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 blue and white fish.

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

**Supplemental Table 10.** Antioxidant capacity of *in vitro* digested-fermented meat depending on the meat type.

**Supplemental Table 11.** Antioxidant capacity of *in vitro* digested-fermented red and white meat.
**Supplemental Table 1.** Food of animal origin and cooking conditions.

| Group  | Sample name     | Cooking method |
|--------|-----------------|----------------|
| 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) | TEAC<sub>FRAP</sub> (μmol Trolox/Kg food) |
|-------------------|------------------------------------------|------------------------------------------|
|                   | Digested fraction | Fermented fraction | Total antioxidant capacity | 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 | 3.07<sup>a</sup> ± 1.41 | 277<sup>a</sup> ± 71.4 | 280<sup>a</sup> ± 71.3 |
| UHT               | 5.45<sup>a,b</sup> ± 2.92 | 207<sup>a</sup> ± 2.21 | 213<sup>a</sup> ± 5.13 | 0.77<sup>a</sup> ± 0.44 | 185<sup>a</sup> ± 2.45 | 185<sup>a</sup> ± 2.02 |
| Fried             | 14.5<sup>b</sup> ± 10.1 | 322<sup>a</sup> ± 233 | 336<sup>a</sup> ± 232 | 4.29<sup>a</sup> ± 2.50 | 282<sup>a</sup> ± 83.3 | 287<sup>a</sup> ± 83.5 |
| Grilled           | 10.2<sup>a,b</sup> ± 5.49 | 326<sup>a</sup> ± 237 | 361<sup>a</sup> ± 59.8 | 3.23<sup>a</sup> ± 0.95 | 342<sup>a</sup> ± 147 | 347<sup>a</sup> ± 155 |
| Raw               | 4.76<sup>a</sup> ± 5.41 | 227<sup>a</sup> ± 63.3 | 231<sup>a</sup> ± 63.3 | 4.41<sup>a</sup> ± 2.19 | 276<sup>a</sup> ± 63.2 | 281<sup>a</sup> ± 62.8 |
| Roasted           | 13.1<sup>a,b</sup> ± 7.64 | 347<sup>a</sup> ± 240 | 360<sup>a</sup> ± 242 | 4.36<sup>a</sup> ± 2.37 | 281<sup>a</sup> ± 41.1 | 286<sup>a</sup> ± 40.9 |
Supplemental Table 3. Antioxidant capacity of *in vitro* digested-fermented foods of animal origin depending on the group.

| Food | TEAC<sub>DPPH</sub> (μmol Trolox/Kg food) | TEAC<sub>FRAP</sub> (μmol Trolox/Kg food) |
|------|------------------------------------------|------------------------------------------|
|      | Digested fraction | Fermented fraction | Total antioxidant capacity | Digested fraction | Fermented fraction | Total antioxidant capacity |
| Dairy | 4.98<sup>a</sup> ± 6.12 | 201<sup>a</sup> ± 54.5 | 206<sup>a</sup> ± 55.2 | 5.03<sup>a</sup> ± 3.47 | 271<sup>a</sup> ± 67.0 | 276<sup>a</sup> ± 68.3 |
| Egg  | 10.8<sup>a,b</sup> ± 2.91 | 230<sup>a</sup> ± 66.0 | 241<sup>a</sup> ± 65.6 | 5.68<sup>a</sup> ± 0.89 | 330<sup>a</sup> ± 169 | 336<sup>a</sup> ± 169 |
| Fish | 12.0<sup>b</sup> ± 8.00 | 216<sup>a</sup> ± 36.1 | 228<sup>a</sup> ± 33.5 | 2.73<sup>b</sup> ± 0.89 | 297<sup>a</sup> ± 96.6 | 300<sup>a</sup> ± 96.4 |
| Meat | 15.2<sup>b</sup> ± 6.90 | 463<sup>b</sup> ± 284 | 499<sup>b</sup> ± 280 | 3.23<sup>b</sup> ± 0.87 | 288<sup>a</sup> ± 77.3 | 288<sup>a</sup> ± 77.1 |
| Mean | 8.60 ± 5.98 | 278 ± 110 | 294 ± 109 | Mean | 4.18 ± 1.53 | 297 ± 102 | 300 ± 103 |
**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) | FRAP (mmol Trolox equivalents/Kg food) |
|-------------------|---------------------------------------|---------------------------------------|
|                   | Digested fraction | Fermented fraction | Total antioxidant capacity | Digested fraction | Fermented fraction | Total antioxidant capacity |
| UHT               | 5.45 ± 2.92       | 207 ± 2.21         | 213 ± 5.13               | 0.77 ± 0.44       | 185 ± 2.45         | 186 ± 2.01               |
| Fried             | 10.3 ± 10.8       | 208 ± 36.4         | 218 ± 39.7              | 7.30 ± 3.59       | 333 ± 6.00         | 340 ± 3.07               |
| Grilled           | 4.54 ± 0.52       | 142 ± 0.09         | 146 ± 0.44              | 2.75 ± 0.00       | 216 ± 53.4         | 219 ± 53.4               |
| Raw               | 3.01 ± 2.08       | 225 ± 74.7         | 228 ± 74.5              | 4.25 ± 2.58       | 276 ± 74.7         | 281 ± 74.3               |
| Roasted           | 0.22 ± 0.05       | 170 ± 3.61         | 171 ± 3.66              | 9.36 ± 0.46       | 270 ± 0.05         | 280 ± 0.51               |
Supplemental Table 5. Antioxidant capacity of *in vitro* digested-fermented dairy foods depending on the dairy type.

| Sample | DPPH (mmol Trolox equivalents/Kg food) | FRAP (mmol Trolox equivalents/Kg food) |
|--------|--------------------------------------|--------------------------------------|
|        | Digested fraction | Fermented fraction | Total antioxidant capacity | Digested fraction | Fermented fraction | Total antioxidant capacity |
| Butter | 10.9 ± 10.1 | 260 ± 81.4 | 271 ± 76.0 | 3.39 ± 0.97 | 352 ± 16.8 | 355 ± 15.9 |
| Gouda  | 1.82 ± 1.83 | 176 ± 25.6 | 178 ± 24.4 | 7.51 ± 3.14 | 269 ± 47.7 | 276 ± 50.3 |
| Milk   | 5.45 ± 2.92 | 207 ± 2.21 | 213 ± 5.13 | 0.77 ± 0.44 | 185 ± 2.45 | 186 ± 2.01 |
| Yogurt | 5.23 ± 0.65 | 180 ± 11.9 | 185 ± 11.2 | 2.62 ± 0.65 | 203 ± 11.8 | 205 ± 11.1 |
| Mean   | 5.85 ± 3.88 | 206 ± 30.3 | 212 ± 29.2 | 3.57 ± 1.3 | 252 ± 19.7 | 256 ± 19.8 |
**Supplemental Table 6.** Antioxidant capacity of *in vitro* digested-fermented fish depending on the cooking method.

| Cooking technique | DPPH (mmol Trolox equivalents/Kg food) | FRAP (mmol Trolox equivalents/Kg food) |
|-------------------|--------------------------------------|---------------------------------------|
|                   | Digested fraction | Fermented fraction | Total antioxidant capacity | Digested fraction | Fermented fraction | Total antioxidant capacity |
| Boiled            | 10.9±4.69         | 212±10.1            | 223±9.96                 | 2.38±0.09         | 268±11.1           | 271±11.2                 |
| Fried             | 10.4±11.3         | 225±64.6            | 236±53.8                 | 2.39±0.84         | 281±184            | 283±184                 |
| Grilled           | 13.0±8.90         | 218±39.3            | 231±38.2                 | 2.45±0.44         | 353±114            | 355±114                 |
| Raw               | 10.0±10.5         | 231±10.5            | 241±0.05                 | 4.89±0.02         | 276±0.58           | 281±0.59                 |
| Roasted           | 14.5±8.94         | 200±29.2            | 214±37.2                 | 2.63±0.18         | 296±13.8           | 299±13.9                 |
Supplemental Table 7. Antioxidant capacity of *in vitro* digested-fermented fish depending on the fish type.

| Sample      | DPPH (mmol Trolox equivalents/Kg food) | FRAP (mmol Trolox equivalents/Kg food) |
|-------------|---------------------------------------|----------------------------------------|
|             |            | Digested fraction | Fermented fraction | Total antioxidant capacity | 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 | 2.20<sup>a</sup> ± 0.38 | 310<sup>a</sup> ± 96.9 | 312<sup>a</sup> ± 96.7 |
| Salmon      | 16.7<sup>b</sup> ± 5.79 | 202<sup>a</sup> ± 23.5 | 219<sup>a</sup> ± 20.4 | 3.16<sup>a</sup> ± 0.96 | 287<sup>a</sup> ± 100 | 290<sup>a</sup> ± 100 |
| Mean        | 11.4 ± 6.03 | 217 ± 33.4 | 229 ± 32.3 | 2.68 ± 0.67 | 299 ± 98.5 | 301 ± 98.4 |
Supplemental Table 8. Antioxidant capacity of *in vitro* digested-fermented blue and white fish.

| Other stuffs | DPPH (mmol Trolox equivalents/Kg food) |  |  |
|--------------|--------------------------------------|--|--|
|              | Digested fraction | Fermented fraction | Total antioxidant capacity |
| Blue fish    | 16.7 ± 5.79         | 202 ± 23.5          | 219 ± 20.4                |
| White fish   | 6.00 ± 6.27         | 232 ± 43.3          | 238 ± 44.1                |
| Mean         | **11.4 ± 6.03**     | **217 ± 33.4**      | **229 ± 32.3**            |

| FRAP (mmol Trolox equivalents/Kg) |  |  |
|----------------------------------|--|--|
|                                  |  |  |
| Blue fish                        |  |  |
| 3.16 ± 0.96                     |  |  |
| 287 ± 100                       |  |  |
| 290 ± 100                       |  |  |
| Mean                            | **2.68 ± 0.67** | **299 ± 98.5** | **301 ± 98.4** |
**Supplemental Table 9.** Antioxidant capacity of *in vitro* digested-fermented meat depending on the cooking method.

| Cooking technique | DPPH (mmol Trolox equivalents/Kg food) | FRAP (mmol Trolox equivalents/Kg food) |
|-------------------|---------------------------------------|---------------------------------------|
|                   | Digested fraction | Fermented fraction | Total antioxidant capacity | Digested fraction | Fermented fraction | Total antioxidant capacity |
| **Boiled**        | 13.2 ± 5.11       | 474 ± 311           | 488 ± 314                 | 2.65 ± 0.68      | 288 ± 95.0         | 290 ± 95.0                 |
| **Fried**         | 19.8 ± 9.21       | 457 ± 303           | 477 ± 296                 | 3.62 ± 1.21      | 263 ± 14.9         | 267 ± 15.7                 |
| **Grilled**       | 10.6 ± 3.35       | 450 ± 288           | 559 ± 268                 | 3.26 ± 0.39      | 323 ± 108          | 325 ± 119                  |
| **Roasted**       | 16.1 ± 5.52       | 470 ± 291           | 487 ± 290                 | 3.39 ± 0.74      | 277 ± 57.7         | 280 ± 57.7                 |
**Supplemental Table 10.** 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± 10.8          | 175± 16.5          | 201± 19.4          |
| Chicken| 13.2± 8.94          | 196± 22.1          | 209± 16.2          |
| Lamb   | 13.2± 3.12          | 745± 31.1          | 759± 31.2          |
| Pork   | 15.2± 2.67          | 735± 52.7          | 750± 54.5          |
| Mean   | 15.5± 3.4           | 463± 320           | 480± 317           |

| Sample | FRAP (mmol Trolox equivalents/Kg) |  |  |  |
|--------|----------------------------------|---|---|---|
|        | Digested fraction | Fermented fraction | Total antioxidant capacity |
| Beef   | 3.31± 1.55          | 306± 95.0          | 309± 102           |
| Chicken| 3.12± 0.55          | 331± 89.8          | 335± 89.8          |
| Lamb   | 2.86± 0.80          | 228± 15.3          | 231± 14.9          |
| Pork   | 3.64± 0.38          | 285± 49.9          | 289± 50.1          |
| Mean   | 3.23± 0.33          | 288± 43.9          | 291± 44.2          |
**Supplemental Table 11.** Antioxidant capacity of *in vitro* digested-fermented red and white meat.

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