codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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Agenda Item 9 **CX/NFSDU 01/9**
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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON NUTRITION AND FOODS FOR SPECIAL DIETARY USES
Twenty-third Session
Berlin, Germany, 26-30 November 2001

DISCUSSION PAPER ON ENERGY CONVERSION FACTORS: DERIVATION OF ENERGY FACTORS FOR INCORPORATION IN CODEX NUTRITION LABELLING GUIDELINES

(Paper prepared by Australia)

BACKGROUND

At the 21st Session of the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) in 1998, Australia presented a proposal for new work to define the basis for the derivation of energy conversion factors in the Codex Guidelines on Nutrition Labelling.

Some energy factors for macronutrients are included in the Codex Guidelines on Nutrition Labelling (CAC/GL 2-1985 (Rev. 1-1993) but no factors are assigned to other food components, such as dietary fibre, polyols (sugar alcohols), other unavailable carbohydrates and novel food ingredients. Furthermore, the Codex Guidelines do not give any indication of how energy factors for these food components should be derived.

It was agreed at the 21st Session that the paper prepared by Australia be circulated prior to the 22nd Session for consideration at that meeting, with a view to making a decision about whether this matter would be supported as new work for the Committee (ALINORM 99/26 para 118).

A revised paper was prepared by Australia and presented at the 22nd Session of CCNFSDU in 2000. It was agreed at this meeting that it was premature to request the Commission's approval for new work and that the paper prepared by Australia be included in a circular letter for further country comment on national practices on assigning energy conversion factors to food components, fats and sugars and novel foods (ALINORM 01/26 para 125).

Comments from Thailand, Uruguay and the United States of America in conference room documents at the 22nd session indicated support for further work. Five countries (Cuba, Germany, New Zealand, South Africa and the United States of America) submitted comments for consideration in response to the circular letter, also giving their support for further work. These submissions indicate that there are considerable differences across countries and other jurisdictions in relation to energy conversion factors currently used for food components other than fat, protein, available carbohydrate and alcohol.

PROPOSAL

Australia proposes that CCNFSDU requests the Commission to approve new work to define the basis for the derivation of energy conversion factors and to establish specific factors for individual food components for inclusion in the Codex Guidelines on Nutrition Labelling.

ENERGY FACTORS USED IN INTERNATIONAL AND NATIONAL FOOD STANDARDS

1. Many countries have adopted the energy factors for macronutrients listed in the Codex Guidelines on Nutrition Labelling (available carbohydrate, fat, protein, alcohol, organic acids) in their national food standards. A limited number of energy factors for other food components are listed in some food standards at a national level. However, submissions from Member countries have confirmed that, in some cases, different factors are assigned to the same food component by different jurisdictions.

2. The submission from Germany kindly tabulated the energy factors used by a number of countries for food labelling purposes as well as factors reported in recent scientific literature. This table, updated for recent amendments to energy conversion factors for Australia and New Zealand, is presented at Attachment 1.

3. South Africa also submitted details of their energy conversion factors currently in use (Attachment 2). The submission from Cuba encourages further work on energy conversion factors because of commercial considerations and interest from national institutions linked to food and nutrition. The submission from New Zealand indicated support for Australia's position on the need for international clarification of energy factors.

4. Comment from the United States of America indicates support for the proposal for new work providing this process starts with the development of a general set of criteria that are based on sound science and have applicability across different substances. In the United States, food manufacturers may choose one of 5 methods to determine the energy content of food components using either general or specific factors or bomb calorimetry.

FAO/WHO EXPERT CONSULTATION ON ENERGY AND PROTEIN

5. Since the 22nd Session of CCNFSDU, FAO/WHO held a series of expert working groups in Rome during June - July 2001 to prepare discussion papers for two new joint expert consultations on revising the international 1985 energy and protein requirements (WHO 1985) planned to be held in 2001 - 2002.

6. The Joint FAO/WHO Expert Consultation on Energy Requirements, planned to be held in Rome in October 2001, will provide an 'expert' forum to discuss the assignment of appropriate energy conversion factors to individual food components for the purposes of food labelling at an international level. The Joint FAO/WHO Expert Consultation on Protein Requirements is planned for Geneva in early 2002. The report and recommendations from the first of these Expert Consultations are expected to provide extremely useful technical information that would considerably assist CCNFSDU if the Commission approves the Committee's consideration of this matter as new work.

7. There has also been recent debate in the scientific literature about the appropriate derivation and use of energy conversion factors for the purposes of food labelling at national and international level (Livesey 2001, Warwick and Baines 2000).

CONCLUSION

There is a pressing need to develop a clear system for defining the energy yield of food components to promote a harmonised approach to assigning energy conversion factors to food components for the purposes of food labelling. Member country comment indicates support for this proposal for new work. If the Commission accepts this proposal, work undertaken by CCNFSDU on the derivation of energy conversion factors should take into account the recommendations arising from the Joint FAO/WHO Expert Consultation on Energy Requirements.

RECOMENDATIONS

It is recommended that CCNFSDU propose that the Commission adopt as new work, the derivation and specification of appropriate energy conversion factors for a range of food components.

REFERENCES

Codex Alimentarius Commission CAC/GL 2-1985 (Rev. 1-1993)

Livesey G 2001. Review article: a perspective on food energy standards for nutrition labelling, Brit J Nutr: 85; 271-287.

Warwick PM, Baines J 2000. Point of view: energy factors for food labelling and other purposes should be derived in a consistent fashion for all food components, Brit J Nutr: 84; 897-902.

World Health Organization (WHO) 1985. Energy and protein requirements: report of a Joint FAO/WHO/UNU Expert Consultation, WHO Technical Report Series no 724, WHO, Geneva, Switzerland.

ATTACHMENT 1

Energy values used in food labelling | Scientifically based energy values

COUNTRY:		Australia/ New Zealand[1]		Canada[2]		European Union[3]		USA[2]		Switzerland[2]		Canada[2]		European Union[2]		USA[2]		Livesey[4]		ILSI[2]	
FOOD COMPONENT:		Energy value										Energy value						Energy value			
		KJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal	kJ	kcal
POLYOLS	Isomalt	11.0	2.1	8.5	2.0	10.0	2.4	8.5	2.0	10.2	2.4	8.5	2.0	9.4	2.2	8.5	2.0	8.0	1.9	8,5-9,4	2-2,2
	Lactitol	11.0	2.1	8.5	2.0	10.0	2.4	8.5	2.0	10.2	2.4	8.9	2.1	8.2	1.9	6,8-9,4	1,6 - 2,2	8.0	1.9	8,2-9,4	1,9-2,2
	Maltitol	16.0	3.8	12.8	3.0	10.0	2.4	12.8	3.0	10.2	2.4	10 - 14	2,4 - 3,3	12.3	2.9	11,9-13,6	2,8 - 3,2	12.0	2.8	12-15,7	2,9-3,7
	Maltitol syrup	16.0	3.8	12.8	3.0	10.0	2.4			10.2	2.4										
	Mannitol	9.0	3.8	6.8	1.6	10.0	2.4	6.8	1.6	10.2	2.4	7.2	1.7	8.5	2.0	6.8	1.6	7.0	1.6	6,8-8,5	1,6-2
	Sorbitol	14.0	3.8	11.1	2.6	10.0	2.4	11.1	2.6	10.2	2.4	11.1	2.6	12.8	3.0	7,6-14,0	1,8 - 3,3	11.0	2.6	11,5-13	2,7-3
	Xylitol	14.0	3.3	13.0	3 (tentative)	10.0	2.4	10.2	2.4	10.2	2.4	12.8	3.0	15.3	3.6	10.0	2.4	13.0	3.1	10-15,3	2,4-3,6
	HSH					10.0	2.4			12.8	3.0		-		-	11,9-13,6	2,8 - 3,2	13.0	3.1	13-14,9	3-3,5
	Erythritol	1.0	0.2			10.0	2.4						-	0.0	0.0		-	1.0	0.2		
Other specific carbohydrates	Polydextrose	5.0	1.2	4.3	1.0		n.d.	4.3	1.0	4.3	1.0							5.0	1.2		0.0
	Wheat bran			10.0	2.4																
Fibre	Fermentable	8.0	1.9	17.0	4.0	17.0	4.0	17.0	4.0									8.0	1.9		
	non-fermentable	8.0	1.9			0.0	0.0	0.0	0.0									0.0	0.0		
Other energy values	Alcohol	29.0	6.8			29.8	7.0											26.0	6.1		0.0
	Glycerin	18.0	4.2															17.0	4.0		0.0
	Citric acid	13.0	3.1															11.0	2.6		0.0
	Malic acid	13.0	3.1															7.0	1.6		0.0
	Tartaric acid	13.0	3.1																		
Alternative fats	Caprenin																	21.0	4.9	23.4	5.5
	Medium-chain triglyceride																	33.0	7.8	23.4	5.5
	Olestra																	0.0	0.0	0.0	0.0
	Salatrim																	21.0	4.9	25.1	5.9

[1] Revised energy factors for Australia and New Zealand reported (Gazetted Dec 2000 in the Australia New Zealand Food Standards Code).
[2] Livesey et al.. ILSI. Suitability of traditional energy values for novel foods and food ingredients. Food Control 11(2000). 249 – 289.
[3] Amtsblatt der Europäischen Gemeinschaft Nr. L 276/40 vom 06.10.1990 In: Souci-SW; Fachmann-W; Kraut-H. Food Composition and Nutrition Tables. Scientific Publishers Stuttgart 2000.
[4] Livesey-G; Energy Background paper. Unpublished.

ATTACHMENT 2

Information on use of energy conversion factors submitted by South Africa

Energy conversion factors used in South Africa are:

Carbohydrates, starch, glycogen	17 kJ/g (4.0 kcal/g)
Mono/disaccharides	16 kJ/g (3.8 kcal/g)
Carbohydrates reaching the colon	8 kJ/g (2.0 kcal/g)
Polyols (sugar alcohols)	10 kJ/g (2.4 kcal/g)
Protein	17 kJ/g (4.0 kcal/g)
Alcohol	29 kJ/g (6.8 kcal/g)
Fat	37 kJ/g (8.7 kcal/g)
Organic acids	13 kJ/g (3.1 kcal/g)

NOTE: Values for major macronutrients are those listed in the Codex Guidelines for Nutrition Labelling, that for polyols is the same as currently used in the EU and that for carbohydrates reaching the colon the same as that adopted recently in Australian and New Zealand for this food component.