Dietary Fibre: Appetite Control and Weight Management

Dr Kavita Karnik, VP, Global Nutrition and OI
The risk transition

- Traditional risks
- Modern risks

- Tobacco
- Physical inactivity
- Overweight
- Urban air quality
- Road traffic safety
- Occupational risks
- Undernutrition
- Indoor air pollution
- Water, sanitation and hygiene

Global health risks: mortality and burden of disease attributable to selected major risks. WHO 2009
Obesity in numbers

In the WHO/European Region

- over 50% of people are overweight or obese
- over 20% of people are obese

In the WHO European Region

1 in 3 11-year-olds is overweight or obese

www.euro.who.int/obesity © WHO 07/2013

www.euro.who.int/obesity © WHO 03/2014

World Health Organization

McKinsey Global Institute, Nov 2014
Role of fibres

Obesity represents long-term result of an imbalance between energy intake and energy expenditure ---- the most obvious link between dietary fibre and obesity development is through its effects on energy intake control mechanisms.
What are fibres?

Carbohydrate polymers with a Degree of Polymerisation (DP) of 3 or more

Resistant to absorption and human enzymes in the small intestine

Have a beneficial physiological effects


“Fibre” means carbohydrate polymers with three or more monomeric units, which are neither digested nor absorbed in the human small intestine.

Fibre ingredients should also have a beneficial physiological effect demonstrated by generally accepted scientific evidence

---

(1) Directive 2008/100/EC, Annex II published 29th October 2008; (2) such as: decrease intestinal transit time, increase stool bulk, is fermentable by colonic microflora, reduce blood total cholesterol, reduce blood LDL cholesterol levels, reduce post-prandial blood glucose, or reduce blood insulin levels,....; Also repeated in Commission Guidance methods of analysis December 2012
Structural/functional properties of DF and effects on eating behaviour

**DF properties**
- Fiber characteristics
  - Chemical (molecular) structure
  - Polymer structure
  - Polymer length (MW)
  - Cell wall structure

**DF functionality**
- Modulating digesta properties (gel formation, viscosity)
- Fermentation in gut (extent and rate of fermentation)

**Effects**
- Subjective appetite
  - Satiety
  - Fullness
  - Hunger
  - Desire to eat
  - Prospective food consumption

- Energy intake

Mela et al, 2017
Satiety Index: selected foods

Graph showing the satiety index for various foods compared to white bread = 100. From Holt et al. (1995).
Global fibre intakes and recommendations

 Decreased energy intake after consumption of polydextrose

Systematic review and meta-analysis to examine the effects of polydextrose on energy intake at an *ad libitum* lunch

6 studies were identified with data for a total of 120 subjects

Energy intake at a subsequent *ad libitum* lunch indicates a significant effect of polydextrose in a dose-dependent manner over the placebo (*p* < 0.01)

Energy intake for the rest of the day or dinner and the total daily energy intake were not statistically significant

Ibarra et al, 2015.
Effect of polydextrose on energy intake

Energy intake at the ad libitum lunchtime test meal following fixed energy liquid preloads containing different amounts of polydextrose. n 21; twelve men and nine women

Astbury at al, 2013
PromOat® beta glucan and satiety

Hartvigsen et al. 2014.
Satiety hormones: effect of molecular weight

' oat beta-Glucan improves satiety and release of cholecystokinin is likely to be part of the mechanism'
Soluble Corn Fibre reduces glucose and insulin response

Significant difference between treatments at each time point at p<0.05.

Data expressed as mean ± SEM.

Additional health benefits of soluble corn fibre

- Bone health-enhances mineral absorption
- Prebiotic benefits
- May assist with healthy weight management
- Stool bulking and laxative effects
- Supports healthy blood glucose levels
Growing awareness leads to growing demand for fibre: not only for digestive health but for weight management

Consumers Desire for More Fibre in their Diet

- **60%** USA
- **50%** Middle East
- **52%** Global
- **48%** APAC
- **44%** EUR
- **70%** LATAM

Reasons for Fibre Consumption

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy metabolism</td>
<td>56%</td>
</tr>
<tr>
<td>Digestive health</td>
<td>49%</td>
</tr>
<tr>
<td>Healthy diet</td>
<td>45%</td>
</tr>
<tr>
<td>Regularity</td>
<td>40%</td>
</tr>
<tr>
<td>Full for longer</td>
<td>37%</td>
</tr>
<tr>
<td>Weight management</td>
<td>33%</td>
</tr>
<tr>
<td>Tastes great</td>
<td>32%</td>
</tr>
<tr>
<td>Fit body</td>
<td>30%</td>
</tr>
<tr>
<td>Lowers cholesterol</td>
<td>27%</td>
</tr>
<tr>
<td>Heart health</td>
<td>25%</td>
</tr>
</tbody>
</table>

Source: 1) Tate & Lyle Proprietary Research, Fibre AAU 2016, 11 countries, 8800 consumers
Consumers want fibre across many categories

Purchase Intent - Top 10 Categories Impacted by Inclusion of Fibre
% Very/likely to buy

- Cereal: 55%
- Yogurt: 49%
- Cookies: 45%
- Soup: 45%
- Crackers: 45%
- Juice Drinks: 45%
- Cakes: 44%
- Bars: 44%
- Ice Cream: 40%
- Salty Snacks: 39%

Source: 1) Tate & Lyle Proprietary Research, Global Consumer Ingredient Perception Research, November 2017, 9 countries, 3002 consumers
Consumers are clear that TASTE is critical

84% of consumers agree that taste is the most important factor when choosing what to eat and drink

2017 International Food Information Council (IFIC) Food & Health Survey
Food and beverage companies responding to help consumers live healthier lives

Global growth of product launches with ingredient fibre
5Y CAGR 2013-2017

- North America: +15%
- Europe: +16%
- Latin America: +33%
- Middle East Africa: +10%
- Asia Pacific: +18%

Global growth of product launches with ingredient fibre
5Y CAGR 2013-2017

- Beverages: +23%
- Dairy: +14%
- Soups, Sauces, and Dressings: +32%
- Bakery: +26%

Source: Mintel GNPD 2013-2017 - Ingredients matches “soluble corn fibre” or “polydextrose” or “soluble oat fibre”
**Thousand Island dressing – no added sugar, reduced fat and fibre enriched**

Featuring PROMITOR® Soluble Fibre, OPTIMIZER Stevia™ 4.10, SPLENDA® Sucralose and HAMULSION® Stabiliser System

<table>
<thead>
<tr>
<th></th>
<th>Thousand Island Dressing, Reference / 100 g</th>
<th>Thousand Island Dressing, No added sugar / 100 g</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td>876 kJ / 209 kcal</td>
<td><strong>537 kJ / 128 kcal</strong></td>
</tr>
<tr>
<td><strong>Fat</strong></td>
<td>16.0 g</td>
<td><strong>10.6 g</strong></td>
</tr>
<tr>
<td><strong>of which saturates</strong></td>
<td>1.1 g</td>
<td><strong>0.2 g</strong></td>
</tr>
<tr>
<td><strong>Carbohydrate</strong></td>
<td>15.0 g</td>
<td><strong>5.6 g</strong></td>
</tr>
<tr>
<td><strong>of which sugars</strong></td>
<td>10.0 g</td>
<td><strong>1.6 g</strong></td>
</tr>
<tr>
<td><strong>Fibre</strong></td>
<td>0.2 g</td>
<td><strong>3.8 g</strong></td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>1.2 g</td>
<td><strong>0.7 g</strong></td>
</tr>
<tr>
<td><strong>Salt</strong></td>
<td>1.9 g</td>
<td><strong>1.4 g</strong></td>
</tr>
</tbody>
</table>
Summary

Fibres provide various opportunities to help weight management

A varied diet that uses fibre-fortified foods together with fibre-rich foods has multiple benefits in addition to weight management

Soluble fibres provide an easy-to-use tool to make our foods healthier while preserving the taste

Health benefits from the different dietary fibre types and functions

Closes the fibre gap while staying within a day’s calorie allotment