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Diet and Health

R. Gormley

The relationship between diet and health remains a highly emotive one. However, it is important to stress that health is also strongly influenced by lifestyle, genetic and environmental factors. Having said this, the debate and interest in dietary issues and in food safety continues unabated. This article gives an account of recent and ongoing activity in the area of diet, healthy eating, and human nutrition at The National Food Centre (NFC) and how the programme has evolved and developed over a number of years. The related area of food safety is not considered here, save to note that there is also an extensive and expanding programme at the NFC in this area.

The NFC team

The informal, but dynamic, NFC team active in the diet/healthy eating/human nutrition area came about from the effect of apples and certain fruits in humans, on the use of dietary fibre from apples to control late-maturity-onset diabetes. Recent studies have also been carried out on producing high fibre oat fractions which are particularly rich in soluble fibre.

School meal studies

Two such studies have been carried out to date. The first covered a number of primary schools in the Dublin area while the second was in specific schools in the inner city. Interviews were conducted with many children and the studies pinpointed some deficiencies. These included a dislike of cheese and many vegetables, an underweight/size problem in children in some of the schools, and a reluctance (in some schools) to drink the milk supplied.

Food, health and the consumer

A major study on this topic was funded by the Commission of the European Communities (CEC) under its FAST (Forecasting and Assessment in Science and Technology) programme. The project had three components:

1. A critical review and assessment of key nutritional issues and of the criteria applied for determining the effects of foods of plant, animal and marine origin on human health.

2. An assessment of food and nutrition policies in developed countries.

3. An evaluation and assessment of agricultural production and food processing technologies with respect to their impact on human health, and consumer reaction to them.

Based on the findings, a list of 45 recommendations were made to the CEC for attention, and in some cases for action. The complete results and discussions were published in a 317 page report.

Dietary fibre

Most consumers are now aware of the need to consume adequate dietary fibre, and the food industry is responding with an ever-increasing array of products. Dietary fibre has taken on the status of a food ingredient with a wide range in functionality depending on source. Work is ongoing on fibre-rich products at the NFC and many foods are also being tested for their content of both soluble and insoluble fibre.

Staff expertise in the dietary fibre area has been developed over the years from a number of projects. These include studies on the content and functionality of dietary fibre from different fruits, vegetables and cereals, and between different cultivars of the same item. On the cholesterol reducing effect of apples and peas in humans, and on the use of dietary fibre from apples to control late-maturity-onset diabetes. Recent studies have also been carried out on producing high fibre oat fractions which are particularly rich in soluble fibre.

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book. This, in turn, led to a further study supported by the CEC entitled 'Food and Health in the year 2010'. Some of the speculations and conclusions from the study are as follows:

"It appears likely that current lifestyle trends will continue with a heightened demand for convenience foods that have a positive nutritional image. Increased attention to individual nutritional needs is a likely development leading to a demand for personalised diets for the attainment of optimum nutrition. In relation to diet-related disease, it is likely that better understanding of the major risk factors should result in a greater focus on metabolic and physiological features now only beginning to emerge as relevant. Coupled with a greater desire to prevent disease onset, a probable development is the identification of foods which offer some protection against certain types of illness and also those responsible for sub-clinical conditions in some individuals. The importance of natural complexity in foods will be increasingly realised and there will be major developments in the nutrition of the aged. The role of preventive medicine will expand and the benefits of alternative medicine will also become more obvious."

These two studies have provided an excellent base from which to launch follow-up activity in the food, health and nutrition policy areas.

Product formulation and processing
Staff at the NFC are acutely aware of the potential and need to produce healthier product formulations for increasingly demanding and educated consumers. This applies especially to reduced fat and/or sugar formulations, and extensive studies have been done on a confidential basis on the use of fat substitutes in a range of products. These tests were backed up by extensive sensory analysis of the products. An industry-led demand for the development of such products seems set to continue and it is envisaged that an ingredients expert will join the NFC team in the near future.

In parallel with product formulation, the selection of gentler and more controlled food processing techniques (and especially heat processes) which will result in better retention of nutrients and quality continues to be a priority. Existing staff expertise in the NFC in this area has been complemented recently by the coming on stream of the pilot plant—processing hall and test kitchen combined facility at Dunsinea.

HEALTH-EAT programme
As a follow on from the diet-related activities above, the NFC has recently introduced a national HEALTH-EAT programme aimed at increasing awareness of healthy eating and aiding the food, catering and retail sectors in producing healthier foods, meals, recipes and formulations in line with currently accepted dietary goals. HEALTH-EAT is timely in view of the high incidence in Ireland, and in some other European countries, of the so-called diseases of affluence, some of which are diet-linked. Consumer interest in healthy eating is also increasing rapidly. HEALTH-EAT will focus particularly on the content of fat, complex carbohydrate, dietary fibre, salt and certain vitamins in foods, meals and food formulations and will advise on reformulation, recipe modification, menu and meal planning, balanced diet.
concepts, preparation of information literature, and other aspects on a consultancy basis. Areas covered by the programme include:

- current dietary issues
- current dietary goals
- modified food formulations
- recipe modification
- healthy cooking
- menu modification and planning
- balanced diet concepts
- nutrient losses in foods

Preparation of information literature.

The first thrust of the HEALTH-EAT programme was aimed in 1989/90 at the catering industry and a number of training courses were held dealing with the more prudent use of fat, salt and sugar in catering. The data in Table 1 show the dramatic effect on the fat status and calorie content of 'swamping' coleslaw with mayonnaise and poached salmon with hollandaise sauce. Servings of these accompaniments should be much smaller and on a side plate thus giving the diner the option of using them or not.

A similar example is shown in Table 2 where a predominantly carbohydrate food i.e. potatoes, become a high fat food through the over-use of butter or by deep fat frying (French-fries). These are only two examples and many others can be given in the areas of oversalting (e.g. in soup) and the use of high sugar syrups (e.g. in fruit salad). Oversalting can be overcome by allowing the consumer to add salt to taste and by rinsing the brine off canned vegetables before heating/serving. Similarly there is no need to serve canned fruit salad, or indeed fresh fruit salad, in a flood of syrup. In the case of the former it can be strained off and in the latter a very light syrup can be used.

In 1991 the HEALTH-EAT programme will be aimed at the food processing industry with a view to encouraging processors to produce product formulations lower in fat, sugar and salt.

Summary

1. This article highlights the considerable expertise and facilities available at the NFC for research, development and technical support in the area of diet/healthy eating.

2. It is predicted that consumer pressure in developed countries for healthier foods and for foods targeted at sub-groups which are at risk or have special dietary needs will continue and will result in a greater R and D requirement by the food industry in this area.

Dr. Ronan Gormley is Head of the Plant and Marine Foods Department at the National Food Centre, Castleknock, Dublin 15.

**TABLE 1: Effect of mayonnaise and hollandaise sauce on the fat status of coleslaw and poached salmon respectively**

<table>
<thead>
<tr>
<th>Product</th>
<th>Fat status (% Calories from fat)</th>
<th>Total Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coleslaw (100 g) + mayonnaise (100 g)</td>
<td>94</td>
<td>522</td>
</tr>
<tr>
<td>Coleslaw (100 g)</td>
<td>90</td>
<td>512</td>
</tr>
<tr>
<td>Salmon (200 g) + hollandaise sauce (40 g)</td>
<td>69</td>
<td>549</td>
</tr>
<tr>
<td>Salmon (200 g) + hollandaise sauce (60 g)</td>
<td>72</td>
<td>627</td>
</tr>
<tr>
<td>Salmon (200 g)</td>
<td>59</td>
<td>394</td>
</tr>
</tbody>
</table>

**TABLE 2: Effect of method of cooking on the fat status of potatoes (based on 200 g)**

<table>
<thead>
<tr>
<th>Method</th>
<th>Fat status (% Calories from fat)</th>
<th>Total Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiled</td>
<td>2</td>
<td>160</td>
</tr>
<tr>
<td>Mashed + butter 12 g., milk 53 ml</td>
<td>39</td>
<td>283</td>
</tr>
<tr>
<td>Baked</td>
<td>1</td>
<td>210</td>
</tr>
<tr>
<td>Baked + skins</td>
<td>1</td>
<td>170</td>
</tr>
<tr>
<td>Baked + add sour cream (10 g)</td>
<td>11</td>
<td>191</td>
</tr>
<tr>
<td>Roast</td>
<td>28</td>
<td>314</td>
</tr>
<tr>
<td>French Fries</td>
<td>39</td>
<td>306</td>
</tr>
</tbody>
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Consumer pressure will continue for foods targeted at sub-groups.