Nutritional Benefits of Food Processing

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DECLARATION OF INTEREST

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Other assignments:

• Visiting Professor, University of Ulster

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GLOBAL POPULATION GROWTH IMPLIES 50% MORE FOOD DEMAND BY 2030

75% OF THE WORLD POPULATION WILL LIVE IN CITIES BY 2050

Every day 200,000 people leave the countryside for the city.
THE CHALLENGE IS TO FEED 7 BILLION PEOPLE BOTH SUSTAINABLY & HEALTHY

DIET IS PART OF THE GLOBAL SOLUTION TO BETTER HEALTH

Data on 2000 from WHO (2002)

10 million deaths due to under-nutrition
15 million deaths due to over-nutrition

4bn people affected by malnutrition deserve the chance to develop physically & mentally to get more out of life

50% of world’s population have blood cholesterol that’s too high
30% of world’s population have blood pressure that’s too high
**WHO: GLOBAL STRATEGY ON DIET, PHYSICAL ACTIVITY AND HEALTH**

Recommendations for Diet:
- achieve energy balance and a healthy weight
- limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats and towards the elimination of trans-fatty acids
- increase consumption of fruits and vegetables, and legumes, whole grains and nuts
- limit the intake of free sugars
- limit salt (sodium) consumption from all sources and ensure that salt is iodized

For Physical Activity, it is recommended that individuals engage in adequate levels throughout their lives. Different types and amounts of physical activity are required for different health outcomes: at least 30 minutes of regular, moderate-intensity physical activity on most days reduces the risk of cardiovascular disease and diabetes, colon cancer and breast cancer. Muscle strengthening and balance training can reduce falls and increase functional status among older adults. More activity may be required for weight control.

May 2004, the 57th World Health Assembly

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**OBJECTIVELY: KEY ISSUES ARE SAFA, TFA, SODIUM, SUGAR, (FIBRE, FRUIT & VEGETABLES)**

Subjectively:

<table>
<thead>
<tr>
<th>What Consumers Want More Of:</th>
<th>What Consumers Want Less of:</th>
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<tbody>
<tr>
<td>Fresh foods</td>
<td>Highly processed foods</td>
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<tr>
<td>Vegetables and Fruits</td>
<td>Sugar</td>
</tr>
<tr>
<td>Whole Grains and Fiber</td>
<td>Salt and sodium</td>
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<tr>
<td>Water</td>
<td>Saturated fats, Trans fats</td>
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<tr>
<td>Olive oil and Nuts</td>
<td>Sugar, high fructose, corn syrup</td>
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<tr>
<td>Fish and Poultry</td>
<td>Artificial ingredients</td>
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<tr>
<td>Broccoli, Tomatoes, Oranges</td>
<td>Carbohydrates/simple carbs</td>
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<td>Spinach, Dark Leafy Greens</td>
<td>Reduced and Low foods</td>
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<td>Garlic</td>
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<tr>
<td>Omega 3</td>
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<td>Calcium</td>
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<td>Vits C and E</td>
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<td>Protein</td>
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HealthFocus 2006
(data from 11 countries - around the world)
WHAT IS FOOD PROCESSING?

food processing (fuːd ˈprəʊsesɪŋ)
Definitions
noun
(cookery) the methods by which food is processed for consumption by humans or animals

SOME EXAMPLES OF EVERYDAY FOOD PROCESSING …
**THE ADVANTAGES OF RESPONSIBLE FOOD PROCESSING**

- Increased food safety
- Increased preservation of food quality
  - Better accessibility / distribution
  - Improved taste (and appearance)
  - Less food waste
- More convenience
- Increased bioavailability & retention of (micro)nutrients
- Possibility to change the nutritional composition

**WHY ARE MANY PEOPLE NOT AWARE OF THE ADVANTAGES OF PROCESSING FOODS?**

- Affluence: Almost everyone can afford to get enough to eat and therefore little knowledge or concern about where food comes from.
- Little knowledge or concern about food waste from trimming or spoilage.
- They and their parents never made pickles, buttermilk, cheese, beer or wine.
- Never canned or made frozen vegetables from fresh.
- They have rarely seen a spoiled food – bread, fruits, vegetables, meat or fish.
- Therefore, they don’t understand how a food stays stable and safe nor why they should be concerned about it.
ARE “NATURAL” PRODUCTS HEALTHY? IT DEPENDS….

Yes, If the ‘natural’ products also deliver high levels of nutrients of good quality (“high nutrient density”): fruits and vegetables, legumes, whole grains and nuts.

No, If the ‘natural’ product does not also deliver a ‘healthy’ nutrient composition. E.g. natural fat sources like dairy fat or palm oil do have less favourable fat compositions than olive oil or sunflower oil.

IMPORTANT CONSUMER TRENDS CAN BE CONFLICTING

- Great taste
- Natural & fresh
- Convenience & variety
- Healthy and nutritious
- Sustainability
NUTRIENTS AND BETTER DIETS

• Less calories, SAFA, TFA, Na, sugar

• More fruit & vegetables, legumes, whole grains, nuts, fibres, and micro-nutrients

Recommendations for various micronutrients are increasing (moving from preventing deficiencies to reducing the risk of chronic diseases, e.g.:
  » Vitamin C
  » Vitamin E
  » Folate
  » Vitamin D (under discussion)

GROWING OLDER, EATING BETTER

Consequences of growing older:
• Lower mobility (sarcopenia) → lower energy needs
• Lower food intake (anorexia of ageing) frequent
• Lower efficiency of nutrient absorption
• Other aspects: more illness; poor dentition; drug-nutrient interactions

→ Higher nutrient density required; can generally only be met through nutrient fortification or supplementation
SODIUM REDUCTION NEEDS FOOD PROCESSING

Current approaches for salt reduction include:
» Adaptation
» Flavours
» Lower salt ingredients
» Salt replacers

For sodium reductions up to 20-30 %
» employing multi-sensory principles
» masking the bitterness of salt replacers

Industry-wide approaches
Challenges:
» Solutions for > 30 % sodium reduction

ENHANCEMENT OF SALTINESS BY ADDING A SALT REPLACER AND AROMA

Employing multi-sensory integration principles to increase saltiness and overall flavour perception – the two main functions of salt

Flavour profile Chicken bouillon

100% NaCl
70% NaCl
70% NaCl + salt replacer + aroma
CHOLESTEROL
KEY RISK FACTOR

80% of Cardiovascular disease (CVD) is attributable to modifiable risks like diet and lifestyle

Elevated LDL-cholesterol – key modifiable risk factor for Coronary Heart Disease (CHD)

Yet over 50% of population has elevated cholesterol

PLANT STEROLS ARE “NATURAL” COMPONENTS OF THE HUMAN DIET

Vegetable oils: rich sources of plant sterols

Corn oil (refined): 2 table spoons (30g) 227 mg
Rapeseed oil (refined): 147 mg
Soybean oil (refined): 82 mg
Olive oil (extra virgin): 44 mg
Palm oil (refined): 17 mg

Fruits, vegetables, cereals & nuts also contain plant sterols

Apple 1 small 13 mg
Orange 1 small 24 mg
Broccoli 1 cup, chopped 39 mg
Carrot 1 cup, chopped 16 mg
Tomato 1 medium 4.7 mg
Wholemeal bread 1 slice 29 mg

CHOLESTEROL LOWERING EFFECT OF FATTY FOODS ENRICHED WITH PLANT STEROLS: INTAKE-RESPONSE RELATIONSHIP

Plant sterol intake (g/day)

% reduction of LDL-cholesterol

-2 -4 -6 -8 -10 -12 -14 -16

0.5 1 1.5 2 2.5 3 3.5

- data of ~30 placebo-controlled Unilever-initiated studies with plant sterol-enriched spreads
- data (mean plus 95% confidence interval) from a meta-analysis of 41 studies with plant sterols or stanols (Katan et al, Mayo Clin Proc. 2003)

AMOUNTS OF FOODS NEEDED TO REACH 2 G / DAY PLANT STEROLS

Regular foods: very large quantities
- 425 tomatoes
- 210 carrots
- 150 apples
- 83 oranges
- 70 slices of wholemeal bread
- 11 cups of peanuts

Plant sterol-enriched foods
- 3 portions of plant sterol-enriched foods:
  - enough spread for 2 slices of bread (10g)
  - 1 medium glass (250ml) of milk drink
  - 1 pot (125ml) of yoghurt
  - (where each portion contains 0.75g of plant sterols per serving)
  - or
  - 1 ‘one-a-day’ yoghurt mini-drink
  - (where each mini-drink contains 2g of plant sterols)
A “NATURAL” DILEMMA

Reducing the calorie content of foods, while
- increasing levels of nutrients,
- reducing “unhealthy” nutrients, and/or
- adding “healthy” ingredients
- (and offering great taste and convenience)
requires sophisticated food processing.

CONCLUSIONS

- Nature is paramount in providing us with food!
- Moving towards natural foods is not automatically moving towards a healthier diet.
- Responsible food processing is necessary to give all consumers easy access to sustainable foods that fit in their healthy diet.