

Scientific Advisory Committee on Nutrition

Paper for discussion: A Framework for Evaluation of Evidence that Relates Food and Nutrients to Health

Agenda Item 2

Please see attached paper for consideration. The following annexes are also attached:

Annex 1 General Notes

Annex 2 Nutritional Criteria for the Assessment of Novel Foods

Figure 1 Relationship of ACNFP with other expert committee involved in the assessment of food safety

Scientific Advisory Committee on Nutrition

A Framework for Evaluation of Evidence that Relates Food and Nutrients to Health

This document has been drafted for use by SACN in evaluating evidence that relates food and nutrients to health. It is a draft document and as such may be subject to amendment depending upon requirements.

A DEFINING THE ISSUES (Background to the evaluation)

Subject of the evaluation (may be Terms of Reference)

- Principal nutrients or foods under consideration
- Relevant health or disease endpoints of the evaluation
- Putative role of foods or nutrients in process (i.e. characterisation of the role of nutrition in this area)
- Reason for review being undertaken (i.e. new evidence; request of ministers/other departments; request from industry; EU or international reasons).

Present state of knowledge

- Background/Current state of knowledge (reference previous DoH/FSA/international reports and reviews)
- Current public health policy on issue

B ASSESSMENT (i.e. Quantification of risk/benefit)

Evidence should be reviewed systematically. If certain evidence is not considered, this should be noted.

The following factors to be addressed:

Causal criteria:

- Consistency
- Magnitude of Association
- Dose Response

Confounders and effect modifiers:

- Gender effects
- Age
- Ethnicity

Pregnancy
Smoking and other lifestyle and environmental factors
Genotype

The following information to be addressed;

Epidemiology and Randomised Controlled Trials

- a) Studies tabulated, including date, location, number of subjects and main results (Ecological studies may not have to be listed individually.)
- b) Dietary methodology used and validity
- c) Biomarkers of dietary exposure used and their validity
- d) Sampling and randomisation bias. Drop out rate.
- e) Data analysed according to validation of exposure assessment and health outcome
- f) Influence of common polymorphisms in functionally relevant genes
- g) Conclusion from studies

Statistical Analysis

- a) Appropriateness of statistical methods
- b) Confounding factors taken into account
- c) Potential for meta-analysis
- d) Consistency of meta-analysis results

Human physiological studies

- a) Studies tabulated, including date, location, number of subjects and main results.
- b) Selection of subjects (age, ethnicity etc)
- c) Duration of studies (Short term/long term)
- d) Biomarkers of dietary exposure used and their validity
- e) Success of intervention in achieving dietary intake
- f) Components of diet that have changed i.e. energy, macro and micronutrients, amounts etc
- g) Nature and appropriateness of study design: parallel, sequential or crossover, whether randomised
- h) Markers of compliance measured (blood, urine etc)
- i) Drop out rate
- j) Association of endpoint with health outcome
- k) Influence of common polymorphisms in functionally relevant genes
- l) Potential for meta-analysis
- m) Consistency of meta-analysis results
- n) Conclusion from studies

Clinical studies.

- a) Number of subjects and dates of studies tabulated
- b) Selection of subjects (age, ethnicity etc)
- c) Duration of studies (Short term/long term)
- d) Principal clinical conditions studied. Validity of models used appertaining to the issue
- e) Biomarkers of dietary exposure used and their validity
- f) Success of intervention in achieving dietary intake
- g) Components of diet that have changed i.e. energy, macro and micronutrients, amounts etc

- h) Nature and appropriateness of study design: parallel, sequential or crossover, whether randomised
- i) Markers of compliance measured (blood, urine etc)
- j) Drop out rate
- k) Association of endpoint with health outcome
- l) Influence of common polymorphisms in functionally relevant genes
- m) Drug usage taken into account
- n) Potential for meta-analysis
- o) Consistency of meta-analysis results
- p) Conclusion from studies

Animal studies:

- a) Studies tabulated, including date, location, species, sex, number of animals, main results.
- b) Grounds for selection of studies
- c) Extent to which data from animal studies likely to be relevant
- d) Consistency of data and extent of impact on the diet
- e) Suitability of animal model (anatomy/metabolism/pathophysiology) for the particular diet-disease relationship of interest
- f) Comparability of dietary exposures to human dietary intake levels (in UK/Europe)
- g) Components of diet that have been altered i.e. energy
- h) Consistency of age/stage of growth of the animal with the age-related appearance of the disease in humans
- i) Conclusion from studies

Cellular and molecular studies

- a) Number of subjects and dates of studies tabulated
- b) Extent of cellular/ molecular basis of the disease
- c) Evidence for direct effects of nutrient or their metabolites on cellular processes (e.g. cell signalling mechanisms, transcription factors, gene and protein expression, cell proliferation, differentiation, apoptosis)
- d) Extent of data from cell studies likely to be relevant
- e) Appropriateness of cell models to the human tissue(s) of interest e.g. possessing functionally relevant genes and proteins
- f) Use of physiological levels of nutrients, metabolites or nutrient sensitive endocrine exposures in cell studies
- g) Influence of common polymorphisms in functionally relevant genes
- h) Conclusion from studies

C OVERVIEW AND CONCLUSIONS

1. Extent of evidence to allow firm conclusions to be drawn and to be the basis for a recommendation for public health policy
2. Principal areas of uncertainty
3. Areas of further research required
4. Significance of lifestyle factors (exercise, smoking, stress etc) in contributing to issue. Extent modification of diet contributes to issue.
5. Can the risks or benefits quantified.
6. Recommendation based on all available evidence (Committee may flag up issues/views that are relevant to consideration and implementation of risk management actions)

The annexes that follow are for discussion:

Annex 1 outlines points to be taken into account when drafting recommendations.

Annex 2 is the Nutritional Criteria for the Assessment of Novel Foods

Annex 1**General Notes** (for discussion)**When drafting findings remember the following:**

- The methods used for the review should be described - including details of data sources, databases searched and search strategies. Preference should be for data published in peer-reviewed journals, but other sources such as factual reports, official statistics, government funded research, unpublished data, may provide some valuable information. Where such data are used, the source should be clear.
- The findings of the review should be clearly and consistently described. Descriptors should allow ready assessment of study quality and the validity of findings.
- The main results should be tabulated or listed.
- Basic statistical information needs to be included so that the strength of findings can be seen (at least the number of cases included in the analysis and the 95% confidence interval).
- Markers of study quality should be highlighted, including power, validity of biomarkers, participation rate (for cases and controls), attrition and whether or not confounding has been considered, appropriateness of statistical analysis, appropriateness of measures of dietary exposure or health outcome.
- It may sometimes help clarity if results are presented graphically. Interpretation may be improved by indicating the amount of statistical information provided by a study as proportional to the size of the point plotted (e.g. area of a square). More informative studies then have larger points that make a stronger visual impression, counteracting the tendency for the wide confidence intervals on the estimates from small studies to draw the eye of the reader.
- There are a number of ways in which studies could be grouped for presentation. Grouping could be done according to study design or other major factors that may influence the results.

A very useful guide to reviewing and presenting findings can be found at www.york.ac.uk/inst/crd/report4.htm

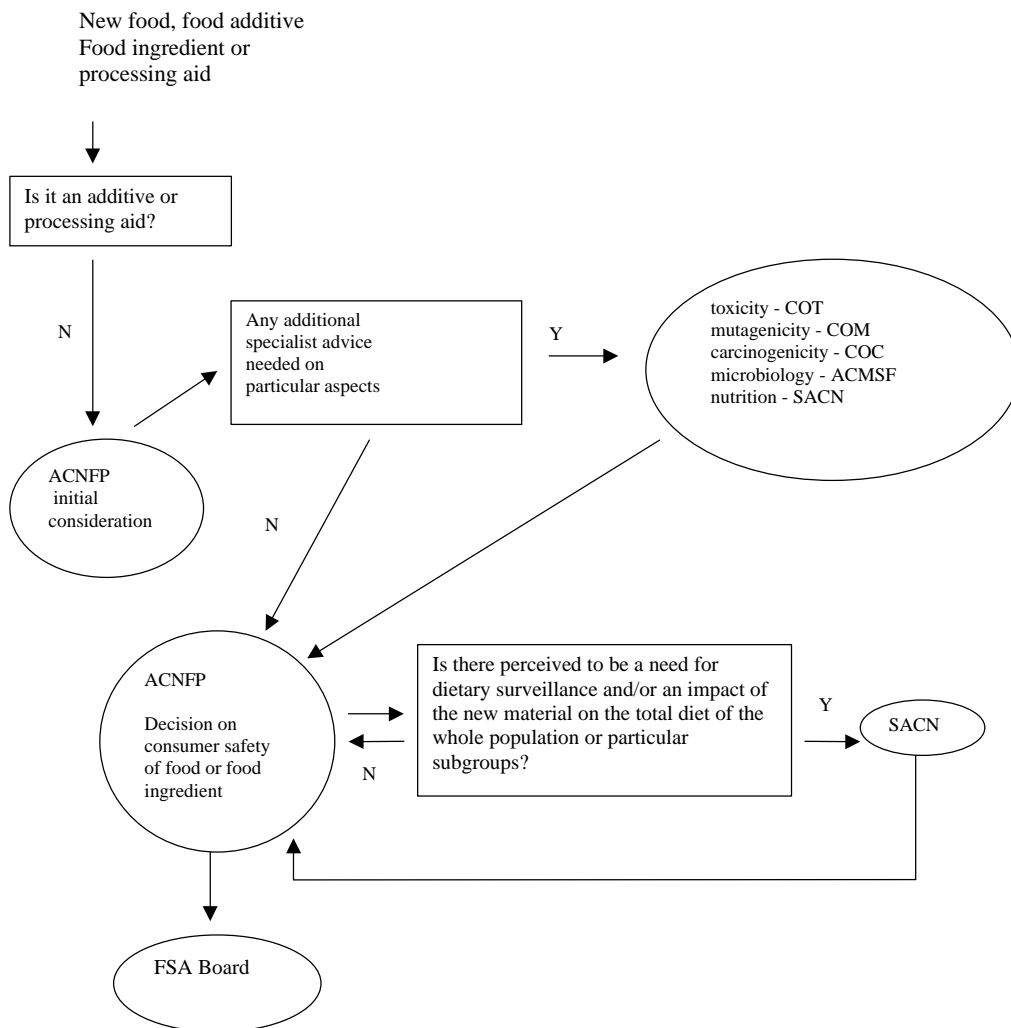
Annex 2**Nutritional Criteria for the Assessment of Novel Foods** (for discussion)¹

- a) The dietary significance of the novel food;
- b) The nutrient content of the diet as eaten containing the novel food, and the content of any anti-nutritional constituents (such as trypsin inhibitors) that may be introduced in to the diet with the novel food;
- c) The bioavailability of the nutrients in the novel food itself, the food's possible effects on other components of the diet, such as the mineral content, and any implications of possible changes that might be induced in the gut microflora;
- d) The effects of the novel food on the bioavailability of nutrients from other foods in the diet;
- e) The quantitative effects and/or dose response relationships of the novel food in relation to gut and systemic functions.

The relationship between the Advisory Committee on Novel Foods and Processes (ACNFP) and SACN is shown in Figure 1.

¹ The Nutritional Assessment of Novel Foods and Processes; Report of the Panel on Novel Foods of the Committee on Medical Aspects of Food Policy

Figure 1: Relationship of ACNFP with other expert committees involved in the assessment of food safety²



² The Nutritional Assessment of Novel Foods and Processes; Report of the Panel on Novel Foods of the Committee on Medical Aspects of Food Policy

Key:
 ACMSF – Advisory Committee on Microbiological Safety of Food
 ACNFP – Advisory Committee on Novel Foods and Processes
 COC – Committee on Carcinogenicity
 COM – Committee on Mutagenicity
 COT – Committee on Toxicity