Electronic Supplementary Material (ESI) for Metallomics.

SUPPLEMENTARY INFORMATION

Uptake, translocation and accumulation of nickel and cobalt in *Berkheya coddii*, a 'metal crop' from South Africa

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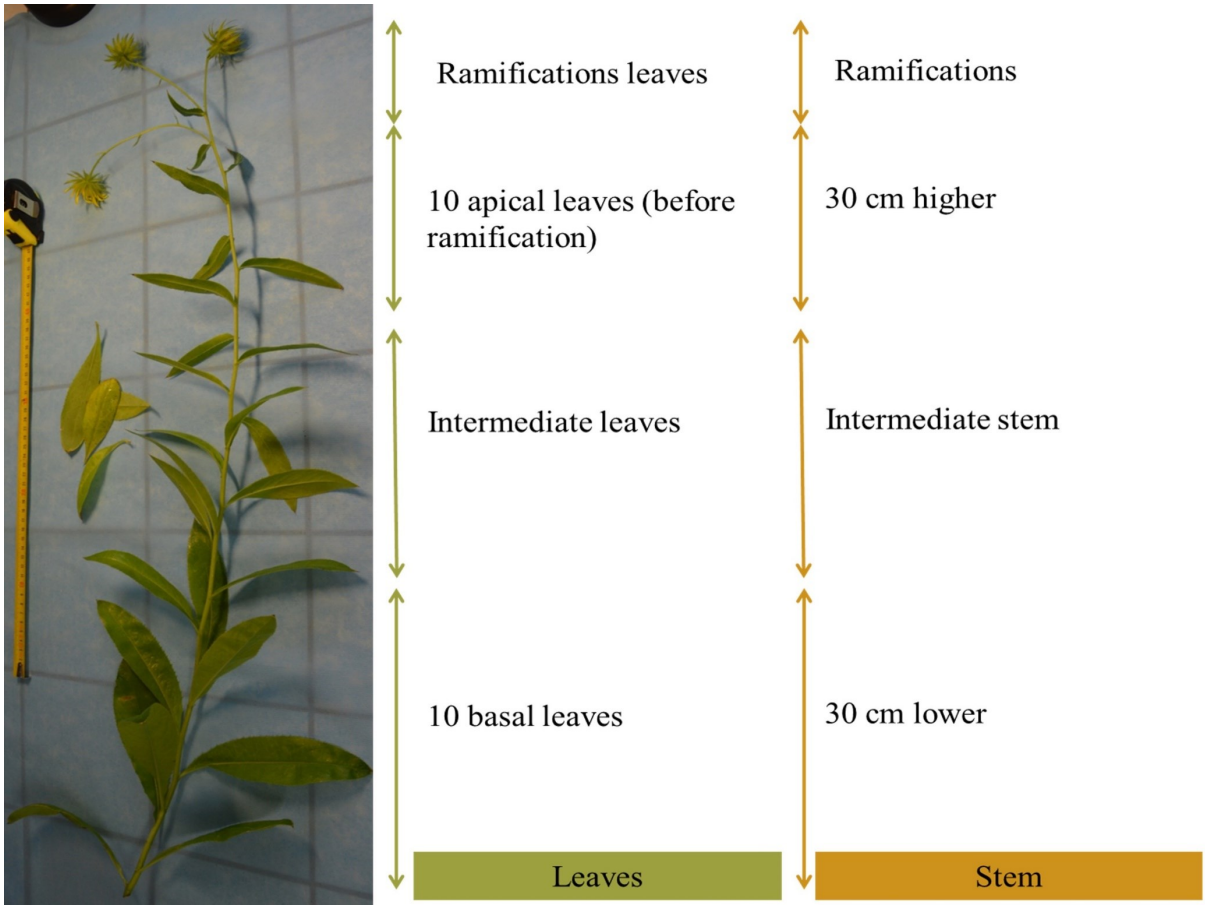

Figure S1. Distribution of leaf and stem samples per individual.

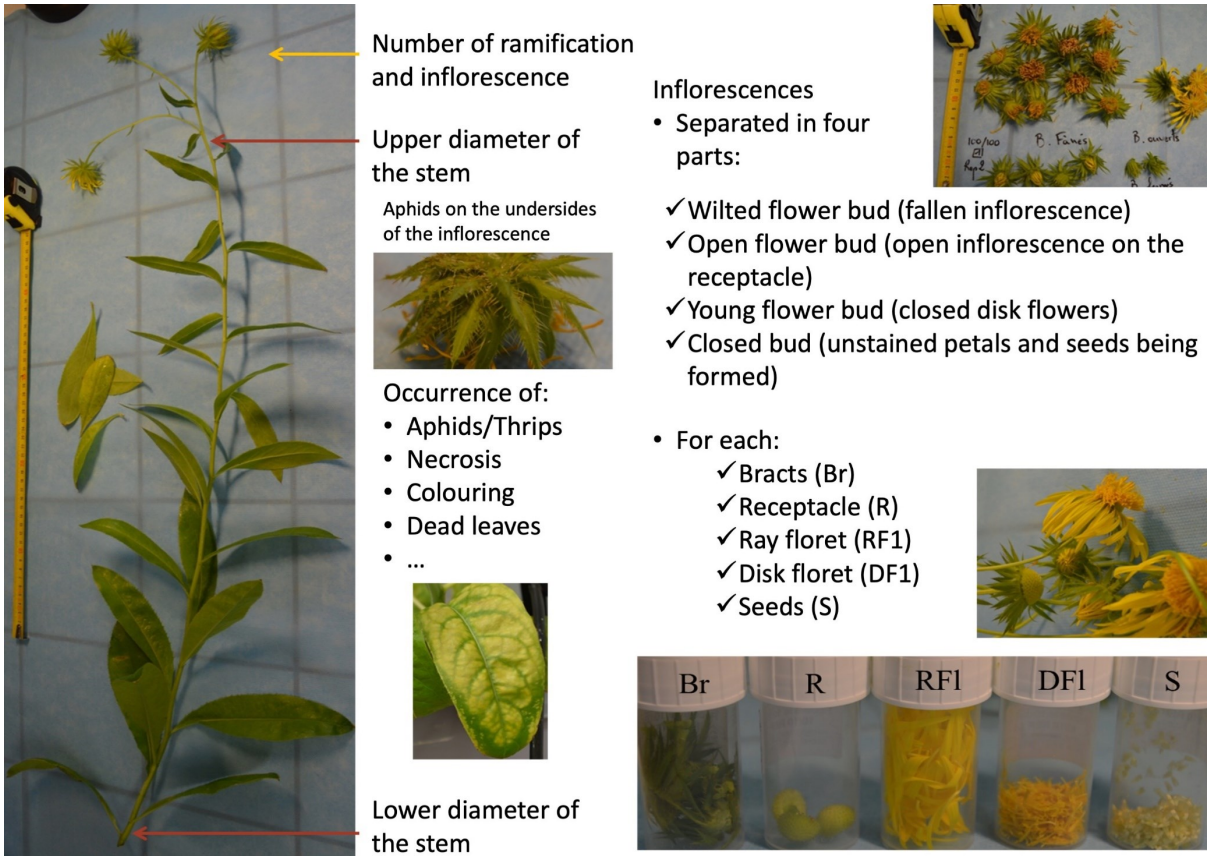

Figure S2. Photographs of the samples collected during the harvest floral part harvest: separation of the buds according to their maturity and separation of the flower parts.

Figure S3. Photographs of the roots of a) *B. coddii*; and b) details of the roots of *B. coddii*. T: tuber, M: medium roots, S: small roots, F: fine roots

Figure S4. Photographs of chlorotic leaves of *B. coddii* according to the modality.

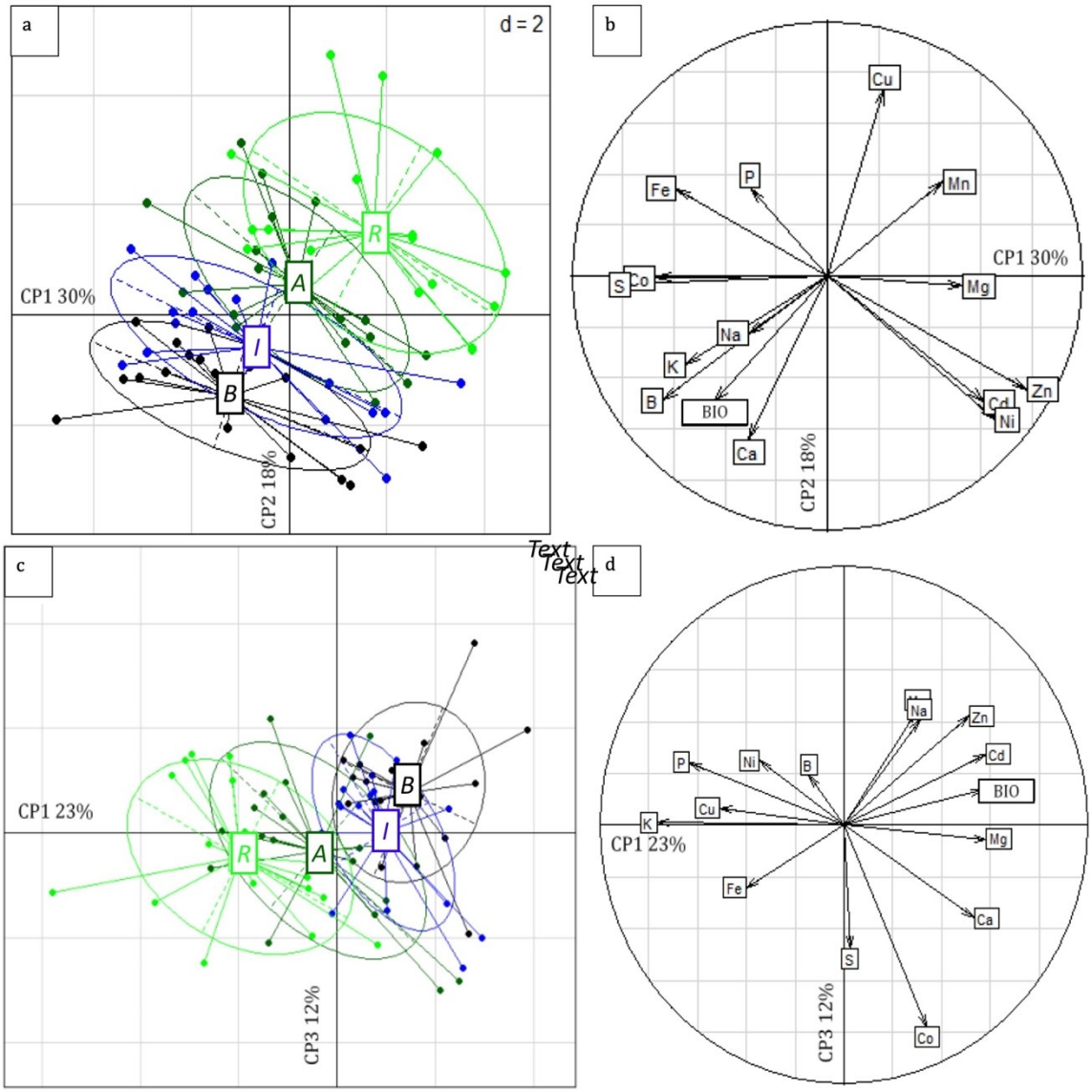

Figure S5. Principal component analysis of *B. coddii* leaves composition + characteristics according to their location on the stem (a, b) and of the composition of the stem according to its separation from the seed (c, d) for the four modalities. a and c) B: basal, I: intermediate, A: apical, R: on ramifications. b and d) representation of the measured variables. Bio: biomass and concentration of the elements: Cu, Mn, Mg, Cd, Ni, Ca, Na, K, B, S, Co, Fe, P.

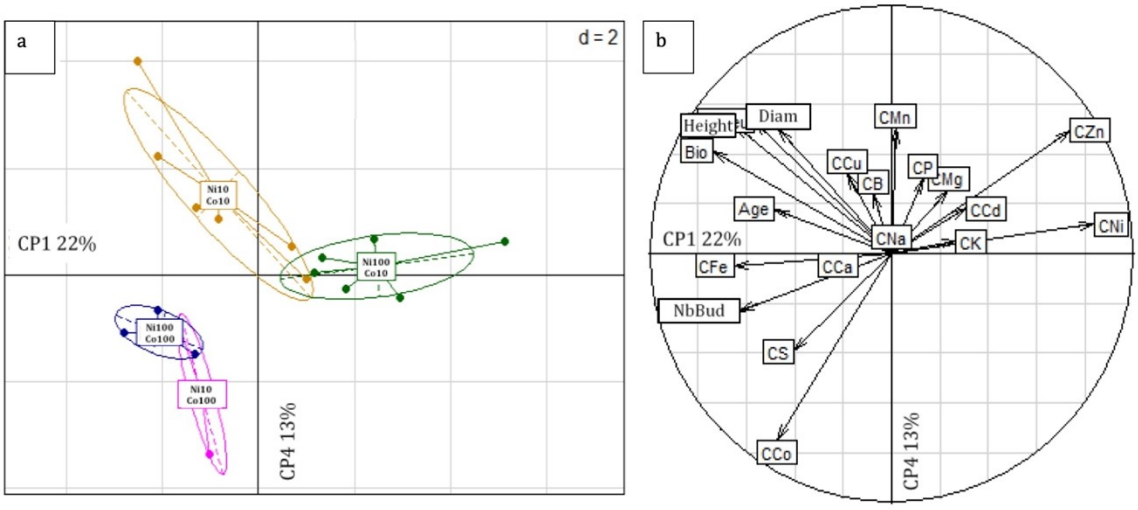

Figure S6. Principal component analysis of the *B. coddii* whole plant composition + characteristics according to the modality. Bio: biomass, NbBud: flower bud count, Diam; lower diameter of the stem Height, age and concentration of the elements in the whole plant: Cu, Mn, Mg, Cd, Ni, Ca, Na, K, B, S, Co, Fe, P.

Parameters	Soil TO				
pH	5.93 ± 0.09				
CEC Tot ($cmol^{+}\ kg^{-1}$)	11.7				
Ca/Mg	7.46				
C_{org} ($g\ kg^{-1}$)	16.0				
N_{tot} ($g\ kg^{-1}$)	1.59				
C/N	10.1				
Organic matter %	2.78				
$P_{tot} - P_{olsen}$ ($g\ kg^{-1}$)	3.31 – 0.09				
Texture	*Clay* 27.6%	*Fine silt* 32.9%	*Coarse silt* 21.1%	*Fine sand* 4.60%	*Coarse sand* 13.8%
	P-Total concentration ($mg\ kg^{-1}$)			**DTPA ($mg\ kg^{-1}$)**	
Mg	3130 ± 10			-	
Al	21900 ± 800			-	
P	1240 ± 60			-	
K	2890 ± 170			-	
Ca	2580 ± 100			-	
Cr	57.5 ± 2.9			<LOQ	
Mn	1480 ± 130			32.9 ± 0.5	
Fe	46700 ± 2400			91.4 ± 0.7	
Co	25.1 ± 2.0			0.19 ± 0.01	
Ni	44.2 ± 2.1			2.01 ± 0.09	
Zn	98.4 ± 3.4			2.55 ± 0.02	

Table S1. Chemistry of soil used for the experiment before amendments. Mean ± sd. <LOQ: Lower than the limit of quantification.

	1st harvest				2nd harvest		
Treatment	**No of Trays**	**Age**	**Parts**	**N ind.**	**Age**	**Parts**	**N of ind.**
Ni10Co10	3	229 (164-295) a	Stem *apical, basal*	7	199 (138-238) a	Above-ground	19
Ni100Co10	3	194 (164-227) a	Leaf *apical, basal*	12	210 (203-224) a		18
Ni10Co100	3	241 (233-253) a	Capitula *bract, receptacle, seeds*, *disk floret, ray floret*	5	149 (69-238) a	Roots *tuber, medium roots, small roots, fine roots*	8
Ni100Co100	3	219 (195-263) a		3	193 (139-203) a		4

Table S2. Details summarising the two harvest periods. Age: age, Parts: Parts digested and analysed via the ICP-OES; N ind.: Number of individual plants harvested Mean (Min-Max). For concerned variables, the affected modalities of the same letter are not significantly different (Waller–Duncan means separation test, $p < 0.05$).

Treatment	Biomass						Stem Diameter			
	Stem		Leaf		Inflorescence		Lower		Higher	
10/10	10.62 (5.64-17.5)	*a*	6.09 (3.75-10.7)	*a*	1.51 (0.96-2.07)	*bc*	0.79 (0.72-0.86)	*a*	0.37 (0.27-0.56)	*a*
10/100	7.46 (6.30-9.77)	*a*	4.85 (4.24-5.17)	*a*	2.10 (1.86-2.40)	*b*	0.71 (0.59-0.84)	*a*	0.30 (0.22-0.50)	*a*
100/10	7.11 (2.65-13.7)	*a*	4.56 (3.46-6.35)	*a*	0.91 (0.53-1.61)	*c*	0.72 (0.64-0.86)	*a*	0.43 (0.34-0.53)	*a*
100/100	12.43 (10.7-15.6)	*a*	5.83 (4.85-6.39)	*a*	3.41 (2.17-4.62)	*a*	0.77 (0.66-0.92)	*a*	0.46 (0.39-0.51)	*a*

Table S3. Biomass of stems, leaves and inflorescence and stem diameters (lower and higher) of *Berkheya coddii* according to the added concentrations of Co and Ni in the substrate. Mean (Min-Max).

Treatment	Seeds from open capitula		Seeds from wilted capitula	
	Co	Ni	Co	Ni
10/10	2.85 (0.50-7.06) b	325 (166-504) c	2.57 (0.66-5.53) b	241 (85.0-444) c
10/100	55.2 (36.0-69.3) a	73.7 (44.9-117) c	66.3 (58.0-82.1) a	76.6 (45.5-125) c
100/10	4.45 (2.86-6.04) b	1850 (1780-1930) b	6.58 (2.65-15.8) b	3130 (1318-5200) a
100/100	63.2 (26.3-95.2) a	692 (333-934) c	59.4 (28.5-82.8) a	534 (215-914) c

Table S4. Concentration of Co and Ni in seeds of open and wilted capitulum of *Berkheya coddii* according to the added concentrations of Co and Ni in the substrate. Mean (Min-Max). For each variable, the affected modalities of the same letter are not significantly different (Waller–Duncan means separation test, $p < 0.05$