sustainability

MDPI

Supplementary Material

S.1. Aqua Regia and DTPA Extractions

The concentrations of elements were analyzed using the method described in. Briefly, 0.5 g of sample was digested using 3 ml concentrated HNO_3 and concentrated HCl (1:3). The bioavailable concentrations were analyzed using DTPA. The DTPA method was used, owing to the alkaline nature of EW. The extractant consisted of 0.005M DTPA, 0.1M triethanolamine, and 0.01M $CaCl_2$, with a pH of 7.3. The soil test consisted of shaking 10 g of air-dry EW with 20 ml of extractant for 2 h. The total and bioavailable concentrations of elements were measured using an Inductively Coupled Plasma Mass Spectrometry (ICP-MS, Perkin-Elmer NexION 350X). All the reagents used were of analytical grade. All solutions were prepared from concentrated stock solutions (Sigma Aldrich). All samples were analyzed in duplicate.

S.2. Seed Germination and Plant Growth Experiments

For the seed germination test, the seeds were made to swell in distilled water for 1 h. They were germinated in disposable Petri dishes, 100 mm in diameter, on ash-less Whatman filter paper moistened with 5 ml of either the test solution or double-distilled water (control). The test solution was prepared by using 200 g of sample of EW, which was brought to a moisture content of 85% and agitated for 2 h. The aqueous extract was obtained by filtering the solution. The aqueous extract (test solution) was then diluted with double-distilled water to obtain an extract concentration of 75% and 50%. The experiments were run in five replicates, using ten seeds per dish. The dishes were incubated in a thermostat for 24 h at 27 °C. At the end of 24 h, the germinated seeds were counted and the root length was measured with a ruler. Average value of each replicate was calculated for use in determination of Germination Index.

For plant growth experiments, base substrate was prepared by mixing silica sand and blond peat in a ratio of 1:1 in volume (Wundram et al. 1997; Blok et al. 2008). The extractive waste samples, without further dehydration, were added to the base substrate in different % (w/w): for each dosage, five replications were performed. The various mixtures obtained were placed in traditional pots (sliced off inverted cones) with square base of *c.* 5 cm side and *c.* 10 cm height containing a layer (1 cm) of expanded clay on the bottom to ensure drainage. To ensure seed germination, the mixture was covered with a layer of 1 cm of sand. Thirty seeds were used for every pot for plant growth experiments. The pots were placed in an incubator at 27°C and watered every day for 21 days. After 21 days, the plant tops were cut, and dried in an oven and the biomass was weighed.

S.3. Quality control measurements of the analysed elements

Table 3. Quality control measurements of the analysed elements.

Analyte Symbol	**Cd**	**Zn**	**Ga**
Unit Symbol	**ppm**	**ppm**	**ppm**
Detection Limit	**0.1**	**0.2**	**0.1**
Analysis Method	**TD-MS**	**TD-MS**	**TD-MS**
GXR-4 Meas	0.3	83.4	19.1
GXR-4 Cert	0.86	73	20
GXR-6 Meas	< 0.1	141	28.7
GXR-6 Cert	1	118	35
OREAS 97 (4 Acid) Meas		662	
OREAS 97 (4 Acid) Cert		646	
OREAS 98 (4 Acid) Meas		1460	

OREAS 98 (4 Acid) Cert		1360	
DNC-1a Meas		68.2	13.3
DNC-1a Cert		70	15
SBC-1 Meas	0.3	205	24.5
SBC-1 Cert	0.40	186	27.0
OREAS 45d (4-Acid) Meas		48	21.5
OREAS 45d (4-Acid) Cert		45.7	21.20
OREAS 96 (4 Acid) Meas		469	
OREAS 96 (4 Acid) Cert		457	
Method Blank	< 0.1	1.5	0.2
Meas* - Measured			
Cert* - Certified