Fibre factsheet

Recommendations from the Scientific Advisory Committee on Nutrition (SACN) on fibre

SACN recommends an increase in the population’s fibre intake to an average of 30g per day for adults. The current recommendation is equivalent to 23-24g/day AOAC fibre and no age group in the UK is achieving this; average intakes in adults are around 18g AOAC fibre. Socio-economic disparities exist with lower intakes in the lowest income quintile compared to the highest, in all age groups and in both sexes. Similar trends are evident in fruit and vegetable intakes, which may partly explain these findings.

For children, the recommended intakes are: 15g/day (age 2-5); 20g/day (age 5-11); 25g/day (age 11-16); 30g/day (age 16-18). These recommendations have been rounded to the nearest 5g and are informed by comparative intakes for dietary fibre in different age groups in the National Diet and Nutrition Survey.

SACN has extended the definition of dietary fibre to include not only non-starch polysaccharides but also non-digestible oligosaccharides, resistant starch and polydextrose as there is now evidence to demonstrate similar beneficial physiological effects (e.g. stool bulking, decreasing intestinal transit time and constipation, or lowering total and LDL-cholesterol) to those demonstrated for naturally integrated (as opposed to extracted natural of synthetic) dietary fibre components of food. So the new definition for fibre (colloquially known as AOAC fibre) includes all carbohydrates that are neither digested nor absorbed in the small intestine and have a degree of polymerisation of three or more monomeric units, plus lignin.

Adopting this approach allows definitions to be aligned with the research bases and helps UK intakes to be compared more easily with those in other countries.

Most of the evidence for the wide range of health benefits of fibre summarised below comes from studies where the exposure reflects dietary fibre intakes achieved through a variety of foods where the fibre is present as a naturally integrated component of the food. There is also evidence to show that particular extracted and isolated fibres have positive effects on blood lipids and colorectal function but, due to the smaller evidence base, it is not known whether these components confer the full range of health benefits associated with the consumption of a mix of dietary fibre rich foods. Therefore, it is recommended by SACN that fibre intakes should be achieved through a variety of food sources.

SACN’s findings on fibre

The methodology used in SACN’s review is summarised at the end of this factsheet. SACN found that, since the dietary reference value for fibre was last considered, the quality of evidence has strengthened considerably for cardiovascular disease, type 2 diabetes and colorectal cancer.

- There is strong evidence from prospective cohort studies that increased intakes of total dietary fibre, and particularly cereal fibre and wholegrains, are associated with a lower risk of cardiometabolic disease (cardiovascular diseases, coronary events, type 2 diabetes) and colorectal...
cancer. The evidence is more limited for individual dietary fibre constituents due to the smaller number of studies available.

- Randomised controlled trials indicate that total dietary fibre, wheat fibre and other cereal fibres increase faecal mass and decrease intestinal transit times.
- Randomised trials indicate that dietary fibre intake has no effect on body weight or energy intake. There is limited evidence from trials that a higher wholegrains intake may decrease total energy intake but more evidence is required before firm conclusions can be drawn.
- Randomised controlled trials also indicate that higher intake of oat bran and isolated β-glucans leads to lower total cholesterol, LDL-cholesterol and triacylglycerol concentrations and lower blood pressure.
- Randomised controlled trials in adults indicate that supplementation with non-digestible oligosaccharides (arabinoxylan-oligosaccharide, fructo-oligosaccharide and galacto-oligosaccharide) improves blood lipid concentrations, and increases faecal mass and bacterial content. Resistant starch supplementation increases faecal mass and short chain fatty acid content. Polydextrose and polyol supplementation increases faecal mass. The health significance of the effects on faecal parameters is, however, unclear.
- Trials indicate that non-digestible oligosaccharides or inulin supplementation increases net calcium absorption in children but the physiological relevance of this is unclear.

Implications of the new recommendation

Figure 1 shows the main contributors of fibre in the UK diet for different age groups. Current average intakes in adults are about 12g below the new recommendation, at 18g, meaning that intakes need to increase substantially to meet the 30g level. Table 1 shows current intakes in the UK compared to the new recommendations for different age groups, for fibre but also free sugars and total carbohydrate.

**Figure 1: Sources of fibre in the UK diet** (Bates et al 2014)
Table 1: Comparison of recommendations for intakes of total carbohydrate, free sugars and dietary fibre with current intakes (as a percentage of dietary energy) for children, teenagers and adults

<table>
<thead>
<tr>
<th></th>
<th>Old recommendation</th>
<th>New recommendation</th>
<th>Children 4-10 y</th>
<th>Teenagers 11-18 y</th>
<th>Adults 19-64y</th>
<th>Older adults 65y plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free sugars (% total dietary energy)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>No more than 10%&lt;sup&gt;b&lt;/sup&gt;</td>
<td>No more than 5%</td>
<td>14.7%</td>
<td>15.4%</td>
<td>11.5%</td>
<td>11.2%</td>
</tr>
<tr>
<td>Total carbohydrate (% total dietary energy)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Approx. 50%</td>
<td>Approx. 50%</td>
<td>52.1%</td>
<td>50.6%</td>
<td>45.7%</td>
<td>45.8%</td>
</tr>
<tr>
<td>Dietary fibre&lt;sup&gt;c&lt;/sup&gt; g/day, adults</td>
<td>About 23-24g&lt;sup&gt;c&lt;/sup&gt; (adults)</td>
<td>30g&lt;sup&gt;c&lt;/sup&gt; (adults)</td>
<td>-</td>
<td>-</td>
<td>About 18g&lt;sup&gt;c&lt;/sup&gt;</td>
<td>About 18g&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dietary fibre&lt;sup&gt;c&lt;/sup&gt; g/day, children</td>
<td>-</td>
<td>15g&lt;sup&gt;c&lt;/sup&gt; (2-5 years) 20g&lt;sup&gt;c&lt;/sup&gt; (5-11 years)</td>
<td>About 14.5g&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dietary fibre&lt;sup&gt;c&lt;/sup&gt; g/day, teenagers</td>
<td>-</td>
<td>25g&lt;sup&gt;c&lt;/sup&gt; (11-16 years) 30g&lt;sup&gt;c&lt;/sup&gt; (16-18 years)</td>
<td>-</td>
<td>About 15g&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup> including energy from alcohol; <sup>b</sup> expressed as non-milk extrinsic sugars; <sup>c</sup> expressed as AOAC fibre

To help consumer understanding and implementation of the new recommendations, BNF has carried out some simple dietary modelling to develop a 7-day menu plan which illustrates, in practice, what a diet that provides 30g of AOAC fibre and meets all other dietary recommendations looks like for adults. For more details, see [http://onlinelibrary.wiley.com/doi/10.1111/nbu.12141/epdf](http://onlinelibrary.wiley.com/doi/10.1111/nbu.12141/epdf). It is possible to achieve the recommendation, if meals are based on starchy foods (mostly wholegrain and high fibre options), high fibre snacks are selected and around 8 portions of fruit and vegetables are consumed daily. However, the required dietary pattern is not reflective of average diets in the UK at present and encouraging sufficient behaviour change to meet the new recommendation will be challenging.

BNF has also developed some menu plans for adults that meet the new free sugars recommendation (5% total dietary energy) as well as providing 30g of fibre. These will be published on our website on 17 July.

**The methodology used by SACN in its review**

SACN’s review was comprehensive and its report stretches to almost 400 pages. Systematic reviews of the literature were undertaken to identify the best quality evidence and SACN restricted its review to evidence from randomised controlled trials (which have the potential to demonstrate a
causal relationship, e.g. between an aspect of diet and a risk factor for disease) and prospective cohort studies (which reveal associations, e.g. between an aspect of diet and a disease risk factor or endpoint) as these are considered to be the most robust study designs for diet and health research.

Strict inclusion and exclusion criteria for individual studies were applied to ensure the evidence considered was of sufficient quality to enable sound conclusions to be reached. For example, the duration of the study was a criterion. The evidence that emerged from a series of systematic reviews was assessed and graded by SACN. Details of the grading scheme can be found in Annex 2 of the SACN report.

The evaluation considered whether intakes of specific carbohydrates are a factor in the risk for cardiovascular disease (heart disease and stroke), obesity, type 2 diabetes and colorectal (bowel) cancers. The evidence for a relationship between carbohydrates and oral health was also considered.

SACN’s recommendations are based on only those relationships where the evidence met the required standards. Where they existed, dose-response relationships between carbohydrate intakes and health outcomes were considered and used to inform the dietary recommendations.