Total Diet Study: Mg and Mn content estimation of a Market Basket of São Paulo state (Brazil) by Instrumental Neutron Activation

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TOTAL DIET STUDY (TDS): 71 food items (consumption more than 2 g/day/person) grouped in 30 composite foods of a Market Basket of São Paulo State (MB), prepared "table-ready".
Food consumption source: Household Budget Survey (IBGE-POF 2002-2003).

OBJECTIVE

To assess the dietary ingestion of the São Paulo State population to Mg and Mn by the TDS approach.

METHODOLOGY

- INAA : **100 mg food sample irradiated for 20 seconds – 6.59 x10^{12} ncm^{-2}s^{-1} – pneumatic station of the IEA-R1 reactor.**
- **Counting system: GC2018 Canberra HPGe detector coupled to a Canberra DSA-1000 multichannel analyzer.**

Table: Mg and Mn concentrations and daily intake in composite food groups

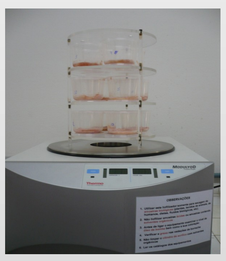
Composite food groups	Concentration mg/kg		Daily Intake (mg/day)	
	Mg	Mn	Mg	Mn
alcoholic beverages	1289 ± 37	1.81 ±0.18	0.67	0.0009
biscuits	356 ± 57	8.15 ± 0.64	0.94	0.02
breads	559 ± 45	8.25 ±0.04	19.2	0.28
cereals	171 ± 9	7.0 ± 0.3	8.19	0.34
coffee	5287 ± 206	32.9 ± 8.0	7.89	0.05
fats	41.4 ± 5.7	0.12 ± 0.01	0.14	0.0004
flours	430 ± 14	14.6 ±0.1	5.14	0.17
freshwater fishes	2654 ± 187	0.34 ± 0.02	0.13	0.00002
fruity vegetables	1370 ± 100	13.7 ± 1.9	2.59	0.03
leafy vegetables	2440 ± 35	18.5 ± 1.8	0.40	0.0031
legumes	1161 ± 205	13.6 ± 0.9	20.1	0.23
milk/cream	733 ± 12	0.29 ± 0.01	13.1	0.005
non-alcoholic beverages	148 ± 25	0.35 ± 0.02	0.87	0.002
oils	na	na	-	-
other dairy products	308 ± 5	0.31 ± 0.01	0.40	0.0004
other fruits	246 ± 30	8.2 ± 2.6	0.13	0.005
other meats	286 ± 68	1.39 ± 0.31	0.41	0.002
pasta	207 ± 1	5.03 ± 0.03	0.18	0.02
pork meats	1860 ± 185	2.9 ± 1.1	1.60	0.0025
poultry	434 ± 18	0.42 ± 0.09	1.35	0.0013
prime grade beef	508 ± 74	0.12 ± 0.04	1.56	0.0004
ready-made dishes	2842 ± 114	0.31 ± 0.03	1.41	0.0002
salts	na	na	-	-
saltwater fishes	3655 ± 401	1.58 ± 0.06	0.55	0.0002
sauces	1247 ± 105	11.5 ± 0.4	0.71	0.01
standard grade beef	273 ± 69	0.22 ± 0.08	0.79	0.0006
sugars	81.2 ± 8.8	0.13 ± 0.01	3.83	0.0061
sweets	2034 ± 144	3.61 ± 0.50	2.18	0.004
tropical fruits	944 ± 146	13.6 ± 0.9	4.79	0.07
tuberous vegetables	1389 ± 72	8.5 ± 1.4	76.2	0.02
		Total	174.8	1.34

na: not analyzed

FOOD GROUP PREPARATION

Table ready

Homogenizing



Freeze-drying

Food group for analysis

QUALITY ASSURANCE

Table: Result of Mg and Mn in the reference materials

Elements	Mg mg/kg		Mn mg/kg	
	This study[a]	Certified value	This study[a]	Certified value
INCT-MPH2 (MPH)	2983 ± 297	2920 ± 180	191 ± 16	191 ± 12
Whole Milk Powder RM8435	795 ± 76	814 ± 76	0.195 ± 0.035	0.17 ± 0.05
Wheat Flour SRM 1567[a]	365 ± 45	400 ± 20	9.51 ± 0.01	9.4 ± 0.9
Oyster Tissue SRM 1566[b]	1382 ± 94	1085 ± 23	18.4 ± 0.4	18.5 ± 0.2

[a] Mean and standard deviation for 4 determinations

Magnesium

- **Concentrations ranged from 41.4 mg/kg (fats) to 5287 mg/kg (cofee).**
- **Tuberous vegetables group showed high daily intake (76.2 mg) representing 41.3% of the total weight of ready-to-consume-groups of this MB followed by legumes (11.5%) and breads groups (10.9%).**
- **Daily intake was 174.8 mg/day (42% of the Recommended Dietary Allowance for the male group and 55% for the female group).**

Manganese

- **Concentrations varied from 0.12 (prime beef) to 32.9 mg/kg (coffee).**
- **The cereal group was the major contributor for the Mn intake (0.34 mg/d), representing 25.4% of the total weight of the MB.**
- **Daily intake was 1.34 mg/d (58.3% of the Adequate intake (AI) for male and 77.8% for female group).**

CONCLUSIONS

- **The daily intake values for Mg and Mn obtained through this Market Basket were low compared to the recommended values.**
- **This study is important as it is first TDS in Brazil and is based on a Market Basket that uses a methodology based on a nationwide governmental survey.**

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