Animal versus vegetable protein; what does the future hold?

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Overview

Introduction

A look at Animal Protein

Reasons for animal production

Natural behavior and food

Effective use of natural resources

Sustainable use of side & waste streams

Summary
# A look at animal protein

<table>
<thead>
<tr>
<th></th>
<th>42%</th>
<th>50%</th>
<th>3%</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed conversion</td>
<td>0,8</td>
<td>4,5-8</td>
<td>2,3</td>
<td>1,5</td>
</tr>
<tr>
<td>Protein conversion</td>
<td>25-33%</td>
<td>9%-24%</td>
<td>19%</td>
<td>37%</td>
</tr>
<tr>
<td>Human consumable / non</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Medium - good</th>
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<td>Human consumable / non</td>
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**Upcycling protein**
A look at animal protein

Fig. 1. Carbon footprints per kilogram of protein.
A look at animal protein
Natural behavior and food

Why do people if they have a choice select a diet with animal proteins?

Nice, Normal, Natural, Nutrition

Because it is good for us and is part of our omnivore natural behaviour
Natural behavior and food

Table 1. Stages of evolution of human diets (Adapted from Eaton & Konner, 1985)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Time period elapsed (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleistocene: Stone Age</td>
<td>1.6 million</td>
</tr>
<tr>
<td><em>Homo sapiens</em>: Archaic</td>
<td>400,000</td>
</tr>
<tr>
<td>Neanderthal</td>
<td>80,000</td>
</tr>
<tr>
<td>Modern</td>
<td>45,000</td>
</tr>
<tr>
<td>Holocene: Agriculture</td>
<td>10,000</td>
</tr>
<tr>
<td>Industrial revolution</td>
<td>200</td>
</tr>
<tr>
<td>Global food economy</td>
<td>50</td>
</tr>
</tbody>
</table>

Palaeolithic diet: high animal protein and high fibre diets
Natural behavior and food

Animal protein is a very good source of:

1) High quality proteins
2) Vitamins like A, B12, D
3) Trace elements like Zinc, Iron, Iodine
4) Calcium & phosphorous

A lacto-ovo vegetarian diet requires a 20% larger intake of protein, and for a fully vegan diet this is 30%

Natural behavior and food

Recommended animal protein intake for health & longevity
Natural behavior and food

Where does all the health debate surrounding animal protein consumption come from?

1) High correlation animal protein intake and unhealthy habits such as amount of processed foods & lifestyle (exercise, smoking, body weight)

2) Unbalanced publications inspired by political motives

http://www.nrc.nl/next/2014/02/12/beter-vegetarier-in-een-hummer-dan-vleeseter-op-d-1345826
Natural behavior and food

Impact processed food

What are processed foods:

- High fat
- High salts & spices
- High sugars and fast refined carbohydrates

In general vegetarian choice for an overall healthier lifestyle
Natural behavior and food

HEALTHY EATING PLATE

- Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.
- The more veggies – and the greater the variety – the better. Potatoes and French fries don’t count.
- Eat plenty of fruits of all colors.

STAY ACTIVE!
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The Nutrition Source
www.hsph.harvard.edu/nutritionsource

Harvard Medical School
Harvard Health Publications
www.health.harvard.edu

- Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.
- Eat a variety of whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).
- Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.
Effective use of natural resources

70% water
30% land

Possibility for sustainable fish consumption?
Effective use of natural resources

We should consume less....
Effective use of natural resources

We can consume more fish

World wide possibility for sustainable fishery ≈50 million tons
Effective use of natural resources

Marginal soils only to be used effectively by cattle
Effective use of natural resources

1/6-1/8 arable land in the Netherlands is peat ground

Only effectively suitable for grass
Sustainable use of side & waste streams

- Food industry by-products
- Biobased by-products
- Former feedstuffs
## EU 27 balance sheet protein

<table>
<thead>
<tr>
<th>Raw material</th>
<th>Self sufficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans/meal</td>
<td>2%</td>
</tr>
<tr>
<td>Rapeseed and sunflower seed/meals</td>
<td>74%</td>
</tr>
<tr>
<td>Pulses</td>
<td>94%</td>
</tr>
<tr>
<td>Dried forages</td>
<td>106%</td>
</tr>
<tr>
<td>Misc. (groundnuts, linseed, cotonseed, corn gluten Feed etc)</td>
<td>56%</td>
</tr>
<tr>
<td>Total protein rich feedstuffs [Eu]</td>
<td>31%</td>
</tr>
<tr>
<td>Total protein in compound feeds [Europe]</td>
<td>52-56%</td>
</tr>
<tr>
<td>Total protein in total ration [Europe]</td>
<td>73-76%</td>
</tr>
</tbody>
</table>

Source: Prolea/Fefac 2012/2013 & WUR 2012-2013 (Marinus van Krimpen)
How do you see the future?
Summary - Reasons for animal production

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Please be aware:

large variations of impact studies