#11) FAO/WHO, World Health Organization.
Evaluation of Certain Food Additives and Contaminants.2011　より抜粋

海外におけるフモニシン汚染実態に関する知見について

Table 5
Levels of FB_1 in food commodities

Commodity	No. of individual samples	% sample < LOD or LOQ	Global total[a] mean (µg/kg)		Mean across GEMS/Food clusters (lower- and upper-bound estimates) (µg/kg)	
			Lower bound	Upper bound	Minimum	Maximum
Barley	175	82	35	44	0	212
Buckwheat	95	100	0	3	0	3
Figs, dried	230	25	238	250	238	250
Groundnuts, shelled	16	81	97	105	97	105
Maize	8569	30	1237	1260	84	4323
Millet	42	86	0	8	0	8
Oats	17	88	1	10	1	10
Rice	242	96	2	31	0	100
Sorghum	17	76	35	74	0	151
Soya bean (dry)	137	53	33	34	0	84
Sweet corn, kernels	740	66	84	94	0	397
Wheat	74	80	38	48	0	221

[a] Global total lower- and upper-bound mean obtained by pooling the data across all GEMS/Food clusters.

of the samples (85%) were for maize. Also in the case of total fumonisins, levels in maize vary widely between and within the GEMS/Food clusters (Table 6). Lower- and upper-bound estimates for the global total mean of total fumonisins in all other commodities and clusters did not exceed 150 and 200 µg/kg, respectively.

Most of the occurrence data were for FB_1, FB_2 or FB_3, with recent studies showing a few samples naturally contaminated with 3-*epi*-FB_3, FB_4 and FB_6.

From the data analysed for foods, the ratios among FB_1, FB_2 and FB_3 are not constant and depend on the fungal species prevalent in different regions of the world. Fumonisin ratios in food also depend on the process to which they are subjected, sometimes showing different ratios between the free fumonisins in corn, and these ratios tend to be normally distributed.

Extractable and hidden fumonisins in three food products showed almost a normal distribution; however, further studies should be done to confirm these results in order to develop improved sampling protocols.

Table 6
Levels of total fumonisins in food commodities

Commodity	No. of individual samples	Global total[a] mean (µg/kg)		Mean across GEMS/Food clusters (lower- and upper-bound estimates) (µg/kg)	
		Lower bound	Upper bound	Minimum	Maximum
Barley	123	51	102	0	340
Buckwheat	96	0	10	0	10
Maize	10 759	1651	1681	174	5921
Millet	42	0	18	0	18
Oats	26	1	23	0	200
Rice	207	1	59	0	104
Soya bean (dry)	106	6	11	0	30
Sweet corn, kernels	939	131	164	0	549
Wheat	94	0	29	0	200

[a] Global total lower- and upper-bound mean obtained by pooling the data across all GEMS/Food clusters.

The Committee was requested by CCCF to evaluate the co-occurrence, in food and feed, of fumonisins with other mycotoxins. However, this evaluation could not be performed by the Committee, because only aggregated data were available. Levels of fumonisins and other mycotoxins must be available at the level of the individual analytical sample for such an assessment to be conducted.

Levels and patterns of contamination in feed

Information on the natural occurrence of fumonisins in feed materials was drawn from data received from a number of countries (Brazil, China, Japan, Norway, South Africa and Uruguay), results submitted by member states of the EU through EFSA (Belgium, Estonia, France, Hungary, Lithuania, the Netherlands and Slovakia), one commercial feed supplier and published surveys.

Data on a total of 19 631 samples of cereals intended for feed production, silage and finished feed were considered. The ratios between levels of each fumonisin to the sum of fumonisins (FB_1 + FB_2 + FB_3) varied for different countries, mostly due to different fungal prevalence.

The log-normal distribution provides an adequate fit for FB_1 and total fumonisins based on the data provided by Japan.

Table 7
Levels of fumonisins (FB_1 + FB_2 + FB_3) in feed

Commodity	No. of individual samples	% sample < LOD or LOQ	Mean concentration (µg/kg)	
			Lower bound	Upper bound
Cereals	384	87	97	313
Corn gluten meal	18	—	3807	3807
Distillers' grains with solubles	78	23	825	883
Dried distillers' grains with solubles	185	14	1077	1110
Finished feed	2353	30	691	765
Maize	1927	24	1565	1625
Other feed	1391	75	339	524
Rice	20	95	38	275
Silage	248	79	184	383
Soya and soya bean products	362	93	52	283
Wheat	88	89	28	250

Data on 7060 samples originating from Africa (4.5%), America (13.3%), Asia (69.8%), Europe (4.5%) and Australia and New Zealand (7%) were selected for evaluation. These data were generated using similar methods of analysis as used for food. The global lower-bound and upper-bound mean values of the sum of FB_1, FB_2 and FB_3 for the more frequently contaminated feed materials were calculated (Table 7). Corn gluten meal, maize and dried grains plus dried soluble matter from distillers were the most contaminated, and the lower-bound mean values were found to be 3807 µg/kg, 1565 µg/kg and 1077 µg/kg, respectively.

Food consumption and dietary exposure assessment

Since the previous evaluation, a number of national evaluations of dietary exposure have been published. The Committee considered evaluations by Brazil, China, the EU (collectively), France, Guatemala, the Islamic Republic of Iran, Italy, the Netherlands, Portugal, the Republic of Korea, South Africa, Spain, the United Republic of Tanzania and the USA (Table 8). Unprocessed maize was often the only source of fumonisins considered, but in some of the studies, other cereals and cereal-based products were also taken into account. Most of these reports included dietary exposure estimates for FB_1 only (six studies), and total fumonisins were expressed as FB_1 + FB_2 and as FB_1 + FB_2 + FB_3 in six and seven evaluations, respectively. Most of the estimates were below 1 µg/kg bw per day for the general population, but