

**Table S1** – Carbon footprint (CF), energy content and Carbon-Footprint/Energy index (CFE index) of the food items.

<b>Meat and fish</b>	<b>CF [g CO<sub>2</sub>/g]</b>	<b>Source of CF<sup>1</sup></b>	<b>Energy content<sup>2</sup> [kJ/g]</b>	<b>CFE index [g CO<sub>2</sub>/kJ]</b>
Beef	22.80	Epd COOP, 2016	5.48	4.16
Beef (hamburger)	10.20	Epd INALCA, 2018	11.03	0.92
Blue shark	3.37	Iribarren et al., 2011	4.40	0.77
Chicken	3.65	Clune et al., 2017	7.17	0.51
Codfish	3.51	Clune et al., 2017	2.96	1.19
Cuttlefish	7.13	Clune et al., 2017	3.02	2.36
Fish (generic)	4.41	Clune et al., 2017	4.40	1.00
Mackerel	1.80	Clune et al., 2017	7.10	0.25
Mussels	9.51	Clune et al., 2017	3.51	2.71
Octopus	7.13	Clune et al., 2017	2.37	3.01
Pilchard	1.10	Clune et al., 2017	9.43	0.12
Pork (generic)	5.77	Clune et al., 2017	8.58	0.67
Pork (ham)	4.25	Bava et al., 2017	9.36	0.45
Pork (minced meat)	4.22	LCA food dk (database)	10.80	0.39
Pork (tenderloin)	4.17	LCA food dk (database)	6.58	0.63
Pork (sausages)	4.22	LCA food dk (database)	12.73	0.33
Pork (bacon)	4.23	LCA food dk (database)	22.19	0.19
Shrimps	7.80	Clune et al., 2017	2.96	2.64
Squid	7.13	Clune et al., 2017	2.84	2.51
Tuna	2.15	Clune et al., 2017	6.66	0.32
Tuna (yellowfin)	20.45	Iribarren et al., 2011	6.66	3.07
Turkey	7.17	Clune et al., 2017	5.64	1.27
Veal	24.10	Epd COOP, 2016	4.48	5.38

<b>Dairy, eggs, subs.</b>	<b>CF [g CO<sub>2</sub>/g]</b>	<b>Source of CF<sup>1</sup></b>	<b>Energy content<sup>2</sup> [kJ/g]</b>	<b>CFE index [g CO<sub>2</sub>/kJ]</b>
Butter	9.25	Clune et al., 2017	31.71	0.29
Coconut milk	0.42	Clune et al., 2017	14.97	0.03
Cream	5.90	Epd Granarolo, 2018	9.74	0.61
Eggs	3.20	Epd Granarolo, 2019	5.35	0.60
Gorgonzola	10.70	Bava et al., 2017a	13.56	0.79
Mascarpone	7.11	Epd Granarolo, 2016	19.02	0.37
Milk	1.8	Epd Granarolo, 2017	2.65	0.68
Mozzarella	8.70	Epd Granarolo, 2019	10.58	0.82
Parmigiano	16.90	Bava et al., 2017a	16.61	1.02
Pecorino Romano	16.90	Vagnoni et al., 2017	17.10	0.99
Pecorino Sardo	17.10	Vagnoni et al., 2017	16.90	1.01
Rice milk	0.66	Epd OraSi, 2019	2.22	0.30
Ricotta	3.33	Epd Granarolo, 2016	6.58	0.51
Soy milk	0.69	Epd OraSi, 2019	1.33	0.52
Stracchino	5.08	Epd Granarolo, 2016	12.55	0.40
Yogurt	2.73	Epd Granarolo, 2018	2.78	0.98

<b>Vegetables</b>	<b>CF [g CO<sub>2</sub>/g]</b>	<b>Source of CF<sup>1</sup></b>	<b>Energy content<sup>2</sup> [kJ/g]</b>	<b>CFE index [g CO<sub>2</sub>/kJ]</b>
Artichokes	0.48	Clune et al., 2017	1.38	0.35
Aubergines	1.35	Clune et al., 2017	0.94	1.44
Beans	0.43	Clune et al., 2017	13.62	0.03
Beans (borlotti)	1.06	Epd Valfrutta, 2019	4.26	0.25
Cowpeas	0.49	Clune et al., 2017	13.32	0.04
Broccoli	0.60	Clune et al., 2017	1.40	0.43
Cabbage	0.23	Clune et al., 2017	1.00	0.23

Carrots	0.20	Clune et al., 2017	1.71	0.12
Cauliflower	0.36	Clune et al., 2017	1.24	0.29
Celery	0.18	Clune et al., 2017	0.97	0.19
Chard	0.10	Adeyale et al., 2016	1.03	0.10
Chickpeas	0.77	Clune et al., 2017	4.65	0.17
Cucumber	0.23	Clune et al., 2017	0.65	0.35
Fava beans	0.56	Ecoinvent 3.5 (database)	2.15	0.26
Fennel	0.48	Clune et al., 2017	0.62	0.77
Garlic	0.57	Clune et al., 2017	2.22	0.26
Green beans	0.31	Clune et al., 2017	1.01	0.31
Leek	0.09	de Backer et al., 2009	1.45	0.07
Legumes (generic)	0.51	Clune et al., 2017	13.56	0.04
Lentils	1.03	Clune et al., 2017	13.35	0.08
Lettuce	0.37	Clune et al., 2017	0.92	0.40
Mushrooms	0.27	Clune et al., 2017	1.28	0.21
Olives	0.63	Clune et al., 2017	10.17	0.06
Onion	0.17	Clune et al., 2017	1.18	0.14
Peas	0.38	Clune et al., 2017	3.28	0.12
Pepper	0.66	Clune et al., 2017	1.08	0.61
Potatoes	0.25	Epd Selenella, 2019	3.03	0.08
Pumpkin	0.25	Clune et al., 2017	1.23	0.20
Savoy cabbage	0.23	Clune et al., 2017	1.21	0.19
Soybean	0.49	Clune et al., 2017	18.00	0.03
Spinach	0.54	Clune et al., 2017	1.45	0.37
Sweetcorn	0.47	Clune et al., 2017	4.39	0.11
Tofu	0.49	Clune et al., 2017	3.27	0.15
Tomatoes	0.45	Clune et al., 2017	0.80	0.56
Vegetables (generic)	0.37	Clune et al., 2017	0.96	0.38
Zucchini	0.21	Clune et al., 2017	0.66	0.32

Cereals and pasta	CF [g CO <sub>2</sub> /g]	Source of CF <sup>1</sup>	Energy content <sup>2</sup> [kJ/g]	CFE index [g CO <sub>2</sub> /kJ]
Barley	0.43	Clune et al., 2017	14.47	0.03
Bread (sliced)	1.03	Epd Barilla, 2020	11.20	0.09
Breadcrumbs	1.03	Epd Barilla, 2020	14.96	0.07
Burghul	0.52	Clune et al., 2017	12.77	0.04
Corn flour	0.93	Agri-foot print (database)	14.26	0.07
Cous cous	0.52	Clune et al., 2017	15.09	0.03
Croutons	1.44	Epd Barilla, 2019	11.52	0.12
Quinoa	1.15	Clune et al., 2017	15.72	0.07
Rice	2.55	Clune et al., 2017	14.15	0.18
Seitan	0.51	Clune et al., 2017	15.49	0.03
Semolina pasta	0.82	Epd Barilla, 2019	14.26	0.06
Tagliatelle (egg pasta)	2.46	Epd De Cecco, 2017	14.49	0.17
Wheat	0.52	Clune et al., 2017	13.76	0.04
Wheat flour	0.31	Epd Molino Grassi, 2018	13.52	0.02

Fruits	CF [g CO <sub>2</sub> /g]	Source of CF <sup>1</sup>	Energy content <sup>2</sup> [kJ/g]	CFE index [g CO <sub>2</sub> /kJ]
Almonds	1.54	Clune et al., 2017	26.29	0.06
Apples	0.15	Epd Assomela, 2019	1.82	0.08
Apricot	0.43	Clune et al., 2017	1.77	0.24
Banana	0.72	Clune et al., 2017	3.19	0.23
Blueberries	0.92	Clune et al., 2017	2.07	0.44
Cashew nut	1.44	Clune et al., 2017	25.26	0.06
Cherries	0.39	Clune et al., 2017	2.01	0.19
Chestnut	0.43	Clune et al., 2017	7.28	0.06
Figs	0.43	Clune et al., 2017	2.62	0.16
Hazelnuts	0.97	Clune et al., 2017	28.08	0.03

Kiwi	0.36	Clune et al., 2017	2.02	0.18
Lemon juice	0.70	Beccali et al., 2009	0.43	1.63
Melon	0.30	Clune et al., 2017	1.43	0.21
Oranges	0.33	Clune et al., 2017	1.55	0.21
Peaches	0.43	Clune et al., 2017	1.19	0.36
Peanut	0.83	Clune et al., 2017	25.93	0.03
Pears	0.31	Clune et al., 2017	2.16	0.14
Raspberries	0.84	Clune et al., 2017	2.03	0.41
Strawberries	0.58	Clune et al., 2017	1.27	0.46
Watermelon	0.32	Clune et al., 2017	0.67	0.48
White wine	0.76	Fusi et al., 2014	2.93	0.26

<b>Oil, spices, sauces</b>	<b>CF [g CO<sub>2</sub>/g]</b>	<b>Source of CF<sup>1</sup></b>	<b>Energy content<sup>2</sup> [kJ/g]</b>	<b>CFE index [g CO<sub>2</sub>/kJ]</b>
Mustard	2.09	Clune et al., 2017	24.28	0.09
Olive oil	4.14	Epd Monini, 2019	37.62	0.11
Peanuts oil	4.72	Schmidt, 2015	37.62	0.13
Pesto sauce	2.72	Epd Barilla, 2019	10.44	0.26
Ragù sauce	4.41	Epd, 2015	8.18	0.54
Saffron	3205.13	Khanali et al., 2016	13.77	232.73
Tomato sauce	1.14	Epd Valfrutta, 2019	0.89	1.28

<sup>1</sup> Epd source: (The International EPD® System, 2020)

<sup>2</sup> Data come from: Ministero delle politiche agricole, alimentari e forestali (CREA, 2019).

**Table S2** – Total amount of ingredients (divided by course and category) used in the menus.

<b>Food category</b>	<b>Unit</b>	<b>Winter menu</b>			<b>Summer menu</b>		
		<i>First course</i>	<i>Second course</i>	<i>Side dish</i>	<i>First course</i>	<i>Second course</i>	<i>Side dish</i>
Meat and fish	g	170	1650	0	120	1460	0
Dairy, eggs and subs.	g	165	491	0	135	443	11
Vegetables	g	1065	560	2880	435	1465	2710
Fruits	g	0	0	0	0	300	0
Cereals and pasta	g	1465	80	0	1600	30	30
Oil, spices and sauces	g	920	200	132	974	346	90

**Table S3** – Recipes from the school canteen meals.

<b>FIRST COURSE</b>	<b>g</b>	<b>SECOND COURSE</b>	<b>g</b>	<b>SIDE DISH</b>	<b>g</b>
<b><u>Barley soup</u></b>		<b><u>Aubergines roll</u></b>		<b><u>Backed/steam potatoes</u></b>	
Pearl barley	40	Aubergines	150	Potatoes	230
Potatoes	100	Ham	80	Olive oil	6
Olive oil	6	Tomato sauce	70		
		Olive oil	6	<b><u>Carrots</u></b>	
<b><u>Gnocchi with tomato sauce</u></b>				Carrots	120
Gnocchi: potatoes	250	<b><u>Backed chicken thighs</u></b>		Olive oil	6
Gnocchi: wheat flour	75	Chicken thighs	180		
Tomato sauce	70	Olive oil	6	<b><u>Crudities with oil</u></b>	
Onion	5	<b><u>Beef escalope</u></b>		Fennels	100
Olive oil	6	Beef	120	Carrots	100
<b><u>Lasagne</u></b>		Wheat flour	10	Olive oil	6
Egg pasta	60	Olive oil	6	<b><u>Green beans</u></b>	
Tomato sauce	70			Green beans	150
Beef meat	35	<b><u>Blue shark with tomato sauce</u></b>		Olive oil	6
		Blue shark	120		
Bechamel: milk	50	Tomato sauce	30	<b><u>Mixed cooked vegetables</u></b>	
Bechamel: wheat flour	50	Olive oil	6	Spinach	30
Olive oil	6			Pumpkin	30
Grated Parmigiano	5	<b><u>Boiled egg</u></b>		Onion	30
<b><u>Pasta salad</u></b>		Boiled egg	70	Fennel	30
Semolina pasta	80	<b><u>Caprese salad</u></b>		Broccoli	30
Tomatoes	20	Tomatoes	100	Olive oil	6
Aubergines	20	Mozzarella	90		
Mozzarella	10	Olive oil	6	<b><u>Mixed raw vegetables</u></b>	
Olive oil	6			Sweetcorn	50
<b><u>Pasta with aubergines</u></b>		<b><u>Chicken breast</u></b>		Cucumber	50
Semolina pasta	80	Chicken breast	120	Fennel	50
Aubergines	50			Carrots	50
Olive oil	6	<b><u>Chicken escalope</u></b>		Olive oil	6
<b><u>Pasta with oil and Parmigiano</u></b>		Chicken breast	120	<b><u>Mixed salad</u></b>	
Semolina pasta	80	Wheat flour	10	Salad	50
Olive oil	6	Olive oil	6	Tomatoes	100
Grated Parmigiano	6	<b><u>Chicken salad</u></b>		Sweetcorn	50
<b><u>Pasta with peas</u></b>		Salad	50	Olive oil	6
Semolina pasta	80	Chicken breast	100	<b><u>Peas</u></b>	
Tomato sauce	70	Olives	30	Peas	70
Peas	50	Tomatoes	100	Olive oil	6
Olive oil	6	Sweetcorn	50		
		Olive oil	6	<b><u>Peas with butter Parmigiano</u></b>	
<b><u>Pasta with pesto sauce</u></b>		<b><u>Codfish with lemon</u></b>		Peas	70
Semolina pasta	80	Codfish	170	Butter	5
Pesto sauce (ready to eat)	70	Lemon juice	5	Grated Parmigiano	6
<b><u>Pasta with ragù sauce</u></b>		<b><u>Codfish with tomato sauce</u></b>		<b><u>Stew cabbage</u></b>	
				Savoy cabbage	100

Semolina pasta	80
Tomato sauce	70
Beef meat	35
Olive oil	6

**Pasta with tomato sauce**

Semolina pasta	80
Tomato sauce	70
Onion	5
Olive oil	6

**Pasta with tomato sauce and olives**

Semolina pasta	80
Tomato sauce	70
Olives	30
Olive oil	6

**Pasta with tuna**

Semolina pasta	80
Tomato sauce	70
Tuna	30
Olive oil	6

**Pasta with vegetables**

Semolina pasta	80
Tomato sauce	70
Mixed vegetables	50
Olive oil	6

**Pasta with ragù and vegetables**

Semolina pasta	80
Tomato sauce	70
Beef meat	35
Mixed vegetables	50
Olive oil	6

**Pasta with zucchini**

Semolina pasta	80
Zucchini	50
Olive oil	6

**Pizza Margherita**

Wheat flour	120
Olive oil	10
Tomato sauce	80
Mozzarella	60

**Polenta with ragù sauce**

Polenta: corn flour	80
Polenta: olive oil	6
Tomato sauce	70
Beef meat	35

**Rice salad**

Rice	70
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Codfish	120
Tomato sauce	30
Olive oil	6

**Crud cheese (one of this)**

Mozzarella	90
Ricotta	100
Stracchino	90

**Fish croquettes**

Codfish	80
Spinach	80

Potatoes	80
Eggs	15
Olive oil	6

**Fish cutlet**

Blue shark	100
Eggs	15
Olive oil	6

**Hamburger meat pizzaiola**

Beef hamburger	120
Tomato sauce	50
Mozzarella	10
Olive oil	6

**Hamburger sandwich**

Bread	60
Beef hamburger	100

**Mackerel with lemon**

Mackerel	170
Lemon juice	5

**Meat skewers**

Sausages	60
Chicken	60
Olive oil	6

**Meatballs**

Beef	80
Tomato sauce	40
Breadcrumbs	20
Grated Parmigiano	6
Olive oil	6

**Milk turkey stew**

Turkey	120
Milk	50
Butter	5

**Omelette**

Eggs	70
Olive oil	6

Tomato sauce	30
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**Tomatoes gratin**

Tomatoes	150
Breadcrumbs	30
Olive oil	6

Tomatoes	30
Olives	20
Pecorino Romano	20
Backed ham	20
Peas	20
Sweetcorn	20

#### **Rice with tomato sauce**

Rice	70
Tomato sauce	50
Grated Parmigiano	6
Butter	5

#### **Rice with tomato sauce and vegetables**

Rice	70
Mixed vegetables	50
Tomato sauce	50
Grated Parmigiano	6
Butter	5

#### **Risotto Milanese**

Rice	70
Onion	5
Grated Parmigiano	6
Butter	5
Olive oil	6
Saffron	0,05

#### **Risotto Parmigiana**

Rice	70
Onion	5
Grated Parmigiano	6
Butter	5

#### **Risotto with artichokes**

Rice	70
Artichokes	30
Onion	5
Grated Parmigiano	6

#### **Butter**

Olive oil	6
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#### **Risotto with fish**

Rice	70
Blue shark	30
Tomato sauce	50
Grated Parmigiano	6
Butter	5

#### **Soup pasta with legumes**

Semolina pasta	40
Beans (borlotti)	40
Potatoes	100
Olive oil	6

#### **Pork escalope**

Pork loin	120
Wheat flour	10
Olive oil	6

#### **Potato pie**

Potatoes	180
Pecorino Romano	90
Grated Parmigiano	15
Eggs	60

#### **Raw/backed ham**

Raw/backed ham	80
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#### **Raw ham with melon**

Melon	300
Raw ham	80

#### **Ripened cheese (one of this)**

Pecorino Romano	80
Pecorino Sardo	80
Parmigiano Reggiano	70

#### **Roasted turkey**

Turkey	120
Olive oil	6

#### **Squid and potatoes salad**

Squid	100
Tomatoes	30
Carrots	30
Potatoes	30
Olive oil	6

#### **Tuna**

Tuna	100
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#### **Tuna, beans, potatoes and onion**

Tuna	90
Beans (borlotti)	35
Potatoes	50
Onion	20
Olive oil	6

#### **Turkey escalope**

Turkey breast	120
Wheat flour	10
Olive oil	6

#### **Turkey stripes**

Turkey	120
Garlic	5
Wheat flour	10
Olive oil	6

**Spaghetti with garlic and oil**

Semolina pasta	80
Olive oil	10
Garlic	5

**Spaghetti with olives**

Semolina pasta	80
Tomato sauce	70
Olives	30
Olive oil	6

**Vegetable soup with pasta**

Semolina pasta	40
Mixed vegetables	100
Potatoes	100
Olive oil	6

**Veal escalope**

Veal	120
Wheat flour	10
Olive oil	6

**Veal roll with vegetables**

Veal	100
Chard	100
Olive oil	6

**Vegetables parmigiana**

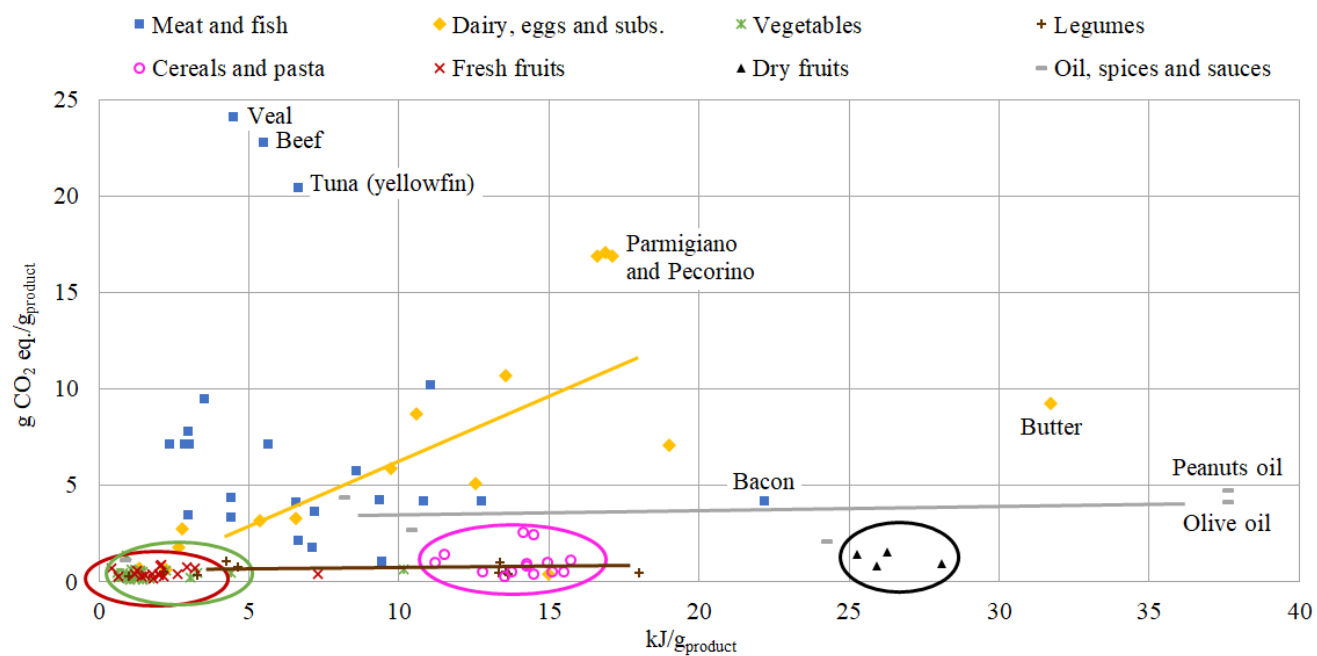
Aubergines	60
Zucchini	60
Tomato sauce	60
Grated Parmigiano	6
Olive oil	6

**Vegetables pie**

Mixed vegetables	120
Eggs	60
Potatoes	180
Pecorino Romano	90
Grated Parmigiano	6
Olive oil	6



**Figure S1** – Carbon-Footprint/Food Energy (CFE) index graph for the analysed ingredients.



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