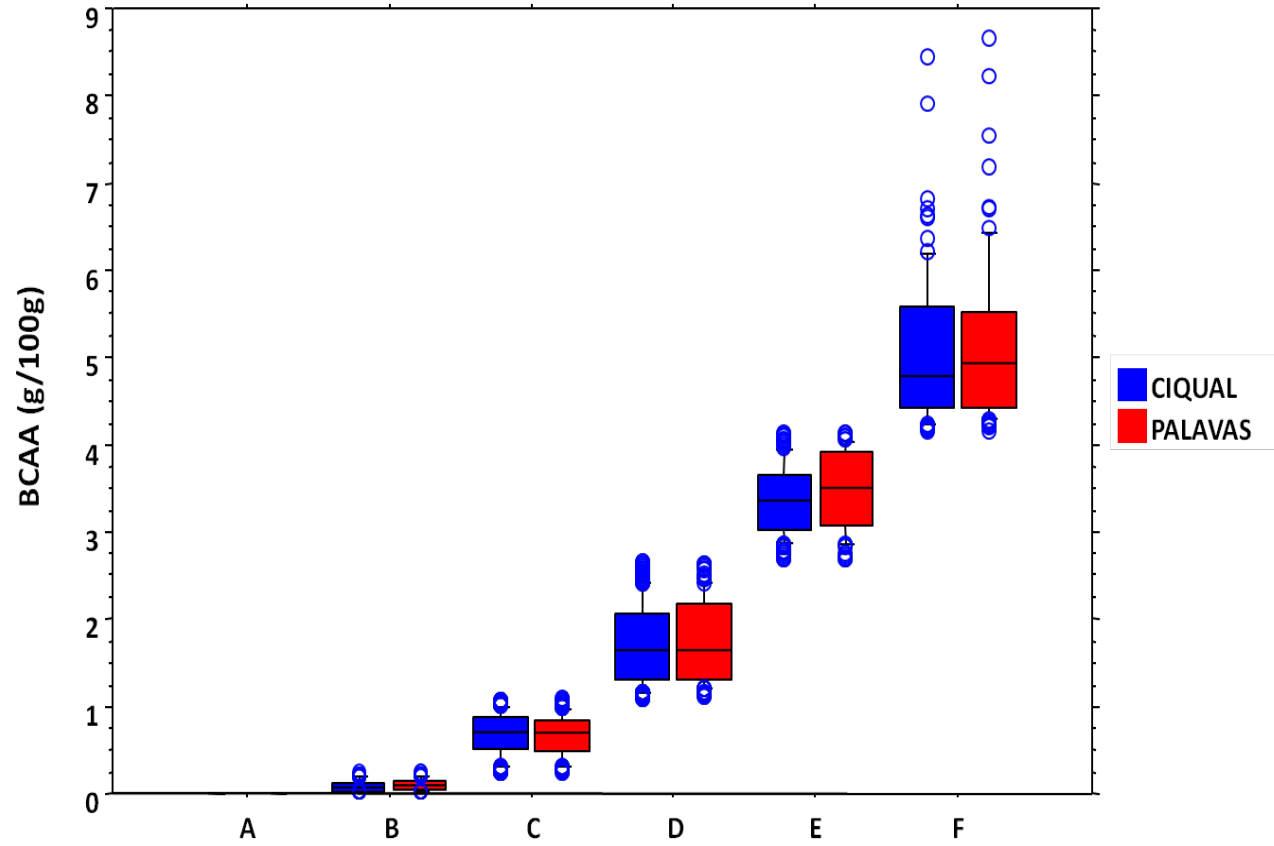


Table S1. Mean BCAA content (g/100 g) by food groups in 1331 compiled food items of CIQUAL

Food Groups	BCAA content
Dairy products & cheese	2.37 ± 0.07
Vegetables, fruits	0.50 ± 0.08
Cereals & Pasta	1.17 ± 0.07
Meat, poultry & fish	3.62 ± 0.06
Sugars & confectionery	0.61 ± 0.18
Fats & oils	0.08 ± 0.17
Beverages	0.06 ± 0.08
Sauces & condiments	0.68 ± 0.14
Mixed dishes & Soups	1.63 ± 0.08
Items for particular nutritional uses	0.54 ± 0.77

Values are expressed as Mean ± SE

Table S2. Clinical features of patients from the SPI collection stratified by BMI

	Normal weight	Obese	P-value (t-test)
n	1659	1298	NA
Age (years)	12.00 ± 0.05	12.16 ± 0.06	0.057
BMI (kg/m ²)	22.02 ± 0.09	30.55 ± 0.14	< 0.0001
Energy intake (Kcal/d)	2264.64 ± 12.14	2537.00 ± 15.33	< 0.0001
Protein intake (g/d)	102.95 ± 0.56	114.41 ± 0.68	< 0.0001
BCAA intake (g/d)	17.70 ± 0.10	19.56 ± 0.12	< 0.0001

Table S3. Contribution of food groups to total and individual BCAA intake in age category 9 – 13 years old in SPI survey stratified by gender and nutritional status.

Food Groups	Isoleucine						Leucine						Valine					
	Female NBW	Male NBW	Female OVW	Male OVW	Female OB	Male OB	Female NBW	Male NBW	Female OVW	Male OVW	Female OB	Male OB	Females NBW	Male NBW	Female OVW	Male OVW	Female OB	Male OB
Offals	0.00	0.00	0.05	0.00	0.04	0.04	0.00	0.00	0.05	0.00	0.05	0.05	0.00	0.00	0.05	0.00	0.04	0.00
Red meat & poultry	39.32	36.85	33.79	34.46	35.53	36.64	41.06	38.58	35.41	35.77	37.31	38.37	36.33	34.32	31.03	31.54	32.70	33.85
Luncheon meats	2.80	3.69	3.84	3.72	3.36	3.46	2.71	3.32	3.86	3.68	3.30	3.45	2.45	2.95	3.49	3.32	2.93	3.07
Fish & seafood	1.58	2.47	2.44	2.05	2.40	1.65	1.71	2.21	2.64	2.14	2.59	1.79	1.52	2.00	2.34	1.89	2.30	1.58
Milk & dairy products	15.49	16.30	16.63	17.17	15.47	16.23	16.16	17.09	17.40	17.88	16.29	16.94	17.19	18.11	18.19	18.71	16.92	17.70
Cheese	11.23	10.79	12.18	12.68	12.27	11.37	6.89	6.86	7.47	8.67	7.19	6.67	12.06	11.65	13.00	13.72	13.15	12.17
Eggs & related products	1.15	0.71	1.36	1.13	1.22	0.92	1.13	0.70	1.33	1.11	1.20	0.90	1.28	0.79	1.50	1.25	1.35	1.01
Bread, Pasta, cereals	16.86	18.79	15.63	16.11	16.35	16.70	17.97	20.11	16.75	17.22	17.68	17.93	17.24	19.30	15.87	16.39	16.71	17.06
Pastries & brioches	2.66	2.22	2.21	2.34	2.49	2.36	2.84	2.40	2.40	2.48	2.72	2.52	2.72	2.29	2.25	2.38	2.56	2.42
Cakes	0.70	0.61	0.76	0.56	0.60	0.48	0.69	0.62	0.76	0.56	0.61	0.48	0.70	0.62	0.77	0.56	0.61	0.48
Fruits & vegetables	1.94	1.87	2.00	1.70	1.79	1.54	1.99	1.81	1.91	1.62	1.72	1.45	1.66	1.62	1.69	1.44	1.52	1.30
Legumes	3.01	2.70	4.86	4.94	5.00	5.21	3.34	3.01	5.42	5.49	5.61	5.80	3.21	2.90	5.15	5.24	5.33	5.55
Nuts & Seeds	0.03	0.02	0.02	0.07	0.02	0.02	0.03	0.02	0.02	0.08	0.02	0.02	0.03	0.02	0.02	0.08	0.02	0.02
Mixed Dishes	1.54	1.22	2.17	1.04	1.39	1.57	1.69	1.30	2.36	1.10	1.49	1.68	1.62	1.27	2.23	1.05	1.42	1.59
Fats & oil	0.07	0.07	0.06	0.06	0.06	0.06	0.08	0.08	0.06	0.06	0.06	0.07	0.08	0.08	0.06	0.06	0.06	0.07
Sugar and confectionery	0.95	1.02	1.32	1.32	1.38	1.16	1.09	1.24	1.54	1.53	1.57	1.33	1.14	1.23	1.58	1.57	1.66	1.39
Drinks	0.64	0.60	0.56	0.57	0.51	0.47	0.58	0.57	0.51	0.54	0.47	0.44	0.74	0.77	0.69	0.72	0.63	0.60
Herbs, Spices & condiments	0.05	0.08	0.11	0.07	0.11	0.12	0.04	0.08	0.10	0.07	0.11	0.12	0.04	0.08	0.11	0.07	0.10	0.12

NBW, normal body weight; OVW, overweight; OB, obese

Table S4 Contribution of food groups to total and individual BCAA intake in age category 14 – 18 years old in SPI surveys stratified by gender and nutritional status

Food Groups	Isoleucine						Leucine						Valine					
	Female NBW	Male NBW	Female OVW	Male OVW	Female OB	Male OB	Female NBW	Male NBW	Female OVW	Male OVW	Female OB	Male OB	Female NBW	Male NBW	Female OVW	Male OVW	Female OB	Male OB
Offals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red meat & poultry	37.59	40.54	37.04	39.33	38.04	38.82	38.99	41.77	38.59	41.59	39.57	40.42	34.74	37.66	34.28	36.56	35.20	35.95
Luncheon meats	2.98	3.31	3.88	3.58	2.91	3.12	2.49	2.87	3.50	3.42	2.94	3.20	2.18	2.58	3.08	3.09	2.67	2.87
Fish & seafood	2.79	0.37	2.45	0.52	1.99	1.38	2.97	0.39	2.66	0.56	2.14	1.45	2.70	0.36	2.35	0.50	1.92	1.34
Milk & dairy products	17.86	14.79	15.86	14.74	15.06	13.48	18.69	15.32	16.66	15.45	15.59	13.95	20.05	16.58	17.69	16.08	16.33	14.64
Cheese	9.33	9.03	10.57	11.31	11.25	10.03	5.82	5.91	6.59	6.23	7.17	5.68	10.00	9.86	11.54	12.07	12.25	10.74
Eggs and related products	1.53	1.25	0.73	1.01	0.63	1.00	1.49	1.21	0.72	0.99	0.62	0.97	1.70	1.39	0.82	1.11	0.70	1.11
Bread, Pasta, cereals	16.16	18.72	16.46	17.34	16.93	17.53	17.24	19.82	17.63	18.65	18.07	18.59	16.54	19.19	16.89	17.84	17.32	17.97
Pastries & brioches	1.69	1.88	2.16	1.60	2.37	2.41	1.80	2.04	2.30	1.71	2.53	2.55	1.74	1.90	2.24	1.65	2.44	2.48
cakes	0.72	0.74	0.47	0.68	0.70	0.91	0.72	0.73	0.47	0.68	0.69	0.89	0.72	0.76	0.47	0.68	0.71	0.92
Fruits & vegetables	2.31	1.73	2.40	1.50	2.13	1.54	2.18	1.62	2.24	1.42	1.97	1.44	1.96	1.45	2.02	1.30	1.81	1.34
Legumes	3.43	3.43	4.12	5.96	3.90	5.05	3.80	3.78	4.58	6.66	4.32	5.59	3.67	3.67	4.41	6.37	4.17	5.40
Nuts & Seeds	0.05	0.05	0.12	0.00	0.12	0.16	0.06	0.06	0.11	0.00	0.13	0.18	0.05	0.06	0.13	0.00	0.13	0.17
Mixed Dishes	1.94	2.63	1.78	0.89	2.17	2.64	2.08	2.89	1.92	0.98	2.32	2.93	1.99	2.72	1.84	0.92	2.20	2.73
Fats & oil	0.05	0.06	0.06	0.06	0.07	0.06	0.05	0.06	0.06	0.07	0.08	0.06	0.05	0.07	0.06	0.07	0.08	0.06
Sugar and confectionery	0.94	0.85	1.16	1.11	1.19	1.38	1.06	0.96	1.31	1.26	1.34	1.60	1.14	1.03	1.39	1.32	1.43	1.65
Drinks	0.57	0.41	0.58	0.31	0.37	0.40	0.53	0.38	0.51	0.27	0.36	0.38	0.73	0.52	0.63	0.38	0.47	0.52
Herbs, spices & condiments	0.04	0.21	0.16	0.06	0.18	0.11	0.04	0.20	0.16	0.05	0.18	0.10	0.04	0.21	0.16	0.06	0.18	0.11

NBW, normal body weight ; OVW, overweight; OB, obese

Table S5 Clinical features of patients from MEDIGENE collection stratified by gender

Parameter	Female	Male	P-value
<i>n</i>	73	46	NA
Age (years)	46.50 ± 1.17	48.28 ± 1.21	NS
BMI (kg/m ²)	28.21 ± 0.68	27.82 ± 0.47	NS
Obesity (%)	41.09	26.08	NS
Glycemia (mmol/L)	5.37 ± 0.15	5.92 ± 0.31	NS
Fast insulin (mU/ml)	8.22 ± 0.61	7.06 ± 0.69	NS
HOMA-IR	2.04 ± 0.22	1.76 ± 0.21	NS
Insulin resistance (%)	31.50	23.91	NS
TG (mmol/L)	115.25 ± 7.26	134.16 ± 9.9	NS
HDL (mmol/L)	55.74 ± 2.01	48.25 ± 1.77	NS
MetS-ATPIII (%)	38.03	52.27	NS
Energy intake kcal/d	1969.13 ± 54.29	2252.15 ± 94.1	0.006
Protein intake (g/d)	73.97 ± 2.24	81.22 ± 3.70	NS
Leucine (g/d)	5.76 ± 0.18	6.16 ± 0.28	NS
Isoleucine (g/d)	3.39 ± 0.11	3.63 ± 0.17	NS
Valine (g/d)	3.76 ± 0.11	4.04 ± 0.18	NS
Total BCAA (g/d)	12.91 ± 0.41	13.84 ± 0.63	NS

Table S6. Mean intake of total and individual BCAA (g/d) stratified by BMI* in MEDIGENE surveys

Mean intake (g/d)	Females				Males			
	Normal weight (n =43)	Obese (n = 30)	P-value§	Energy-adjusted P-value	Normal weight (n = 34)	Obese (n =12)	P-value§	Energy-adjusted P-value
Isoleucine	3.17 ± 0.14	3.69 ± 0.19	< 0.0328	0.2327	3.66 ± 0.18	3.53 ± 0.37	0.7297	< 0.2998
Leucine	5.35 ± 0.22	6.35 ± 0.29	< 0.0071	0.0961	6.13 ± 0.31	6.27 ± 0.66	0.8346	< 0.276
Valine	3.57 ± 0.14	4.03 ± 0.17	< 0.052	0.1354	4.08 ± 0.19	3.94 ± 0.40	0.7353	< 0.2024
BCAA	12.10 ± 0.51	14.05 ± 0.63	< 0.0191	0.1387	13.87 ± 0.69	13.88 ± 1.47	0.9989	< 0.2399

*Obesity was considered with BMI > 30 kg/m²

§ANOVA test; Values are expressed as mean ± SE

Table S7. Mean intake of total and individual BCAA (g/d) stratified by gender in MEDIGENE surveys compared to other international studies.

Mean intake (g/d)	MEDIGENE*		Ishikawa-Takata & Takimoto [61]		Suga et al. [40]		Suga et al. [63]		Ishihara et al. Cohort I [62]		Ishihara et al. Cohort II [62]	
	F (n = 73)	M (n = 46)	F	M	F	M	F	M	F	M	F	M
Isoleucine	3.39	3.63	3.70	4.40	2.85	3.37	2.84	3.40	3.51	4.22	3.421	4.10
Leucine	5.76	6.16	6.50	7.60	5.09	6.03	5.06	6.08	6.07	7.31	5.912	7.09
Valine	3.76	4.04	4.50	5.20	3.36	3.98	3.34	4.01	4.20	5.05	4.11	4.91
BCAA	12.91	13.84	14.70	17.20	11.31	13.38	11.24	13.49	13.78	16.59	13.44	16.10