codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

JOINT OFFICE: Via delle Terme di Caracalla 00100 Rome Tel.: 39.06.57051 Telex: 625825-625853 FAO I E-mail Codex@fao.org Facsimile:39.06.5705.4593

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

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PROPOSED DRAFT MAXIMUM LEVELS FOR CADMIUM

The following comments has been received from USA, Australia ,Canada and Brazil

USA

At the 33rd Session of the CCFAC, the Committee returned the proposed draft Maximum Levels for Cadmium in Liver (Cattle, Poultry, Pig and Sheep) (0.5 mg/kg), Kidney (Cattle, Poultry, Pig and Sheep) (1.0 mg/kg) and Molluscs (1.0 mg/kg) to Step 3 for circulation, comments and further consideration at its next Session. In addition, several delegations noted that various sub-species of molluscs contain naturally high cadmium levels exceeding the proposed ML of 1.0 mg/kg and that additional information was required to determine whether further subdivision and/or explanation might be needed for further elaboration.

At the 55th Joint FAO/WHO Expert Committee on Food Additives (JECFA) meeting (Geneva, Switzerland, June 6-15, 2000), JECFA evaluated cadmium by determining exposure in five regional diets (Middle Eastern, Far Eastern, African, Latin American, European) and identified individual foods providing the highest exposure in diets within the five regions. Results of the JECFA evaluation indicate that cadmium levels vary from food to food with higher levels being observed in organ meats, such as liver and kidney. However, estimates of cadmium intake based on cadmium residue data demonstrate that consumption of liver and kidney contributes negligibly to the total dietary cadmium intake within the five regions.

In light of these findings by JECFA, the United States believes that the criteria (i.e., MLs shall be set only for those contaminants that present both a significant risk to public health and a known or expected problem in international trade and only for those foods that are significant for the total exposure of the consumer to the contaminant) for considering MLs for cadmium in liver and kidney has not been met as provided in the Preamble to the Codex General Standard for Contaminants and Toxins in Foods (General Principles Regarding Contaminants in Foods) and Annex I to the Preamble for establishing Codex MLs.

Nevertheless, based on the U.S. Food and Drug Administration's 1991-1999 Total Diet Study (TDS)[1] results for cadmium in beef liver (Table 1) and the U. S. Department of Agriculture's 1985-86 survey results for cadmium in liver and kidney of livestock and poultry (Table 2), the United States can support the proposed MLs for cadmium in liver (0.5 mg/kg) and kidney (1.0 mg/kg) of cattle, poultry, pig and sheep.

Based on FDA's compliance monitoring data (Table 3), with the exception of oysters, the United States believes that cadmium levels below the proposed ML of 1.0 mg/kg are achievable in clams, mussels, and scallops. The United States notes that, if quality data are available, CCFAC may need to consider raising the proposed cadmium ML of 1.0 mg/kg in certain sub-species of bivalve molluscs due to the accumulation of naturally occurring cadmium in these organisms.

The United States recommends that CCFAC conduct a thorough review of the 55th JECFA findings in further elaboration of cadmium MLs in individual foods at Step 3 and Step 5.

[1] TDS is FDA's annual survey of market baskets representing 265 core foods (ready-to-eat) in the U.S. food supply to assess the levels of contaminants and nutrients in those foods. Each data point for a contaminant or a nutrient represents composite of 3 samples of a food type.

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TABLE 1 - **Cadmium in Beef Liver, U.S. Food and Drug Administration Total Diet Study (1991-1999)[2]**

Year	Market Basket Number	Cadmium Concentration (mg/kg)
1991	91-3	0.085
1992	92-1	0.096
	92-2	0.046
1993	93-1	0.092
	93-2	0.173
	93-3	0.065
1994	94-1	0.043
	94-2	0.074
	94-3	0.084
	94-4	0.096
1995	95-1	0.047
	95-2	0.110
	95-3	0.075
1996	96-1	0.044
	96-2	0.094
	96-3	0.063
	96-4	0.066
1997	97-1	0.042
	97-2	0.046
	97-3	0.036
	97-4	0.070
1998	98-1	0.052
	98-2	0.093
	98-3	0.050
	98-4	0.046
1999	99-1	0.036
		Mean = 0.070

[2]Each data point represents a composite of 3 samples.

TABLE 2 - Cadmium in Liver and Kidney of Livestock and Poultry, U. S. Department of Agriculture Study (1985-1986)[3]

Organ	Product Class	No. of Samples	Positive Samples			
			No.	Percent	Range (mg/kg)	Mean (mg/kg)
Liver	Calf	327	37	11.3	0.10-1.0	0.19
	Heifer/steer	289	105	36.3	0.10-17.0	0.30
	Bull/cow	95	85	89.5	0.10-0.91	0.24
	Lamb	164	38	23.2	0.10-0.28	0.14
	Mature sheep	34	26	82.4	0.10-0.55	0.24
	Market hog	326	97	29.8	0.10-0.56	0.14
	Boar/sow	262	205	72.7	0.10-1.4	0.21
	Young chicken	313	29	9.3	0.10-0.37	0.13
	Mature chicken	309	264	91.9	0.10-131.0	0.71
	Young turkey	60	57	95.0	0.11-0.73	0.27
	Duck	111	73	65.8	0.10-0.44	0.15
Kidney	Calf	328	140	42.7	0.10-8.1	0.36
	Heifer/steer	288	281	97.6	0.10-9.6	0.38
	Bull/cow	95	95	100.0	0.13-32.0	1.52
	Lamb	162	85	52.5	0.10-0.61	0.18
	Mature sheep	34	30	88.2	0.12-3.4	0.83
	Market hog	321	301	93.8	0.10-1.9	0.30
	Boar/sow	281	277	98.6	0.10-4.4	0.65
	Young chicken	312	87	27.9	0.10-414.0	4.92
	Mature chicken	306	303	99.0	0.10-3.6	1.03
	Young turkey	61	61	100.0	0.13-1.5	0.56
	Duck	111	109	98.2	0.11-1.1	0.25

[3]Source: Journal of AOAC International, Vol. 75, No. 4, 1992, pp. 615-625.

TABLE 3 - Cadmium Levels in Bivalve Molluscs, FDA Compliance Monitoring Program (1989-1999)

A. Clams

YR-MIN	1989	
YR-MAX	1999	
MEAN	0.131	mg/kg
STDDEV	0.077	mg/kg
COUNT	45	
MIN	0.000	mg/kg
MAX	0.380	mg/kg
MEDIAN	0.140	mg/kg
PROPOSED ML	1.000	mg/kg

CADMIUM (mg/kg)	# SAMPLES	CUMULATIVE%
0.000	3	6.7%
0.025	1	8.9%
0.050	4	17.8%
0.075	3	24.4%
0.100	4	33.3%
0.125	2	37.8%
0.150	12	64.4%
0.175	2	68.9%
0.200	10	91.1%
0.225	1	93.3%
0.250	2	97.8%
0.275	0	97.8%
0.300	0	97.8%
0.325	0	97.8%
0.350	0	97.8%
0.375	0	97.8%
0.400	1	100.0%
0.425	0	100.0%
0.450	0	100.0%
0.475	0	100.0%
>0.500	0	100.0%

TABLE 3 - Cadmium Levels in Bivalve Molluscs, FDA Compliance Monitoring Program (1989-1999) (cont.)

B. Mussels

YR-MIN	1989	
YR-MAX	1999	
MEAN	0.000	mg/kg
STDDEV	0.000	mg/kg
COUNT	6	
MIN	0.000	mg/kg
MAX	0.000	mg/kg
MEDIAN	0.000	mg/kg
PROPOSED ML	1.000	mg/kg

CADMIUM (mg/kg)	# SAMPLES	CUMULATIVE%
0.000	6	100.0%
>0.000	0	100.0%

TABLE 3 - Cadmium Levels in Bivalve Molluscs, FDA Compliance Monitoring Program (1989-1999) (cont.)

C. Oysters

YR-MIN	1989	
YR-MAX	1999	
MEAN	0.536	mg/kg
STDDEV	0.518	mg/kg
COUNT	65	
MIN	0.000	mg/kg
MAX	2.488	mg/kg
MEDIAN	0.440	mg/kg
PROPOSED ML	1.000	mg/kg

CADMIUM (mg/kg)	# SAMPLES	CUMULATIVE%
0.000	15	23.1%
0.025	2	26.2%
0.050	1	27.7%
0.075	0	27.7%
0.100	0	27.7%
0.125	0	27.7%
0.150	0	27.7%
0.175	1	29.2%
0.200	1	30.8%
0.225	0	30.8%
0.250	3	35.4%
0.275	1	36.9%
0.300	1	38.5%
0.325	0	38.5%
0.350	2	41.5%
0.375	3	46.2%
0.400	2	49.2%
0.425	0	49.2%
0.450	1	50.8%
0.475	0	50.8%
0.500	0	50.8%
0.525	2	53.8%
0.550	0	53.8%
0.575	3	58.5%

C. Oysters (cont.)

CADMIUM (mg/kg)	# SAMPLES	CUMULATIVE%
0.600	1	60.0%
0.625	1	61.5%
0.650	0	61.5%
0.675	2	64.6%
0.700	5	72.3%
0.725	0	72.3%
0.750	0	72.3%
0.775	0	72.3%
0.800	2	75.4%
0.825	0	75.4%
0.850	1	76.9%
0.875	0	76.9%
0.900	1	78.5%
0.925	0	78.5%
0.950	1	80.0%
0.975	2	83.1%
1.000	2	86.2%
>1.000	9	100.0%

TABLE 3 - Cadmium Levels in Bivalve Molluscs, FDA Compliance Monitoring Program (1989-1999) (cont.)

D. Scallops

YR-MIN	1989	
YR-MAX	1999	
MEAN	0.206	mg/kg
STDDEV	0.190	mg/kg
COUNT	8	
MIN	0.000	mg/kg
MAX	0.547	mg/kg
MEDIAN	0.189	mg/kg
PROPOSED ML	1.000	mg/kg

CADMIUM (mg/kg)	# SAMPLES	CUMULATIVE%
0.000	1	12.5%
0.025	1	25.0%
0.050	1	37.5%
0.075	0	37.5%
0.100	0	37.5%
0.125	0	37.5%
0.150	0	37.5%
0.175	1	50.0%
0.200	0	50.0%
0.225	1	62.5%
0.250	0	62.5%
0.275	0	62.5%
0.300	1	75.0%
0.325	0	75.0%
0.350	0	75.0%
0.375	1	87.5%
0.400	0	87.5%
0.425	0	87.5%
0.450	0	87.5%
0.475	0	87.5%
0.500	0	87.5%
0.525	0	87.5%
0.550	1	100.0%
>0.575	0	100.0%

AUSTRALIA

Cadmium is a widespread naturally-occurring element present in all soils, rocks and waters. Background concentrations of cadmium in soils and natural waters are derived from the parent rock geology. Due to the highly weathered nature of the Australian continent, cadmium concentrations in both soils and waters are generally low by world standards. Cadmium is added to the environment through both natural (e.g. volcanic activity) and anthropogenic processes (e.g. fossil fuel combustion, soil amendments, effluent waters, etc.). In Australia, low levels of urban and industrial activity have minimised the magnitude of cadmium pollution through atmospheric sources, or through disposal or re-use of sewage and industrial waste-waters and solids.

Widespread, but low level, cadmium contamination of agricultural soil has occurred, due to the presence of cadmium as an impurity in phosphatic fertilisers. However, cadmium concentrations in soils are still significantly lower than those reported for many other countries (e.g. USA, Europe), due to the prevalence of relatively low input agricultural systems in Australia. Current and predicted rates of cadmium addition to soil continue to be low by world standards.

Uptake of cadmium by plants can be influenced by a number of factors including soil type, soil pH and the level of certain other elements and micronutrients (particularly zinc). Often, these are more important than the soil cadmium concentration in controlling cadmium accumulation by crops. Thus, Australia's National Cadmium Minimisation Strategy has included changes in farmer management practices as a key component of cadmium minimisation, rather than focussing only on minimising cadmium inputs.

In surveys of agricultural crops known to accumulate cadmium (e.g. potatoes, wheat, etc) cadmium concentrations in Australia have been found to be similar or lower than those reported in other countries. Higher cadmium concentrations in crops are usually associated with cultivation in sandy, acidic, saline or zinc-deficient soils, rather than the cadmium concentrations in the soil per se.

Cadmium levels in open oceans reflect background levels in the natural environment. Higher values may occur in inshore and estuarine waters and sediments due to contamination from human activity on land. Compared to the northern hemisphere, the low intensity of industrialisation and low population densities in Australia result in relatively low levels of cadmium emissions to estuarine and marine environments. Local pollution occurs in some areas, but in general the marine environment is not significantly contaminated by cadmium as a result of human activity. Where high levels of cadmium in marine biota occur, these are not widely or consistently related to human or industrial activity. Marine biota in some environments regarded as pristine (remote from any industrial or human activity) exhibit high cadmium concentrations, suggesting geogenic sources.

Development of Codex Maximum Levels for Cadmium

The Codex Alimentarius Commission at its 24th Session (July 2001) adopted a maximum level of 0.1 mg/kg for cadmium in cereals, pulses and legumes excluding bran and germ, wheat grain, rice, soybeans and peanuts. Draft MLs for several other foods have been recommended by CCFAC for adoption by the Commission at Step 5 but due to time constraints the Commission deferred consideration of these and other Step 5 standards to a special meeting of the Codex Executive Committee on 26-27 September 2001. Australia submitted written comments objecting to advancement of the proposed draft ML for cadmium in crustaceans and proposing it be returned to Step 3 for further consideration along with the proposed MLs for molluscs, kidney and liver, which have been retained at Step 3 by CCFAC. The 49th extraordinary Session of the Codex Executive Committee decided to return all of the proposed draft limits to Step 4 in view of the need to consider overall dietary intake data, in particular from staple foodstuffs.

GENERAL PRINCIPLES FOR SETTING MAXIMUM LEVELS FOR CONTAMINANTS

To meet its objectives of protecting the health of consumers and promoting fair practices in food trade, it is important that Codex ensures the standards set for contaminants are based on scientific risk analysis. Principles to be met in elaborating MLs for contaminants are set out in the preamble to the General Standard for Contaminants and Toxins. These state that MLs shall be set:

a. Only for those contaminants that present both a significant risk to public health and a known or expected problem in international trade;
b. Only for those foods that are significant for the total exposure of the consumer to the contaminant;
c. As low as reasonably achievable. Providing it is acceptable from the toxicological point of view, MLs shall be set at a level which is (slightly) higher than the normal range of variation in levels in foods that are produced with current adequate technological methods, in order to avoid undue disruptions of food production and trade.

PROPOSED CODEX MAXIMUM LEVELS FOR CADMIUM

Although cadmium meets criterion (a), Australia considers several of the proposed MLs for cadmium do not meet criteria (b) and (c).

With regard to criterion (b), it is questionable whether fresh herbs, fungi and celeriac make a significant contribution to total dietary exposure to cadmium and whether an ML for those vegetables is warranted, or whether they should simply be excluded from the MLs applying to other vegetables. The significance of crustaceans, molluscs, liver and kidney to total dietary intake of cadmium on a global basis is also questionable. An assessment of the sources of dietary exposure to cadmium should be made and MLs established only for those foods that are significant to the total exposure on a global basis.

With regard to criterion (c), Australia questions the calculations on which the proposed MLs have been based, as set out in the background paper Proposed Draft Maximum Levels for Cadmium (CX/FAC 01/28). In particular, Australia questions the statistical rigour and rationale for setting the ML using 3 times the median without any regard to the upper end of the distribution for cadmium. Interpretation of the data on which the proposed MLs were based therefore appears to be flawed and as a result the proposed MLs are not consistent with the principles set out in the General Standard.

Australia believes that the proposed MLs for crustaceans, molluscs, liver and kidney have not been set at levels that are reasonably achievable, as defined by the principles quoted above. The reasons why the proposed levels are not considered reasonably achievable are discussed under the specific product headings below.

Australia also considers it essential that the product to which the proposed MLs apply is clearly defined. The background paper (CX/FAC 01/28) states that 'unless otherwise stated the ML applies to the fresh product as traded'. However, the product definition needs to be included in the draft standard to ensure that there is no misunderstanding about the application of each of the proposed MLs and also to ensure that the proposed MLs are based on relevant data. In the case of prawns, for example, both whole prawns and headless prawns are traded. The cadmium level in whole prawns is very much higher than in the portion generally consumed (tails), due to accumulation of cadmium in the hepato-pancreas (contained in the head portion). Australian data indicates that the mean concentration of cadmium in the whole prawn is approximately 27 times that in the tail portion only

Australia is not, at this time, proposing alternative MLs for any of the products of concern. Rather, we are proposing that the rationale for the proposed MLs, and the level at which they are set, be reconsidered on the basis of a comprehensive risk analysis and compliance with the principles set out in the preamble to the General Standard.

PROPOSED MLs FOR CRUSTACEANS, MOLLUSCS AND OFFAL

<u>Crustaceans and Molluscs</u>

Extensive Australian data on levels of cadmium in crustaceans and molluscs reflect the occurrence of natural levels of cadmium in aquatic animals living in unpolluted oceans. Crustaceans and molluscs contain naturally high levels of cadmium, which is concentrated in the hepato-pancreas (body of crabs and heads of prawns, lobsters and crayfish) and the viscera of molluscs. (The level of cadmium is also highly species-specific).

The samples from which the Australian data were obtained are from unprocessed product representing the commercial catch from the major fishing areas of Australia. It comprises a wide range of species representing taxonomic and ecological groupings as well as different feeding habits, and also represents a range of sizes and where possible, both genders, within species. The levels of cadmium in Australian crustaceans and molluscs represent naturally-occurring background levels in the ocean, and would not be expected to differ significantly from the levels in wild-caught crustaceans and molluscs elsewhere in the world. The distribution of crustaceans and molluscs in Australian waters cover a wide range of bio-geographic regions with various geologic substrates, flora and fauna as well as physical and chemical factors. These variables contribute to the large range of average levels found in populations of crustaceans, in which some isolated regions can be significantly higher than others, due to the nature of substrate rocks.

Crustaceans

Australia has no objection to the exclusion of brown meat of **crabs**, which is a practical means of minimising exposure of consumers to cadmium which is contained at highest levels in the hepato-pancreas. However, Australia data indicates that even in the white meat, cadmium can occur at levels well above the proposed ML of 0.5 mg/kg. In 4.6% of 426 samples, levels in white meat exceeded the proposed ML of 0.5mg/kg.

Australia notes that the decision of CCFAC to exclude **lobster** from the crustacean ML does not appear to have been based either on scientific evidence of the cadmium levels in lobsters relative to other groups of crustaceans or on their contribution to dietary exposure. Unless a case can be made for excluding certain groups of crustaceans from the general ML on these grounds, Australia considers the ML should apply to all crustaceans. It is recognised that there can be significant variations between species, but setting a different level for individual species or groups of species of crustaceans appears unnecessary and impractical, especially considering that the overall group appears not to be a major contributor to dietary intake of cadmium.

Australian data from 606 samples taken from 5 species of lobster indicates that around 2% of lobster would exceed the proposed ML., although some would be significantly above it (up to 0.78 mg/kg). Data from **prawns** (1300 samples representing 8 species, and comprising only the edible portion, indicates that around 8.5% would exceed the proposed ML.

Australia's contention that the proposed MLs for cadmium in crustaceans are not reasonably achievable is based on data from crustaceans that have been living in a wild state in the ocean. An increasing, but still small, proportion of crustacean production in Australia is from aquaculture and the production conditions may result in different cadmium levels in the environment and in the crustaceans. However, cadmium levels would be more amenable to management in an aquaculture environment. The limited data Australian available on aquaculture crustaceans (prawns and freshwater crayfish) indicates they would comfortably meet the proposed ML.

Australia proposes that the proposed ML for crustaceans be returned to Step 3 and reconsidered, taking into account the distribution of cadmium levels in crustaceans from various regions of the world, and the contribution of crustaceans to dietary intake of cadmium.

Molluscs

The proposed draft ML for molluscs, currently at Step 3, is 1.0 mg/kg for all molluscs, with no distinction being made between bivalve and other molluscs. This is consistent with the approach taken in Australia, where one level is set for all molluscs. The Australian ML for molluscs is 2mg/kg.

Current Australian data indicates that cadmium levels in Australian molluscs, as consumed, would generally be below the proposed Codex ML.

Offal

The proposed draft MLs for Cadmium in offal are currently at Step 3. They are 0.5 mg/kg for liver of cattle, sheep, pig and poultry and 1.0 mg/kg for kidney of the same species. The Australian ML for cadmium in kidney is currently set at 2.5mg/kg, and for liver is 1.25 (both MLs apply only to cattle, sheep and pig).

Both liver and kidney are significant items in trade. Australia's annual exports of liver and kidney total around 24 000 tonnes, mainly from cattle and sheep; only a small quantity of pig offal is exported. Any risk management measures (including MLs) should be based on scientific assessment of risk to human health, having regard to the contribution of liver and kidney to dietary exposure.
Australia does not routinely monitor for cadmium in **kidney**. Australian monitoring data for the period 1999-2001 for **liver** of cattle, sheep, pigs and poultry shows that cadmium levels in around 16% of sheep liver and 1% of cattle liver exceeded the proposed draft ML of 0.5 mg/kg (5% also exceeded the Australian ML of 1.25mg/kg). These data reflect the cadmium levels present in animals being slaughtered for human consumption, a high proportion of which are young animals.

On the basis of extensive data on cadmium levels in liver, Australia considers that the proposed level of 0.5 mg/kg is not reasonably achievable in the case of sheep. Australia also considers it likely that the proposed ML for kidney is also not reasonably achievable and the estimation of appropriate MLs from the data previously provided by member countries should therefore be reassessed for both liver and kidney.

CONCLUSION

Australia supports the elaboration of MLs for cadmium in those foods that contribute significantly to dietary exposure on a global basis. The MLs in these foods should be based on the principles established by Codex for setting maximum levels for contaminants. This must be based on high quality data from all regions.

CANADA

Canada has indicated previously that the proposed Maximum Levels for Cadmium in liver and kidney at 0.5 mg/kg and 1.0 mg/kg, respectively, are reasonable and believes that these values can be generally met.

However, Canada has difficulty with the 1.0 mg/kg proposed ML at step 3 for molluscs. There are indications that the mean natural levels in oysters harvested off the east and west coasts of this country may exceed this ML. Table 1 consists of consolidated 1993 -2000 data for cadmium value in oysters harvested from selected west coast sites. Canada will provide information, hopefully before the 34 th CCFAC Meeting in March, 2002, on cadmium levels in molluscs harvested from east coast sites.

Ca na da is presently endea vouring to refine its consumption va lues for molluscs a nd develop a n appropriate proposed maximum level (ML). At this point, Canada believes that such an ML would lie somewhere between 2 and 3 mg/kg but wishes to undertake further development of such a figure.

The Canadian estimated dietary intake of cadmium from food, based on total diet studies, is about 14.5 ÿg/day or 0.21 ÿg/kg b.w./day[1] and the exposure resulting from cigarette smoke is reported to be 10

[1] Robert W. Dabeka and Arthur D. McKenzie. Total diet study of lead and cadmium in food composites -Preliminary investigations (Paper accepted for publication in *Journal of the Association of Official Analytical Chemists* and in press.)

ÿg/day or 0.16 ÿg/kg b.w./day and water at 1.2 ÿg/da[1]y or 0.02 mg/kg b.w./day.[2] The total intake from these latter three sources is therefore estimated to be 0.39 ÿg/kg b.w./day.

[2]U.S. Food and Drug Administration (Center for Food Safety and Applied Nutrition). 1993. *Guidance Document for Cadmium in Shellfish.* (Internet: http://vm.cfsan.fda.gov/~frf/guid-cd.html)

Table 1
Cadmium Data for Canadian West Coast Oysters
1993-2000

Area	Mean Cd (ppm)	Median Cd (ppm)	Low Cd (ppm)	High Cd (ppm)	No. Samp.
13	2.54	2.42	1.19	5.10	17
14	2.14	2.09	0.16	6.02	25
15	3.05	2.59	1.33	5.55	27
16	3.14	3.06	1.24	4.78	20
17	1.36	1.32	0.58	2.87	21
18/19	2.12	2.24	1.54	2.46	4
23	2.79	2.63	1.43	4.57	10
24	1.87	1.97	0.51	3.00	15
25	2.03	2.32	0.86	2.60	4
Areas 13 to 19	2.46	2.28	0.16	6.02	114
Areas 23 to 25	2.24	2.10	0.51	4.57	29
All Areas	2.41	2.24	0.16	6.02	143

* Data from Canadian Food Inspection Agency and Environment Canada analyses, as of 31/08/00.

BRAZIL

Brazil would like to provide recent data on cadmium content of selected foods:

Food	n	Cadmium(mg/kg)*	Analytical Method
Fish	52	0.01-.02	ICP/AES
Bivalve molluscs	69	0.01- 0.43	ICP/AES
Oyster	70	0.04-0.22	ICP/AES
Meat of horse	6	<0.02	AAS
Lettuce	60	<0.01	ICP/AES
Liver of horse	6	0.21- 1.37	AAS

* LOQ = 0.01 mg/kg

Nota: Dados disponíneis sobre monitoramento de metais em alimentos comercializados na região de São Paulo (LANARA/IAL)