Supplementary Information

Effective procedures for the determination of As, Cd, Cu, Fe, Hg, Mg, Mn, Ni, Pb, Se, Th, Zn, U and rare earth elements in plant and foodstuffs

Fernanda Pollo Paniz[a], Tatiana Pedron[a], Bruna Moreira Freire[a], Daiane Placido Torres[b], Fábio Ferreira Silva[a], Bruno Lemos Batista[a]

[a]Center for Natural and Human Sciences, Federal University of ABC, Postal Code 09210-580, Santo André, SP, Brazil.

[b]Brazilian Agricultural Research Corporation, EMBRAPA Clima Temperado (Embrapa Temperate Agriculture), Rodovia BR 392, km 78, Postal Code 96010-971, Pelotas, RS, Brazil.

*Corresponding author: Bruno Lemos Batista. Address: Centro de Ciências Naturais e Humanas, Universidade Federal do ABC, Bloco A 607-3, Santo André, Brazil. E-mail: bruno.lemos@ufabc.edu.br Tel: +55 11 4996 8355

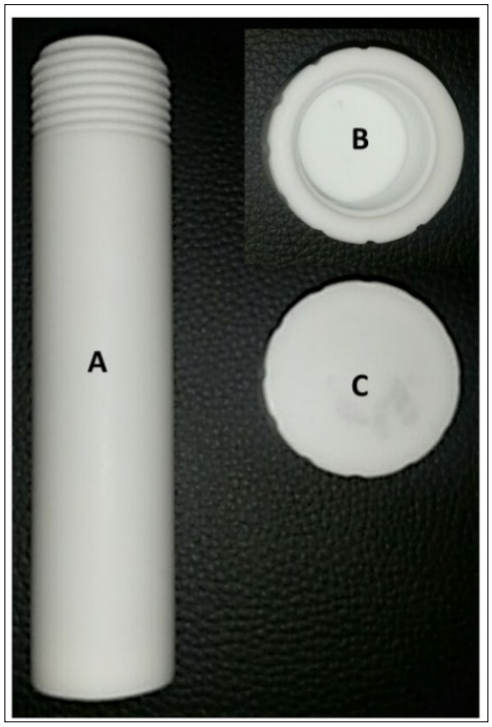

Figure S1. Homemade PTFE vessels developed to fit in the digester block used in the present study. Sizes (mm): Vessel **(A):** height: 130; external diameter: 29; internal diameter: 22; Top cover (**B,** top view, and **C,** bottom view): height: 23.6; external diameter (C): 38.8; internal diameter: 29.6 (B).

Table S1. Microwave oven-heating program for medium (MWMP) and high (MWHP) pressure vessels.

Step	Power (W)	Time (min)		Temperature (°C)	
		MWMP	MWHP	MWMP	MWHP
1	1800	45	15	Ramp up to 190 °C	Ramp up to 230°C
2	1800	30	15	Hold at 190°C	Hold at 230°C
3	0	40	40	Cooling	Cooling

Table S2. Spiking recoveries in Aquatic Plant BCR 670 and Fish Tissue IPEN 001 using different heating processes for digestion. Results of recoveries are expressed as mean ± standard deviation, in percentage.

	Aquatic Plant (BCR-670)				Fish Tissue (IPEN 001)			
Element	MWHP	MWMP	DB	WB	MWHP	MWMP	DB	WB
As	109.7±0.01	99.6±1.9	99.3±2.1	106.1±2.1	103.9±3.5	111.7±3.9	106.9±4.1	101.4±8.2
Cd	94.8±0.22	98.2±1.9	100.0±1.2	96.9±2.1	95.9±1.0	100.2±1.4	103.3±1.1	102.4±4.2
Cu	89.3±0.14	91.6±2.4	91.5±1.6	85.6±3.0	92.3±1.1	96.8±9.4	96.9±0.5	95.6±4.6
Fe	96.3±0.9	89.1±0.4	78.9±1.9	73.6±1.0	105.5±0.6	96.7±1.3	87.5±0.4	94.5±2.2
Hg	100.1±1.3	107.4±3.2	51.7±10.7	19.6±8.5	109.0±7.4	94.2±4.8	107.4±8.8	91.7±4.6
Mg	97.9±0.9	91.3±0.7	87.4±2.6	87.4±1.3	114.7±4.5	103.7±9.9	93.9±5.4	103.6±6.6
Mn	98.2±1.6	90.5±0.2	87.8±1.4	89.2±0.8	104.6±1.0	101.8±64.6	92.9±2.3	98.8±2.0
Ni	99.6±0.14	100.5±2.5	98.0±2.2	98.1±2.5	100.1±3.4	100.5±8.2	94.1±5.4	102.8±2.1
Pb	96.7±3.71	94.1±0.0	93.0±1.1	93.6±1.9	103.3±0.5	101.7±1.0	98.8±0.9	100.4±1.1
Se	102,3±1,6	97.4±0.7	93.7±2.4	106.3±1.4	100.1±3.4	100.5±8.2	94.1±5.4	100.8±2.1
Zn	96.8±3.91	88.9±0.3	86.4±2.2	86.2±1.3	105.2±10.0	105.4±13.0	94.3±9.3	103.9±9.7

Table S3. Spiking recoveries of rare earth elements in Aquatic Plant BCR 670 and Fish Tissue IPEN 001 using different heating processes for digestion. Results of recoveries are expressed as mean ± standard deviation, in percentage.

Element	Aquatic Plant (BCR 670)				Fish Tissue (IPEN 001)			
	MWHP	MWMP	DB	WB	MWHP	MWMP	DB	WB
La	93.0±3.8	84.8±0.8	79.1±1.1	73.2±0.9	105.8±1.0	101.9±1.9	98.0±0.9	99.0±3.3
Ce	89.6±2.1	80.4±0.7	74.9±1.7	68.0±0.8	105.7±1.1	100.6±1.6	102.0±1.2	99.7±3.0
Sm	97.1±4.3	95.2±0.9	90.9±2.1	91.4±1.5	107.0±1.0	104.2±1.5	97.9±0.8	104.0±2.4
Eu	97.1±3.0	97.6±0.3	92.8±1.3	93.4±1.6	105.5±0.5	105.8±1.6	101.4±0.7	103.2±1.6
Gd	96.6±2.5	95.5±0.7	92.0±3.3	89.4±0.6	106.6±1.1	104.2±1.7	95.4±1.4	102.1±2.8
Tb	99.2±3.0	98.5±0.2	94.5±1.6	94.5±1.6	108.7±1.1	105.7±1.4	98.0±0.9	98.3±1.7
Dy	97.3±1.7	97.5±0.8	92.9±2.1	91.0±1.3	108.2±0.7	101.0±2.0	100.9±1.4	101.3±2.7
Er	99.2±3.8	98.6±0.5	94.4±2.3	94.0±1.5	108.6±0.5	106.9±1.1	99.8±0.4	104.5±2.0
Ho	99.0±3.6	99.0±0.6	94.9±2.0	95.0±1.5	108.5±0.7	105.3±1.1	98.9±0.9	104.3±1.9
Nd	91.7±2.6	86.7±0.6	81.2±2.0	78.7±3.3	105.4±1.4	105.8±1.8	99.0±1.0	101.1±2.5
Pr	93.7±3.0	92.6±1.0	86.9±1.7	85.2±1.5	106.3±1.7	104.3±1.6	98.8±1.0	100.5±1.8
Tm	98.5±3.1	99.3±0.3	95.4±3.0	95.2±2.0	107.0±1.1	106.0±1.1	99.1±0.4	104.2±2.1
Yb	96.6±3.7	97.6±0.9	93.3±2.2	91.6±1.4	105.6±0.8	104.8±1.2	98.0±0.7	102.1±1.4
Th	99.5±2.1	93.3±3.5	44.0±4.3	54.0±9.2	101.4±0.5	105.8±19.4	107.5±1.9	104.8±0.8
U	102.2±3.2	102.5±1.1	102.3±0.9	97.0±1.0	105.3±2.4	97.2±1.3	104.5±1.6	104.0±0.8