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SUPPLEMENT

# Codex recommendations on the scientific basis of health claims

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**Abstract**
*Background* Within the framework of Codex Alimentarius, attempts are being made at international level to establish guidelines for use of nutrition and health claims. An important issue that has to be addressed is the process of scientific substantiating of claims on foods.
*Objective* To provide an insight into the current step procedure of the proposed draft recommendations on the scientific basis of health claims. These Codex recommendations are intended to facilitate governments' own evaluation of health claims made by the industry.
*Methods* Review of comments of governments, observers and non-governmental organizations (NGOs) and relevant references to the proposed draft recommendations of the last sessions of the Codex Committee on Nutrition and Food for Special Dietary Uses (CCNFSDU). A literature search was performed using the PubMed database.
*Results/Conclusions* Several proposed draft recommendations on the scientific substantiation of health claims have been considered and amended by the CCNFSDU in recent years but the work is not yet complete. The current work draws on the work of FUFOSE and PASSCLAIM and also on that of WHO and FDA. Given the important role of Codex in food safety, the draft recommendations emphasize circumstances where additional evaluation of safety or nutritional safety needs to be considered. High quality human intervention studies are the prime evidence needed to substantiate claims but there is recognition that, in some cases, only observational studies may be available. Animal and in vitro studies will also be evaluated as part of the totality of the evidence. It has been suggested that the recommendations should include re-evaluation of claims after a certain time period, or if new evidence calls into question the scientific validity underpinning the claims. Setting out a common approach for the substantiation of health claims is an important step in the use of health claims around the world. There is a need to reflect emerging as well as consensus science. The substantiating evidence should be proportionate to the claim. Further progress in the elaboration of this relevant Codex text is needed to reach consensus.

**Keywords** Guidance for governments · Scientific substantiation · Health claims · Totality of evidence

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## Background

More and more foods bear health claims. There are diverse approaches to regulate the market. No scientific consensus exists on how to substantiate health claims on food. The scepticism of consumers regarding functional foods resides mainly in the veracity of health claims and in the low and often inadequate control of their claimed properties [3, 23, 25]. Many countries throughout the world, including Canada, China, Japan, Korea, Australia and New Zealand, the USA and the European Union are in the process of establishing regulations to control the use of health claims on labels [5, 21, 24, 26, 30, 33, 36,

40]. It is important that health claims should provide truthful and non-misleading information to aid consumers in choosing healthful diets, that they should be supported by a sound and sufficient body of scientific evidence to substantiate the claim and reinforced by specific consumer education.

Why is Codex interested? International standardization is a key issue for a homogenous and legally transparent market, and steps taken by FAO/WHO Codex Alimentarius are important. The international guidelines and standards developed by the Codex Alimentarius Commission (CAC) perform an important advisory role in establishing and developing national regulations and standards and are central to protect the health of consumers and to ensure fair practices in global food trade [27, 35]. Therefore, during its 22nd session in 2000, the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) initiated work on the establishment of scientific criteria relevant for the justification of health claims at the request of the Codex Committee on Food Labelling (CCFL) [25]. Meanwhile, the revised guidelines for use of nutrition and health claims, prepared by the CCFL, were adopted by the Codex Alimentarius Commission (CAC) during its 27th session in 2004. The CAC has considered three types of health claims: "nutrient function claims", "other function claims" and "reduction of disease risk claims" [10].

In the last few years, several proposed draft recommendations on the scientific basis of health claims have been considered and amended by the CCNFSDU, but this work has not yet been finalized [7, 8, 11–13]. The Committee agreed that the proposed draft recommendations, when finalized would be included, as an Annex in the guidelines for use of nutrition and health claims.

## Objective

The purpose of this paper will be to provide an insight into the current step procedure of the proposed draft recommendations. It will also discuss the comments at step 4 for further consideration at the next session.

## Methods

Review of comments of governments, observers and non-governmental organizations (NGOs) and relevant references to the proposed draft developed at the last sessions of the CCNFSDU. A literature search was performed using the PubMed database.

## Results and discussion

### Proposed draft annex to the Codex guidelines for use of nutrition and health claims: recommendations on the scientific basis of health claims

#### *Scope*

It should be pointed out that these recommendations are intended to help governments evaluate the health claims used by industry. They address the nature and the quality of the scientific evidence supporting these claims. They are not intended for the complete evaluation of the safety and the quality of a food, for which relevant provisions are laid out by other Codex standards and guidelines or general rules of existing national legislations.

Whether a health claim should be granted pre-market approval or how responsibilities are shared between competent authorities and industry in the provision and updating of scientific evidence are issues that are beyond the scope of this paper. Generally, the procedural and organizational issues should be left for the competent national authorities to decide upon.

The objective of the proposed draft recommendations on the scientific basis of health claims is to give guidance for the assessment of the scientific evidence used in support of health claims. By establishing common criteria for such assessment, these recommendations will lead to harmonization of the requirements for scientific substantiation of claims around the world [22].

Safety as a prerequisite for all foods [2] is addressed by existing Codex standards or guidelines and by national legislations. Therefore, the sole task of the proposed draft recommendations was to define criteria for the scientific substantiation of claims, and only the safety issues directly related to the claims required specific consideration [7]. As regards the strength of evidence to justify health claims, these recommendations should focus on procedures for the review of scientific evidence for substantiation of health claims [9]. It was proposed to delete the definition section as the guidelines for use of nutrition and health claims [10] did not refer to properties in the definition of health claims and this would ensure consistency of the Annex with the guidelines. The phrase "food or food constituent" should be used throughout the text [13].

#### Specific safety concerns

- When a claim is made about a food or food constituent, the amount recommended should not expose the consumer to health risks and the known interactions between the constituent and other constituents should be considered.

- The expected level of consumption should not exceed relevant upper levels of intake for food constituents.
- The exposure assessment should be based on an evaluation of the distribution of usual total daily intakes for the general population [16] and, where relevant, those for vulnerable populations groups.
- It should account for the possibility of cumulative intake from all dietary sources, and of nutritional imbalance due to changes in dietary patterns in response to consumers' information laying emphasis on the food or food constituent.

Consideration of safety concerns is separate from consideration of the totality of evidence to substantiate a health claim. Governments should favour a risk analysis approach that can determine whether safety considerations might restrict the range of foods that are eligible to carry the claim. It is not necessary to detail the safety considerations in this Annex, as jurisdictions would apply their own approach to risk analysis [8, 12].

## Evaluation of the scientific evidence used to support a health claim

### *Nature, quality, and scope of the evidence*

Regarding nature, quality, and scope of the evidence, CCNFSDU proposes that the following criteria should be applied in identifying, categorizing, and evaluating relevant studies:

- The scientific studies should provide adequate characterization of the relationship between the food or food constituent and the health effect. Relevant studies include those that use appropriate measurements for the food or food constituent and health endpoint, those that do not have significant study design flaws, and those that are applicable to the population targeted by a health claim.
- The totality of the evidence should be reviewed, including evidence to support the claimed effect, evidence that contradicts the claimed effect, and evidence that is ambiguous or unclear.
- Health claims should primarily be based on evidence provided by well-designed human intervention (clinical) studies. A well-designed randomized, placebo-controlled clinical trial may demonstrate a causal relationship between a food or food constituent and a health endpoint.
- Observational studies should provide information about an association, but not causation.
- Animal model studies and in vitro studies may be provided as supporting the knowledge base for the food or food constituent—health effect relationship, but they should not be considered sufficient per se to substantiate any type of health claim.
- The methodological quality of each type of study should be assessed, including study design and statistical analysis. For example, human intervention studies should include an appropriate control group; they should describe the background diets of the study groups and other relevant aspects of their lifestyles; they should be of an adequate duration, and they should assess the influence of the food matrix and total dietary context on the health effect. Statistical analysis of the data should be conducted with methods recognized by the scientific community as being appropriate for such studies, and with the proper interpretation of the concept of "statistical significance".

The CCNFSDU [7] was not able to discuss the relevance of the PASSCLAIM criteria for the scientific substantiation of health claims [2, 5] in detail. It was suggested that sufficient time be allowed for discussion of this agenda item at the next session.

Some Members have suggested a basic scheme as broadly applicable. It is made up of three steps:

(1) Define a physiological or behavioural endpoint (biomarker); (2) define an enhanced component of the diet and (3) monitor the relation between the two. Some delegates consider that the definition of all three types of health claims could accommodate well-established biomarker endpoints as the health effect. They support text such as that provided by the United States in relation to biomarkers:

> Biomarkers might be used as an indicator or predictor of a disease or health-related condition or as an indicator of a body function. A relevant biomarker would be a well-defined and validated biological, physiological, clinical or epidemiological indicator for which there is agreement among the qualified scientific community on the relationship between the biomarker and the disease.

This concept was also suggested by the EU Concerted Action on Functional Food Science in Europe (FUFOSE) [6, 14]. However, it is only justifiable when based on appropriate, validated markers of exposure, enhanced function or reduction of risk of disease. Currently, the numbers of biomarkers that fulfil these criteria are relatively small and potentially limiting [29, 37]. Then again, there was no final decision to consider whether this approach should be used as the main basis of the recommendations [8, 9].

## Evaluation of the total body of relevant evidence

In evaluating the strength of the evidence, CCNFSDU is of the opinion that consideration should be given to the type,

quantity and quality of relevant human studies, and to the consistency and reproducibility of their results.

For example:

- Evidence based on human intervention (clinical) studies should demonstrate a consistent association between the food or food constituent and the health effect, with little or no evidence to the contrary.

Based on this evaluation, a government can determine if and under what circumstances a claimed health relationship is substantiated, and how the claim can be communicated in truthful, accurate and non-misleading language.

In one delegate's opinion, the sources and nature of the evidence may be different, but the scientific standard for the process of substantiation of all health claims should be the same. The substantiation of health claims should be carried out on a case-by-case basis and the degree of substantiation and the sources and nature of the supporting evidence should be proportionate to the type of health claim and take into account the totality of the available evidence and the weighing of the evidence.

Human studies are accorded greater weight than animal or in vitro studies, and human intervention studies have greater weight than observational studies. However, it is important to include text which states that the substantiation of a health claim can be demonstrated on a case-by-case basis by a number of different sources of evidence and types of studies and designs, and that methodological soundness overrides any hierarchy of studies, given that scientific validity depends not only on the appropriateness of study type but also on the quality of its design, execution and analysis [8]. Scientific bodies or independent expert bodies are likely to assess the totality of available data and weight of evidence, as shown in Table 1.

However, these factors should be not used as strict rules. For example, the absence of a dose–response relationship does not prove that an association is not causal; in some situations, a threshold effect exists and no dose–response relationship would be expected [25].

**Table 1** Factors likely to be taken into account for the assessment of the totality of available data and weight of evidence (Adapted from Aggett et al. [2])

- Persuasiveness of each relevant study
- Consistency of results across different studies
- Consistency among various populations and within them
- Magnitude of the effect
- Strength of the association
- Dose–response relationship
- Temporal relationship
- Biological plausibility
- Specificity of the effect
- Statistical validity

Some delegations support the articulation of a specific standard/strength/grade of evidence in these recommendations rather than requiring jurisdictions to make their own determination [29]. Such an approach would contribute to a similar global standard of supporting evidence for health claims appearing on foods traded internationally. The WHO Technical Report on Diet, Nutrition and the Prevention of Chronic Diseases provided criteria to describe the strength of scientific evidence. They were based on the criteria used by the World Cancer Research Fund, but have been modified by the Expert Consultation to include the results of controlled trials where relevant and available. There are four grades of evidence: 'convincing', 'probable', 'possible' and 'insufficient'. These definitions have been specified for observational/epidemiological studies, although they need to be developed to cover the interpretation of other human studies and areas of supporting evidence, including animal and in vitro studies.

Determining the weight of the evidence as a whole requires an assessment of the persuasiveness of each relevant study [31]. The overall assessment, however, should be the application of the scientific judgement and critical interpretation of the data as a whole (totality of evidence). The WHO framework provides a good starting point from which to forge consensus on an agreed strength of evidence [38, 39]. Some delegations and observers therefore support the idea of establishing the standard of evidence at the level of 'convincing' [8]. In their view, a 'convincing' standard of evidence (or significant scientific agreement) is needed to offer reasonable certainty that any health claim is unlikely to be contradicted in the future by new evidence [7, 17]. The Committee discussed that the WHO definition of a 'convincing strength of evidence' should be amended[1] to allow for the possibility of the totality of evidence comprising observational evidence only, as this could be particularly relevant for the relationship between health and a particular diet/food group. In addition, some observers expressed their support for a system of grading of evidence (published or not, peer-reviewed or not) reflecting the strength of the evidence, the degree of certainty, or the balance of probabilities that there is sufficient evidence supporting a claim between a food or food constituent and

[1] The following language was suggested: "Convincing evidence – There are consistent associations between the diet, food or food constituent and the health effect, with little or no evidence to the contrary. There should be a substantial number of human studies of acceptable quality, preferably including both observational and experimental studies and preferably conducted in different population groups. Any intake response relationships should be supportive of a causal relationship and the relationship should be biologically plausible. Supporting evidence sources should be consistent with the findings of human evidence" [7].

a health benefit and that the claim is truthful, accurate and not misleading.

There is also a need to define the term 'significant scientific agreement' and 'generally accepted scientific data' as used by governments in new laws in such a way as to take account of emerging science in addition to well-established consensus science [25].

"Significant scientific agreement" exists when the validity of the relationship is not likely to be reversed by new and evolving science, although the exact nature of the relationship may need to be refined over time. Furthermore, although significant scientific consensus or agreement is not consensus in the sense of unanimity, it represents considerably more than an initial body of emerging evidence. Because each situation may differ with the nature of the claimed food or food constituent/disease relationship, it is necessary to consider both the extent of agreement and the nature of the disagreement on a case-by-case basis. If scientific agreement were to be assessed under arbitrary quantitative or rigidly defined criteria, the resulting inflexibility could cause some valid claims to be disallowed where the disagreement, while present, is not persuasive. Significant scientific agreement cannot be reached without a strong, relevant, and consistent body of evidence on which experts in the field may base a conclusion that a food or food constituent/disease relationship exists. There is considerable potential for incorrect conclusions if only preliminary evidence (emerging science) is available for review [17].

A guidance document for the industry, which is to be read in conjunction with the new Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods, has been developed by the European Food Safety Authority (EFSA) and its scientific Panel on Dietetic products, Nutrition and Allergies (NDA Panel) [15]. It is in line with the principles laid down in the proposed draft Recommendations, notably on the following key points:

(a) Information on the characteristics of the food, or food constituent for which a health claim is made.
(b) Target population for the intended health claim.
(c) Systematic and comprehensible review of the totality of the data from studies in humans addressing the relationship between the consumption of the food/constituent and the claimed effect (data from studies in animals or model systems may be included only as supporting evidence).
(d) Data from intervention studies in humans should be organised according to a hierarchy of study designs, reflecting the relative strength of evidence which may be obtained from different types of studies.

**Table 2** Ranking of the type of research supporting efficacy (in descending order of persuasiveness) (FDA [20])

- Randomized, controlled clinical trial
- Cohort (longitudinal) studies
- Case–control studies
- Cross-sectional studies
- Uncontrolled case series or cohort studies
- Time-series studies
- Ecological (cross-population) studies
- Descriptive epidemiology
- Case reports

The US Food and Drug Administration (FDA) has ranked the persuasiveness of the type of research supporting efficacy, as shown in Table 2.

The FDA accepts all types of data in support of a health claim. But animal and in vitro studies alone would not adequately support a health claim. Human data are required. Among the human studies, the FDA considers "interventional" studies, i.e., randomized, controlled clinical trials, to represent the gold standard. Furthermore, the FDA has never approved a claim based on meta-analysis alone; such analyses are regarded as corroborative but not as alternatives to primary data [20, 36].

The FDA has also developed a draft system of evaluating qualified health claims as guidance for the food industry and for its own bodies [18, 30, 32, 36]. According to the interim procedures, the degree of qualification needed and the level of evidence supporting a health claim will be judged by the following rating system:

- A: significant scientific agreement exists—no qualifications are necessary
- B: the evidence is not conclusive
- C: the evidence is limited and not conclusive
- D: there is little scientific evidence supporting the claim

The types of studies supporting claims will be rated:

- Type 1: randomized controlled intervention trial
- Type 2: prospective observational cohort study
- Type 3: non-randomized intervention trial with concurrent or historical control
- Type 4: cross-sectional study, case study

The strength of the total body of scientific evidence will be rated according to:

- Quantity: the number of studies and number of individuals tested, weighted by study type and quality
- Consistency: similarity of results from high quality studies of design types 1 and 2
- Relevance: magnitude of effect (observed in high quality studies of design types 1 and 2), and

consideration of whether the effect is physiologically meaningful and achievable [19].

This new approach to health claim approval will undoubtedly open the door for many more claims than are currently in use [31]. PASSCLAIM did not consider regulation or classification of claims as well as "qualified" claims[2] [1, 2, 28, 29]. The examples given here can only provide information to member states about how to regulate health claims.

## Special cases

Although high quality of scientific evidence should always be maintained, it is the opinion of the Committee that substantiation may take into account specific situations, such as:

- The totality of evidence may only comprise observational evidence.
- 'Nutrient function' claims may be substantiated on the basis of generally accepted authoritative information that has been verified and validated over time.
- One could also use consensus reports or evidence-based dietary guidelines, provided that these reports/guidelines have been prepared by an authoritative body, that they meet high scientific standards; that they are relevant to the claim as well as to the population in question and that they are up-to-date.

## Step-by-step process

It is possible to broadly outline a process for the substantiation of health claims by national or supranational competent authorities that takes into account the general principles for substantiation. Such a process would typically include the following steps:

1. Identify the standard of evidence for substantiation and other national policies for health claims.
2. Identify the proposed relationship between the food or food constituent and the health endpoint for a health claim.
3. Identify appropriate measurements for the food or food constituent and the health endpoint.
4. Identify and categorize all the relevant studies.
5. Assess and interpret each relevant study.
6. Evaluate the totality of the evidence across studies and determine if and under what circumstances a claimed relationship is substantiated.

In order to substantiate a 'reduction of disease risk' claim, which offers the highest 'degree of promise' in the Codex guidelines, a rigorous step-by-step evaluation of the available evidence should be required according to the outline given above. Although stringent standards of scientific evidence should always be maintained, substantiation may be achieved through simplified processes for categories of claims with a lower 'degree of promise'. One could also use consensus reports or evidence-based dietary guidelines, provided that these reports/guidelines have been prepared by an authoritative body, that they meet high scientific standards that they are relevant to the claim as well as to the population in question and that they are up-to-date. A systematic approach for the whole process of scientific substantiation of health claims with particular reference to the grading of evidence is demonstrated in Fig. 1.

Established or proposed health effects can be classified as 'convincing' in case of consensus or acceptance by official independent scientific bodies or independent expert bodies. Evidence based on epidemiological studies showing consistent associations between exposure and disease risk reduction, with little or no evidence to the contrary, can also be classified as 'convincing'. The available evidence is based on a substantial number of studies including prospective observational studies and where relevant, randomized controlled trials of sufficient size, duration and quality showing consistent effects. The association should be biologically plausible. The health effects can be classified as 'probable' if the scientific evidence in support of the effect outweighs the evidence against. Possible evidence in this case includes evidence based on epidemiological studies and showing fairly consistent associations between exposure and reduction of risk of disease, but where there are perceived shortcomings in the available evidence or some evidence to the contrary, thus precluding a more definite judgement. Laboratory evidence is usually supportive. Again, the association should be biologically plausible. In case of contradictory or inconsistent results, or data based upon small studies, or in vitro studies only, effects can be classified as 'insufficient' [17, 28, 34]. Overall, the totality and coherence of published and unpublished evidence should be considered. Assessments for substantiation need expert judgement, weighting of the strength of the claim, and intelligent use of the criteria applied on an individual basis with respect both to gaps

[2] In the USA "unqualified" health claims (also referred to as "authorized health claims") must be supported by significant scientific agreement among qualified experts that the claim is supported by the totality of publicly available scientific evidence for a substance/disease relationship. In comparison, "qualified" health claims are supported by scientific evidence, but do not meet the significant scientific agreement standard. As a result, to ensure that they are not false or misleading to consumers, they must be accompanied by a disclaimer or other qualifying language to accurately communicate the level of scientific evidence supporting the claim. Both unqualified and qualified health claims may be used on conventional foods and on dietary supplements [20].

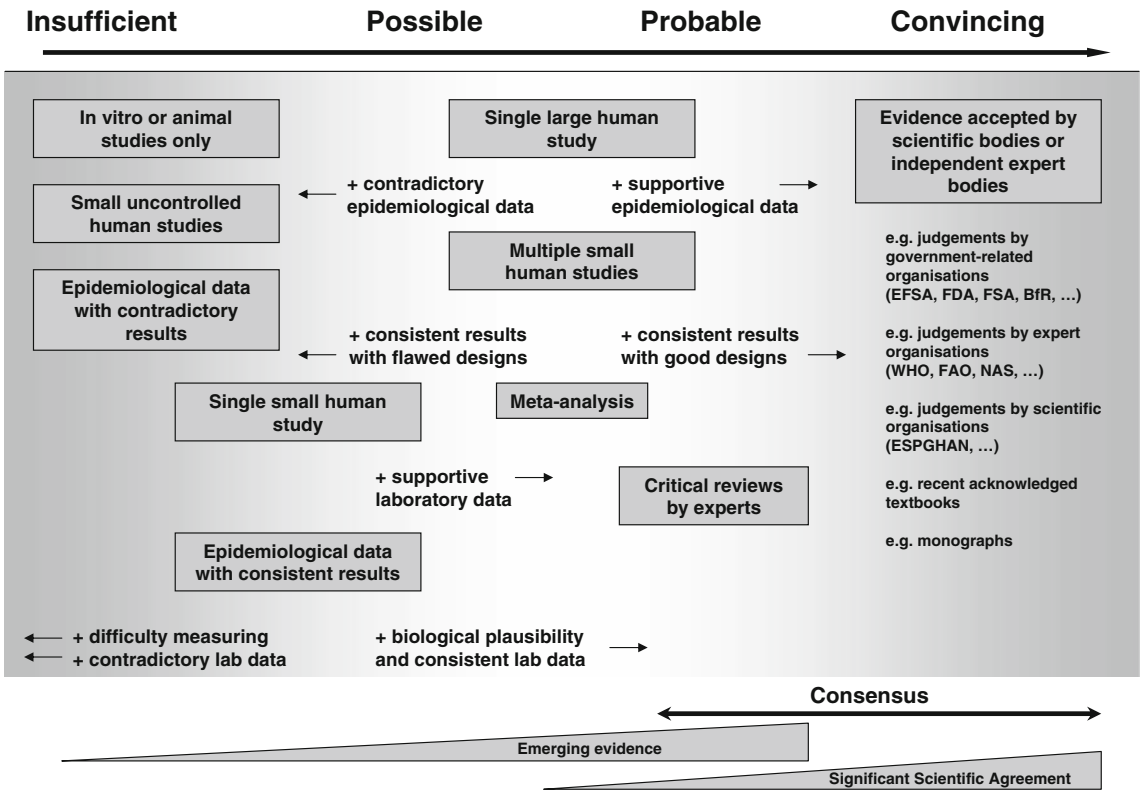


**Fig. 1** Systematic approach for the grading of evidence in support of a health claim. Adapted from [17, 28, 34]

in knowledge and to any need for new knowledge and data [1].

Re-evaluation

There is consensus that health claims should be re-evaluated after a certain period of time or following the emergence of significant new evidence that has the potential to alter previous conclusions about the food or food constituent—health relationship. In view of the frequency with which new evidence might emerge, a review may be unnecessary if the new evidence is unlikely to change the claim. Health claims should be re-evaluated if new evidence calls into question the scientific validity underpinning the claim.

## Conclusions

These Codex recommendations are intended to assist governments by facilitating their own evaluation of health claims. Setting out a common approach for the substantiation of health claims is an important step in the use of health claims around the world. Health claims need to reflect emerging as well as consensus science. The substantiating evidence should be proportionate to the claim. This paper also highlights issues that are emerging and will require consideration and dialogue in the forthcoming session of CCNFSDU. Further progress in the elaboration of the respective Codex document is needed to reach consensus.

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## References

1. Aggett PJ (2007) Criteria for substantiating claims. Novartis Found Symp 282:46–53 discussion 53–58

2. Aggett PJ, Antoine JM, Asp NG, Bellisle F, Contor L, Cummings JH, Howlett J, Muller DJ, Persin C, Pijls LT, Rechkemmer G, Tuijtelaars S, Verhagen H (2005) Process for the Assessment of Scientific Support for Claims on Foods (PASSCLAIM): consensus on criteria. Eur J Nutr 44(Suppl 1):5–30
3. Arvanitoyannis IS, Van Houwelingen-Koukaliaroglou M (2005) Functional foods: a survey of health claims, pros and cons, and current legislation. Crit Rev Food Sci Nutr 45:385–404
4. Asp N-G (2002) Health claims within the Swedish Code. Generic claims and product-specific physiological claims in relation to current European and international developments. Scand J Nutr 46:131–136
5. Asp N-G, Bryngelsson S (2008) Health claims in Europe: new legislation and PASSCLAIM for substantiation. J Nutr 138:1210S–1215S
6. Bellisle F, Diplock ST, Hornstra G, Koletzko B, Roberfroid M, Salminen S, Saris WHM (1998) Functional food science in Europe. Br J Nutr 80(Suppl 1):1–193
7. CAC (2006a) Proposed draft recommendations on the scientific basis of health claims at step 3. CX/NFSDU 06/28/7 June 2006
8. CAC (2006b) Proposed draft recommendations on the scientific basis of health claims at step 3. CX/NFSDU 06/28/7-Add.1 October 2006
9. CAC (2006c) Report of the 28th session of the Codex Committee on Nutrition and Foods for Special Dietary Uses. Chiang Mai, Thailand, 30 October–3 November 2006, ALINORM 07/30/26, para. 131–134
10. CAC (2007a) Food Labelling, 5th edn. Guidelines for use of nutrition and health claims (CAC/GL 23-1997 Rev. 1-2004). World Health Organization/Food and Agriculture Organization of the United Nations, Rome, p 33
11. CAC (2007b) Proposed draft recommendations on the scientific basis of health claims at Step 3. CX/NFSDU 07/29/6, September 2007
12. CAC (2007c) Proposed draft recommendations on the scientific basis of health claims at Step 4. CX/NFSDU 07/29/6-Add.1, September 2007
13. CAC (2007d) Report of the 29th session of the Codex Committee on Nutrition and Foods for Special Dietary Uses. Bad Neuenahr-Ahrweiler, Germany, 12–16 November 2007, ALINORM 08/31/26, para. 79–97
14. Diplock AT, Aggett PJ, Ashwell M, Bornet F, Fern EB, Roberfroid MB (1999) Scientific concepts of functional foods in Europe: consensus document. Br J Nutr 81:1–27
15. EFSA (2007) Scientific opinion of the Panel on dietetic products, nutrition and allergies on a request from the Commission related to scientific and technical guidance for the preparation and presentation of the application for authorisation of a health claim. EFSA J 530:1–44
16. FAO, WHO (2006) A model for establishing upper levels of intake for nutrients and related substances. Report of a Joint FAO/WHO technical workshop on nutrient risk assessment, Geneva, Switzerland, 2–6 May 2005. Published 30 June 2006
17. FDA/CFSAN/OSN (1999) Guidance for industry. Significant Scientific Agreement in the Review of Health Claims for Conventional Foods and Dietary Supplements. December 22, 1999. http://vm.cfsan.fda.gov/~dms/ssaguide.html
18. FDA/CFSAN (2003a) Guidance: Interim procedures for qualified health claims in the labelling of conventional human food and human dietary supplements. July 10, 2003.http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/ucm053832.htm
19. FDA/CFSAN (2003b) Guidance for industry and FDA. Interim evidence-based ranking system for Scientific Data. July 10, 2003. http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/ucm053855.htm
20. FDA/CFSAN (2005) Questions and answers qualified health claims in food labeling—report on effects of strength of science disclaimers on the communication impacts of health claims. September 28, 2005. http://www.fda.gov/Food/LabelingNutrition/LabelClaims/QualifiedHealthClaims/ucm109470.htm
21. Hurt E (2002) International guidelines and experiences on health claims in Europe. Asia Pac J Clin Nutr 11:S90–S93
22. Jones PJH, Asp N-G, Silva P (2008) Evidence for health claims on foods: how much is enough? Introduction and general remarks. J Nutr 138:1189S–1191S
23. Katan MB, De Roos NM (2004) Promises and problems of functional foods. Crit Rev Food Sci Nutr 44:369–377
24. Kim JY, Kim DB, Lee HJ (2006) Regulations on health/functional foods in Korea. Toxicology 221:112–118
25. Kwak NS, Jukes D (2001) Issues in the substantiation process of health claims. Crit Rev Food Sci Nutr 41:465–479
26. Ohama H, Ikeda H, Moriyama H (2006) Health foods and foods with health claims in Japan. Toxicology 221:95–111
27. Randell AW, Whitehead AJ (1997) Codex Alimentarius: food quality and safety standards for international trade. Rev Sci Tech 16:313–321
28. Richardson DP, Affertsholt T, Asp N-G, Bruce A, Grossklaus R, Howlett J, Pannemans D, Ross R, Verhagen H, Viechtbauer V (2003) PASSCLAIM—synthesis and review of existing processes. Eur J Nutr 42(Suppl. 1):I/96–I/111
29. Richardson DP (2005) The scientific substantiation of health claims with particular reference to the grading of evidence and consumer understanding. Food Sci Technol Bull Funct Foods 2:1–10
30. Rowlands JC, Hoadley JE (2006) FDA perspectives on health claims for food labels. Toxicology 221:35–43
31. Sanders ME, Tompkins T, Heimbach JT, Kolida S (2005) Weight of evidence needed to substantiate a health effect for probiotics and prebiotics: regulatory considerations in Canada, E.U, and U.S. Eur J Nutr 44:303–310
32. Schneeman B (2007) FDA's review of scientific evidence for health claims. J Nutr 137:493–494
33. Tapsell LC (2008) Evidence for health claims: a perspective from Australia-New Zealand region. J Nutr 138:1206S–1209S
34. The Netherlands Ministry of Health (2004) Netherlands proposal for a systematic approach for a generic list of health claims. VWA (Dutch Food Authority) Nutrition Centre
35. Tontisiri K, Lepretre C (2001) Codex as the basis for national standards and international harmonization. Biomed Environ Sci 14:137–144
36. Turner RE, Degnan FH, Archer DL (2005) Label claims for foods and supplements: a review of the regulations. Nutr Clin Pract 20:21–32
37. Verhagen H, Coolen S, Duchateau G, Hamer M, Kyle J, Rechner A (2004) Assessment of the efficacy of functional food ingredients—introducing the concept "kinetics of biomarkers". Mutat Res 551:65–78
38. WCRF (1997) Food, nutrition and the prevention of cancer: a global perspective. World Cancer Research Fund (American Institute for Cancer Research), Washington, DC
39. WHO (2004) Diet, nutrition and the prevention of chronic diseases: report of a joint FAO/WHO Expert Consultation. WHO Technical Report Series 916, Geneva, pp 53–54
40. Yang Y (2008) Scientific substantiation of functional food health claims in China. J Nutr 138:1199S–1205S