Nutritional Benefits of Animal Products

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EAAP conference, 1st Sept 2016
Overview

1. UK purchasing trends for animal products
2. UK intake of animal products vs recommendations
3. Comparisons with EU intakes
4. Challenges for the agri-food industry

Definition of animal Products:
- Meats & meat products
  - Red meats
  - Processed meats
  - Poultry
- Fish and fish products
- Eggs
- Milk & dairy products
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UK household purchasing trends
(average / person / week)
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Meat & meat product purchases

GRAMS

All meat
Processed meats & meat products
Red meat
Poultry

DEFRA 2015
UK household purchasing trends
(average / person / week)

Fish purchases

DEFRA 2015
UK household purchasing trends
(average / person / week)

Egg purchases

Number

[Graph showing egg purchases from 1974 to 2014, indicating a downward trend with a slight increase from 2010 onwards.]
UK household purchasing trends
(average / person / week)

Milk & dairy product purchases

[Graph showing trends in milk and dairy product purchases from 1974 to 2014, with specific categories for all dairy, cheese, milk, and yoghurt over time.]
Factors affecting purchasing trends

Changes in:

- **Cost**, driven by factors such as:
  - Environment / climate
  - Demand

- Lifestyle & food preferences

- Agricultural & Processing techniques

- Safety concerns

- Economy

- Population changes

- Nutritional advice

- Environmental concerns
Factors affecting purchasing trends

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Changes in UK egg purchases

Concern over cholesterol content – high risk CVD context

Science started to unravel function dietary cholesterol & Saturated fatty acids

British Lion Code (ACMSF)

No association between dietary cholesterol or egg consumption & CVD

Early exposure allergens, inc. egg, prevents dev allergens

Micro safety concern – new strain Salmonella

Salmonella essentially eliminated from laying flocks

ACMSF review group – risk v low

Advice to vulnerable groups to avoid raw or likely cooked

Advice to vulnerable groups relaxed

Allergy related factors
Nutritional factors
Food safety factors
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National Diet & Nutrition Survey (NDNS)

- Nationally representative data
  - Pre-school children: 1.5-4.5 years
  - Young people: 4-18 years
  - Adults: 19-64 years
  - Older adults: >65 years
- Data from 1992
- Latest programme 2008/09-2011/12
  - Food diary (n=6,828)
  - Blood sample (n=2,671)
  - Urine sample (n=3,676)
UK meat intake (g/day)

Processed meat
Red meat

UK NDNS 2008/09-2011-12 data
Dept. of Health 2011 recommendations

Maximum recommended
UK meat intake (g/day)

Years

UK NDNS 2008/09-2011-12 data

Dept. of Health 2011 recommendations

Maximum recommended
Meat types consumed

UK NDNS 2008/09-2011-12 data
Red vs poultry meat intake

UK NDNS 2008/09-2011-12 data
UK Fish intake

Mean intake (g/week)

Recommendation (2 portions/week)

Dept. of Health 2004 recommendations
UK Fish intake

Mean intake (g/week) vs Years

Recommendation (1 portion oily fish/week)

Dept. of Health 2004 recommendations

- White fish coated or fried including fish fingers
- Other white fish, shellfish, fish dishes and canned tuna
- Oily fish
UK milk & dairy product intake

Mean intake (ml/g per day)

Years

UK NDNS 2008/09-2011-12 data
Milk & milk products consumed

UK NDNS 2008/09-2011-12 data
Eatwell Plate vs New Eatwell Guide

- **Fruit and vegetables**
- **Bread, rice, potatoes, pasta, and other starchy foods**
- **Meat, fish, eggs, beans, and other non-dairy sources of protein**
- **Food and drinks high in fat and/or sugar**
- **Milk and dairy foods**

**Eatwell Guide**

- Check the label on packaged foods.
- Use the Eatwell Guide to help you get a balance of healthier and more sustainable food.
- Choose foods lower in fat, salt and sugars.
- Eat less often and in small amounts.
- Choose unsaturated oils and use in small amounts.

**U.S. Department of Agriculture guidelines**

- **Protein**
- **Vegetables**
- **Grains**
- **Dairy**
- **Fruits**

**Ulster University**
Dairy & cardiovascular (CVD) health

Inflammation
(“risk) not observed in overweight/obese subjects

Blood pressure
(“risk)

Blood cholesterol
(“risk)

CVD (No ‘risk)

Milk & Dairy products

Myocardial infarction risk
(“risk)

Type 2 diabetes
(“risk)

↑ Weight control

Stroke (“risk)
# Nutrient contribution of animal products

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NDNS key findings

Too high
- Saturated fat
- Free sugar
- Salt

Too low
- Fruit & Vegetables
- Fibre
- Oily Fish
- Vitamin D*
- Riboflavin (young people & women)
- Iron* (young people & women)
- Vitamin A (young people)
- Folate (girls only)
- Magnesium, potassium & selenium (older children & adults)

* Biochemical data
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[www.milknutritiousbynature.eu](http://www.milknutritiousbynature.eu); European Milk Forum

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**Contribution (%) of meat & meat products to total energy intakes across Europe** (Linseisen et al 2002)

**European Investigation into Cancer & Nutrition (EPIC) study**

- **Northern Europe:** ↑total meat intakes
- Greater differences with meat **type** rather than **total intake**
- **Southern Europe:** ↑intake beef, veal & poultry
  ↓ intake pork & processed meat
Mean availability of fish and seafood for European countries (g/person/day).

- Highest: Portugal (83g/person/day)
- Lowest: Hungry (4.8g/person/day)
- Main factors: proximity to sea and cost.
Overview

1. UK consumption trends for animal products
2. UK intake of animal products vs recommendations
3. Comparisons with EU intakes
4. Challenges for the agri-food industry

Definition of animal Products:
- Meats & meat products
  - Red meats
  - Processed meats
  - Poultry
- Fish and fish products
- Eggs
- Milk & dairy products
Challenges for the agri-food industry

- Sustainability
- Safety and traceability
- Quality
- Maximise nutritional quality of foods, e.g.
  - modify fatty acid profile - "SFA while 'PUFAs?"
Saturated fat (SFA)….an evolving picture

1. No independent association between the consumption of SFA and the risk of CVD (Jakobsen et al. 2009)


3. Some evidence for the benefit of replacing SFA with PUFA (Livingstone et al 2012; Micha & Mozaffarian 2010; Hooper et al. 2012)


CHO – carbohydrate
PUFA – polyunsaturated fatty acids
FA – fatty acids
CVD – Cardiovascular disease
Challenges for the agriculture & food industry

• Sustainability
• Safety and traceability
• Quality
• Maximise nutritional quality of foods, e.g.
  • modify fatty acid profile - ‘SFA while “PUFAs?
    • Bio-fortification
  • maximise vitamins and minerals content
    • Bio-fortification
    • Fortification
Northern Ireland Centre for Food & Health (NICHE)
Ulster University, Coleraine campus
Red meat study: bio-fortification
McAfee et al. 2011

Aim: to compare the effects on plasma and platelet LC n-3 PUFA status of consuming red meat produced from either grass-fed animals or concentrate-fed animals.
40 (20M; 20F) healthy volunteers

Baseline: Blood sample - fatty acid profile; Anthropometric; Blood pressure; Randomly assigned to treatment.

Red meat (690g (469g)/week) from animals offered a grass-finishing diet

Post-intervention: Blood sample - fatty acid profile; Anthropometric; Blood pressure.

Red meat (690g (469g)/week) from animals offered a concentrate-finishing diet

mince beef, sirloin steak, lamb medallion

McAfee et al. 2011
Findings
McAfee et al. 2011

• Meat from grass-finished animals had a significantly:
  • ↓ total fat content
  • ↑ $n$-3 PUFA content

• 4-week consumption of the grass-finished meats (67g/d) resulted in:
  • 18mg/d ↑ intake of $n$-3 PUFA
  • ↑ plasma & platelet $n$-3 PUFA concentrations
  • No change in cholesterol or blood pressure
The D-Light Study: fortification
Weir, Pourshahidi et al. unpublished

**Aim:** to investigate the effects of vitamin D3-fortified milk and supplemental vitamin D3 on vitamin D status and functional health outcomes during the winter.
52 (26M; 26F) healthy volunteers

**Baseline:** Blood sample - Vitamin D status & inflammation, Body composition; Blood pressure; Randomly assigned to treatment.

- **n=13** Vitamin D3 10µg + 10µg
- **n=13** Vitamin D3 10µg + 0µg
- **n=13** Vitamin D3 0µg + 10µg
- **n=13** Vitamin D3 0µg + 0µg

**Post-intervention:** Blood sample - Vitamin D status & inflammation, Body composition; Blood pressure

500ml milk/day
Findings
Weir, Pourshahidi et al. unpublished

• Preliminary results indicate the potential for a Vitamin D fortified milk to maintain Vitamin D status throughout the winter period
Conclusions

Purchasing trends:
- Little change: all meat, cheese
- ↓: all fish, all dairy, red meat, milk
- ↑: eggs, poultry, processed meats, salmon, yoghurt

Currently animal products make a significant contribution to UK and European dietary intake of a range of nutrients
Comparison with UK current dietary recommendations indicates:
- ↓ fish intake
- ↑ red and processed meat intake

Challenges: develop novel strategies to maximise the nutritional content of animal products
Acknowledgments