DIFFERENCES IN FATTY ACID COMPOSITION OF RABBIT’S MEAT AFTER THE CHANGE OF THE SOURCE OF FAT IN THE DIET

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Introduction

Healthy diet

Polyunsaturated fatty acid (PUFA) → human health

Western diet → $\uparrow$ n-3 PUFA and $\downarrow$ n-6 PUFA

$\downarrow\downarrow$ n-6/n-3 PUFA ratio

Deficiency of n-3 PUFA

Cardiovascular diseases

Cancer
Meat and meat products in human nutrition

- source of nutrients
- healthy growth and development

?? fats ??

✓ nutritional, energy in sensory value of food

✓ taste and flavour

✓ source of fat-soluble vitamins (A, D, E, K)

✓ source of polyunsaturated fatty acids (PUFA)
Functional food

Animal products (meat, eggs, milk) enriched with n-3 PUFA

Different dietary strategies

Linseed or linseed oil

α-linolenic acid

eicosapentaenoic acid

docosahexaenoic acid

long chain fatty acids
Rabbit meat

Often recommended by nutritionists

Low lipid and cholesterol level

High content of PUFA

<table>
<thead>
<tr>
<th></th>
<th>Rabbit</th>
<th>Pig</th>
<th>Beef</th>
<th>Veal</th>
<th>Chicken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipid (g/100g)</td>
<td>6.8</td>
<td>8.7</td>
<td>9.0</td>
<td>4.0</td>
<td>6.6</td>
</tr>
<tr>
<td>Cholesterol (mg/100g)</td>
<td>45</td>
<td>61</td>
<td>70</td>
<td>66</td>
<td>81</td>
</tr>
<tr>
<td>PUFA (%)</td>
<td>23.9</td>
<td>18.5</td>
<td>9.5</td>
<td>15.2</td>
<td>25.1</td>
</tr>
<tr>
<td>n-6/n-3</td>
<td>6.7</td>
<td>32.5</td>
<td>9.5</td>
<td>36.6</td>
<td>18.0</td>
</tr>
</tbody>
</table>

Dalle Zotte, 2002
Aim

Changes of the fatty acid composition of rabbit’s meat (back and hind leg muscles)

Palm fat

Linseed oil
Materials and methods

24 x

6 ♂ 6 ♀

Control group

rabbit’s diet +
6% palm fat

69% PUFA

6 ♂ 6 ♀

Linseed group

rabbit’s diet +
6% linseed oil

80% SFA
## Main differences between diets

<table>
<thead>
<tr>
<th></th>
<th>Control diet</th>
<th>Linseed diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>∑ SFA</td>
<td>80.08</td>
<td>13.48</td>
</tr>
<tr>
<td>∑ MUFA</td>
<td>8.05</td>
<td>24.14</td>
</tr>
<tr>
<td>∑ PUFA</td>
<td>11.86</td>
<td>62.38</td>
</tr>
<tr>
<td>n-3 PUFA</td>
<td>2.85</td>
<td>40.33</td>
</tr>
<tr>
<td>n-6 PUFA</td>
<td>9.01</td>
<td>22.05</td>
</tr>
<tr>
<td>n-6/n-3</td>
<td>3.16</td>
<td>0.55</td>
</tr>
</tbody>
</table>
Material and methods

- Diet intake → recorded daily
- Body weight → recorded weekly
- 22 days of treatment
- Samples: → back muscle (*M. longissimus dorsi*)
  → hind leg muscle (*Biceps femoris*)
- Analysis: → GC
  → HPLC
Results

Productive performance

Weight gain (g/d)

Control group | Linseed group

Feed intake (g/d)

Control group | Linseed group

Feed conversion rate (g/g)

Control group | Linseed group
Fatty acid composition of rabbit meat

**back muscle**

- **SFA**
  - Control: $a$
  - Linseed: $b$
- **MUFA**
  - Control: $a$
  - Linseed: $a$
- **PUFA**
  - Control: $a$
  - Linseed: $b$

**hind leg muscle**

- **SFA**
  - Control: $a$
  - Linseed: $b$
- **MUFA**
  - Control: $a$
  - Linseed: $a$
- **PUFA**
  - Control: $a$
  - Linseed: $b$

### Percentage of total FA

- **SFA**
  - Control: $a$
  - Linseed: $a$
- **MUFA**
  - Control: $a$
  - Linseed: $a$
- **PUFA**
  - Control: $a$
  - Linseed: $b$

### Percentage of total PUFA

- **n-3 PUFA**
  - Control: $a$
  - Linseed: $b$
- **n-6 PUFA**
  - Control: $a$
  - Linseed: $b$
Fatty acid composition of rabbit meat

**back muscle**

- **SFA**: 40\% Control, 20\% Linseed
- **MUFA**: 30\% Control, 40\% Linseed
- **PUFA**: 50\% Control, 20\% Linseed

**hind leg muscle**

- **SFA**: 40\% Control, 20\% Linseed
- **MUFA**: 30\% Control, 40\% Linseed
- **PUFA**: 50\% Control, 20\% Linseed

**PUFA**

- **n-3 PUFA**: 7.28 : 1 Control, 1.81 : 1 Linseed
- **n-6 PUFA**: 100\% Control, 80\% Linseed
Fatty acid composition of rabbit meat

back muscle

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<tr>
<td>Control</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Linseed</td>
<td>b</td>
<td>a</td>
<td>a</td>
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hind leg muscle

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Legend:
- a: Different from control at p<0.05
- b: Different from Linseed at p<0.05

n-3 PUFA: 7.28 : 1
n-6 PUFA: 1.81 : 1
Malondialdehyde concentration

back muscle

Control group | Linseed group
---|---
a | b

hind leg muscle

Control group | Linseed group
---|---
a | b
Conclusions

Dietary FA composition → Meat FA composition

Linseed oil → ↓ SFA and ↑ PUFA (n-3) → ↓ n-6/n-3 PUFA ratio → healthier food for human

↑ PUFA → ↑ susceptibility to lipid oxidation → various natural antioxidants
Conclusions

Dietary FA composition → Meat FA composition

Linseed oil → ↓ SFA and ↑ PUFA (n-3)

↓ n-6/n-3 PUFA ratio

healthier food for human

↑ PUFA → ↑ susceptibility to lipid oxidation

various natural antioxidants