

*Effect of cooking methods on the antioxidant capacity of foods  
of animal origin submitted to in vitro digestion-fermentation*

**SUPPLEMENTAL INFORMATION**

## **Supporting information description**

**Supplemental Table 1.** Food of animal origin and cooking conditions.

**Supplemental Table 2.** Antioxidant capacity of *in vitro* digested-fermented foods of animal origin depending on the cooking method.

**Supplemental Table 3.** Antioxidant capacity of *in vitro* digested-fermented foods of animal origin depending on the group.

**Supplemental Table 4.** Antioxidant capacity of *in vitro* digested-fermented dairy foods depending on the cooking method.

**Supplemental Table 5.** Antioxidant capacity of *in vitro* digested-fermented dairy foods depending on the dairy type.

**Supplemental Table 6.** Antioxidant capacity of *in vitro* digested-fermented fish depending on the cooking method.

**Supplemental Table 7.** Antioxidant capacity of *in vitro* digested-fermented fish depending on the fish type.

**Supplemental Table 8.** Antioxidant capacity of *in vitro* digested-fermented meat depending on the cooking method.

**Supplemental Table 9.** Antioxidant capacity of *in vitro* digested-fermented meat depending on the meat type.

**Supplemental Table 10.** Antioxidant capacity of *in vitro* digested-fermented red and white meat.

**Supplemental Table 1.** Food of animal origin and cooking conditions.

<b>Group</b>	<b>Sample name</b>	<b>Cooking method</b>
Dairy	Butter	Fried
Dairy	Butter	Raw
Dairy	Cheese (Gouda)	Fried
Dairy	Cheese (Gouda)	Grilled
Dairy	Cheese (Gouda)	Raw
Dairy	Cheese (Gouda)	Roasted
Dairy	Milk	UHT
Dairy	Yogurt	Raw
Egg	Egg	Boiled
Egg	Egg	Fried
Egg	Egg	Grilled
Egg	Egg	Roasted
Fish	Cod fish	Boiled
Fish	Cod fish	Fried
Fish	Cod fish)	Grilled
Fish	Cod fish	Roasted
Fish	Salmon	Boiled
Fish	Salmon	Fried
Fish	Salmon	Grilled
Fish	Salmon	Raw
Fish	Salmon	Roasted
Meat	Beef	Boiled
Meat	Beef	Fried
Meat	Beef	Grilled
Meat	Beef	Roasted
Meat	Chicken	Boiled
Meat	Chicken	Fried
Meat	Chicken	Grilled
Meat	Chicken	Roasted
Meat	Lamb	Boiled
Meat	Lamb	Fried
Meat	Lamb	Grilled
Meat	Lamb	Roasted
Meat	Pork	Boiled
Meat	Pork	Fried
Meat	Pork	Grilled
Meat	Pork	Roasted

**Supplemental Table 2.** Antioxidant capacity of *in vitro* digested-fermented foods of animal origin depending on the cooking method.

Cooking technique	TEAC <sub>DPPH</sub> (μmol Trolox/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Boiled	12.5 <sup>a,b</sup> ± 4.81	354 <sup>a</sup> ± 270	368 <sup>a</sup> ± 272
UHT	5.45 <sup>a,b</sup> ± 2.92	207 <sup>a</sup> ± 2.21	213 <sup>a</sup> ± 5.13
Fried	14.5 <sup>b</sup> ± 10.1	322 <sup>a</sup> ± 233	336 <sup>a</sup> ± 232
Grilled	10.2 <sup>a,b</sup> ± 5.49	326 <sup>a</sup> ± 237	361 <sup>a</sup> ± 59.8
Raw	4.76 <sup>a</sup> ± 5.41	227 <sup>a</sup> ± 63.3	231 <sup>a</sup> ± 63.3
Roasted	13.1 <sup>a,b</sup> ± 7.64	347 <sup>a</sup> ± 240	360 <sup>a</sup> ± 242
	TEAC <sub>FRAP</sub> (μmol Trolox/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Boiled	3.07 <sup>a</sup> ± 1.41	277 <sup>a</sup> ± 71.4	280 <sup>a</sup> ± 71.3
UHT	0.77 <sup>a</sup> ± 0.44	185 <sup>a</sup> ± 2.45	185 <sup>a</sup> ± 2.02
Fried	4.29 <sup>a</sup> ± 2.50	282 <sup>a</sup> ± 83.3	287 <sup>a</sup> ± 83.5
Grilled	3.23 <sup>a</sup> ± 0.95	342 <sup>a</sup> ± 147	347 <sup>a</sup> ± 155
Raw	4.41 <sup>a</sup> ± 2.19	276 <sup>a</sup> ± 63.2	281 <sup>a</sup> ± 62.8
Roasted	4.36 <sup>a</sup> ± 2.37	281 <sup>a</sup> ± 41.1	286 <sup>a</sup> ± 40.9

Different letters in the same column indicates statistically significant differences ( $p < 0.05$ )

**Supplemental Table 3.** Antioxidant capacity of *in vitro* digested-fermented foods of animal origin depending on the group.

<b>Food</b>	<b>TEAC<sub>DPPH</sub> (μmol Trolox/Kg food)</b>		
	<b>Digested fraction</b>	<b>Fermented fraction</b>	<b>Total antioxidant capacity</b>
Dairy	4.98 <sup>a</sup> ± 6.12	201 <sup>a</sup> ± 54.5	206 <sup>a</sup> ± 55.2
Egg	10.8 <sup>a,b</sup> ± 2.91	230 <sup>a</sup> ± 66.0	241 <sup>a</sup> ± 65.6
Fish	12.0 <sup>b</sup> ± 8.00	216 <sup>a</sup> ± 36.1	228 <sup>a</sup> ± 33.5
Meat	15.2 <sup>b</sup> ± 6.90	463 <sup>b</sup> ± 284	499 <sup>b</sup> ± 280
<i>Mean</i>	<i>8.60 ± 5.98</i>	<i>278 ± 110</i>	<i>294 ± 109</i>
	<b>TEAC<sub>FRAP</sub> (μmol Trolox/Kg food)</b>		
	<b>Digested fraction</b>	<b>Fermented fraction</b>	<b>Total antioxidant capacity</b>
Dairy	5.03 <sup>a</sup> ± 3.47	271 <sup>a</sup> ± 67.0	276 <sup>a</sup> ± 68.3
Egg	5.68 <sup>a</sup> ± 0.89	330 <sup>a</sup> ± 169	336 <sup>a</sup> ± 169
Fish	2.73 <sup>b</sup> ± 0.89	297 <sup>a</sup> ± 96.6	300 <sup>a</sup> ± 96.4
Meat	3.23 <sup>b</sup> ± 0.87	288 <sup>a</sup> ± 77.3	288 <sup>a</sup> ± 77.1
<i>Mean</i>	<i>4.18 ± 1.53</i>	<i>297 ± 102</i>	<i>300 ± 103</i>

Different letters in the same column indicates statistically significant differences ( $p < 0.05$ )

**Supplemental Table 4.** Antioxidant capacity of *in vitro* digested-fermented dairy foods depending on the cooking method.

Cooking technique	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
UHT	5.45 <sup>a</sup> ± 2.92	207 <sup>a</sup> ± 2.21	213 <sup>a</sup> ± 5.13
Fried	10.3 <sup>a</sup> ± 10.8	208 <sup>a</sup> ± 36.4	218 <sup>a</sup> ± 39.7
Grilled	4.54 <sup>a</sup> ± 0.52	142 <sup>a</sup> ± 0.09	146 <sup>a</sup> ± 0.44
Raw	3.01 <sup>a</sup> ± 2.08	225 <sup>a</sup> ± 74.7	228 <sup>a</sup> ± 74.5
Roasted	0.22 <sup>a</sup> ± 0.05	170 <sup>a</sup> ± 3.61	171 <sup>a</sup> ± 3.66
Cooking technique	FRAP (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
UHT	0.77 <sup>a</sup> ± 0.44	185 <sup>a</sup> ± 2.45	186 <sup>a</sup> ± 2.01
Fried	7.30 <sup>a</sup> ± 3.59	333 <sup>a</sup> ± 6.00	340 <sup>b</sup> ± 3.07
Grilled	2.75 <sup>a</sup> ± 0.00	216 <sup>a</sup> ± 53.4	219 <sup>a,b</sup> ± 53.4
Raw	4.25 <sup>a</sup> ± 2.58	276 <sup>a</sup> ± 74.7	281 <sup>a,b</sup> ± 74.3
Roasted	9.36 <sup>a</sup> ± 0.46	270 <sup>a</sup> ± 0.05	280 <sup>a,b</sup> ± 0.51

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**Supplemental Table 5.** Antioxidant capacity of *in vitro* digested-fermented dairy foods depending on the dairy type.

Sample	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Butter	10.9 <sup>a</sup> ± 10.1	260 <sup>b</sup> ± 81.4	271 <sup>b</sup> ± 76.0
Gouda	1.82 <sup>a</sup> ± 1.83	176 <sup>a</sup> ± 25.6	178 <sup>a</sup> ± 24.4
Milk	5.45 <sup>a</sup> ± 2.92	207 <sup>a,b</sup> ± 2.21	213 <sup>a,b</sup> ± 5.13
Yogurt	5.23 <sup>a</sup> ± 0.65	180 <sup>a,b</sup> ± 11.9	185 <sup>a,b</sup> ± 11.2
<i>Mean</i>	5.85 ± 3.88	206 ± 30.3	212 ± 29.2
Sample	FRAP (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Butter	3.39 <sup>a,b</sup> ± 0.97	352 <sup>b</sup> ± 16.8	355 <sup>b</sup> ± 15.9
Gouda	7.51 <sup>b</sup> ± 3.14	269 <sup>a</sup> ± 47.7	276 <sup>a</sup> ± 50.3
Milk	0.77 <sup>a</sup> ± 0.44	185 <sup>a</sup> ± 2.45	186 <sup>a</sup> ± 2.01
Yogurt	2.62 <sup>a,b</sup> ± 0.65	203 <sup>a</sup> ± 11.8	205 <sup>a</sup> ± 11.1
<i>Mean</i>	3.57 ± 1.3	252 ± 19.7	256 ± 19.8

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**Supplemental Table 6.** Antioxidant capacity of *in vitro* digested-fermented fish depending on the cooking method.

Cooking technique	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Boiled	10.9 <sup>a</sup> ± 4.69	212 <sup>a</sup> ± 10.1	223 <sup>a</sup> ± 9.96
Fried	10.4 <sup>a</sup> ± 11.3	225 <sup>a</sup> ± 64.6	236 <sup>a</sup> ± 53.8
Grilled	13.0 <sup>a</sup> ± 8.90	218 <sup>a</sup> ± 39.3	231 <sup>a</sup> ± 38.2
Raw	10.0 <sup>a</sup> ± 10.5	231 <sup>a</sup> ± 10.5	241 <sup>a</sup> ± 0.05
Roasted	14.5 <sup>a</sup> ± 8.94	200 <sup>a</sup> ± 29.2	214 <sup>a</sup> ± 37.2
	FRAP (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Boiled	2.38 <sup>a</sup> ± 0.09	268 <sup>a</sup> ± 11.1	271 <sup>a</sup> ± 11.2
Fried	2.39 <sup>a</sup> ± 0.84	281 <sup>a</sup> ± 184	283 <sup>a</sup> ± 184
Grilled	2.45 <sup>a</sup> ± 0.44	353 <sup>a</sup> ± 114	355 <sup>a</sup> ± 114
Raw	4.89 <sup>b</sup> ± 0.02	276 <sup>a</sup> ± 0.58	281 <sup>a</sup> ± 0.59
Roasted	2.63 <sup>a</sup> ± 0.18	296 <sup>a</sup> ± 13.8	299 <sup>a</sup> ± 13.9

Different letters in the same column indicates statistically significant differences ( $p < 0.05$ )



**Supplemental Table 7.** Antioxidant capacity of *in vitro* digested-fermented fish depending on the fish type.

Sample	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Cod fish	6.00 <sup>a</sup> ± 6.26	232 <sup>a</sup> ± 43.3	238 <sup>a</sup> ± 44.1
Salmon	16.7 <sup>b</sup> ± 5.79	202 <sup>a</sup> ± 23.5	219 <sup>a</sup> ± 20.4
<i>Mean</i>	<i>11.4 ± 6.03</i>	<i>217 ± 33.4</i>	<i>229 ± 32.3</i>
	FRAP (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Cod fish	2.20 <sup>a</sup> ± 0.38	310 <sup>a</sup> ± 96.9	312 <sup>a</sup> ± 96.7
Salmon	3.16 <sup>b</sup> ± 0.96	287 <sup>a</sup> ± 100	290 <sup>a</sup> ± 100
<i>Mean</i>	<i>2.68 ± 0.67</i>	<i>299 ± 98.5</i>	<i>301 ± 98.4</i>

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**Supplemental Table 8.** Antioxidant capacity of *in vitro* digested-fermented meat depending on the cooking method.

Cooking technique	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Boiled	13.2 <sup>a</sup> ± 5.11	474 <sup>a</sup> ± 311	488 <sup>a</sup> ± 314
Fried	19.8 <sup>a</sup> ± 9.21	457 <sup>a</sup> ± 303	477 <sup>a</sup> ± 296
Grilled	10.6 <sup>a</sup> ± 3.35	450 <sup>a</sup> ± 288	559 <sup>a</sup> ± 268
Roasted	16.1 <sup>a</sup> ± 5.52	470 <sup>a</sup> ± 291	487 <sup>a</sup> ± 290
Cooking technique	FRAP (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Boiled	2.65 <sup>a</sup> ± 0.68	288 <sup>a</sup> ± 95.0	290 <sup>a</sup> ± 95.0
Fried	3.62 <sup>a</sup> ± 1.21	263 <sup>a</sup> ± 14.9	267 <sup>a</sup> ± 15.7
Grilled	3.26 <sup>a</sup> ± 0.39	323 <sup>a</sup> ± 108	325 <sup>a</sup> ± 119
Roasted	3.39 <sup>a</sup> ± 0.74	277 <sup>a</sup> ± 57.7	280 <sup>a</sup> ± 57.7

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**Supplemental Table 9.** Antioxidant capacity of *in vitro* digested-fermented meat depending on the meat type.

Sample	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Beef	20.5 <sup>a</sup> ± 10.8	175 <sup>a</sup> ± 16.5	201 <sup>a</sup> ± 19.4
Chicken	13.2 <sup>a</sup> ± 8.94	196 <sup>a</sup> ± 22.1	209 <sup>a</sup> ± 16.2
Lamb	13.2 <sup>a</sup> ± 3.12	745 <sup>b</sup> ± 31.1	759 <sup>b</sup> ± 31.2
Pork	15.2 <sup>a</sup> ± 2.67	735 <sup>b</sup> ± 52.7	750 <sup>b</sup> ± 54.5
<i>Mean</i>	<i>15.5 ± 3.4</i>	<i>463 ± 320</i>	<i>480 ± 317</i>

  

Sample	FRAP (mmol Trolox equivalents/Kg)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Beef	3.31 <sup>a</sup> ± 1.55	306 <sup>a,b</sup> ± 95.0	309 <sup>a,b</sup> ± 102
Chicken	3.12 <sup>a</sup> ± 0.55	331 <sup>b</sup> ± 89.8	335 <sup>b</sup> ± 89.8
Lamb	2.86 <sup>a</sup> ± 0.80	228 <sup>a</sup> ± 15.3	231 <sup>a</sup> ± 14.9
Pork	3.64 <sup>a</sup> ± 0.38	285 <sup>a,b</sup> ± 49.9	289 <sup>a,b</sup> ± 50.1
<i>Mean</i>	<i>3.23 ± 0.33</i>	<i>288 ± 43.9</i>	<i>291 ± 44.2</i>

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**Supplemental Table 10.** Antioxidant capacity of *in vitro* digested-fermented red and white meat.

Other meats	DPPH (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Red meat	16.3 <sup>a</sup> ± 7.99	460 <sup>a</sup> ± 296	520 <sup>a</sup> ± 287
White meat	14.2 <sup>a</sup> ± 5.88	466 <sup>a</sup> ± 281	480 <sup>a</sup> ± 282
<i>Mean</i>	<i>15.3 ± 1.48</i>	<i>463 ± 4.24</i>	<i>500 ± 28.3</i>
	FRAP (mmol Trolox equivalents/Kg food)		
	Digested fraction	Fermented fraction	Total antioxidant capacity
Red meat	3.06 <sup>a</sup> ± 1.15	267 <sup>a</sup> ± 77.1	269 <sup>a</sup> ± 73.8
White meat	3.37 <sup>a</sup> ± 0.53	308 <sup>a</sup> ± 74.2	312 <sup>a</sup> ± 74.1
<i>Mean</i>	<i>3.20 ± 0.22</i>	<i>288 ± 29.0</i>	<i>291 ± 30.4</i>

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