

SUPPLEMENTARY MATERIAL TO
**Comparative assessment of adsorbents performances of plant
biomasses grown on different sites: Case study of invasive
Acer negundo L.**

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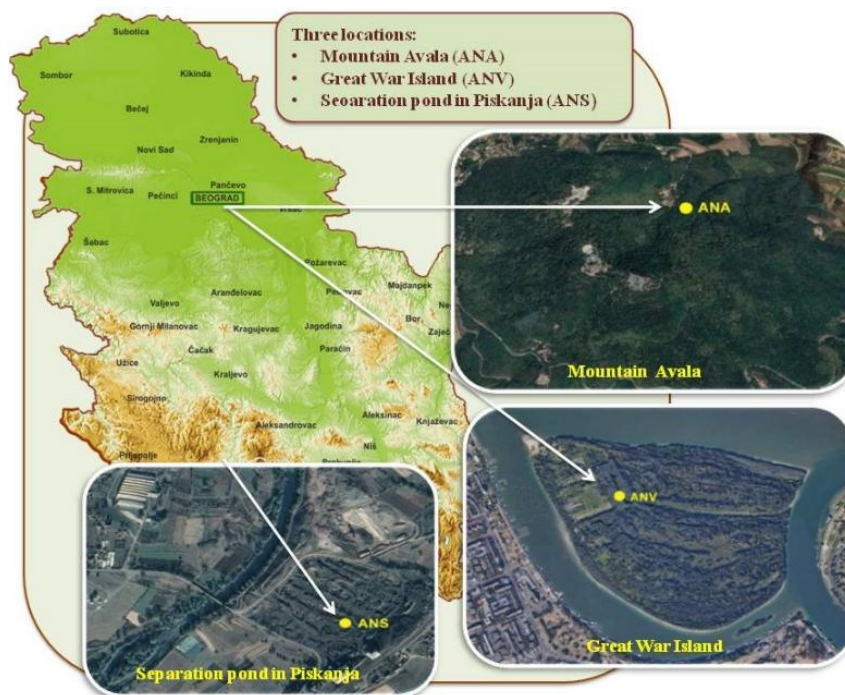


Fig. S-1. Sample points: forest edges on Mt. Avala (a), riparian forests at Great War Island (b) and banks of former coal separation pond in Piskanja (c).

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Table S-I. Models used for evaluation of lead sorption onto investigated *A. negundo* sorbents

Model	Equation	Parameter
<i>Kinetic model</i>		
Pseudo-first order ¹	$\ln(q_e - q_t) = \ln q_e - k_1 t$	q_e (mg/g): sorption capacity at equilibrium q_t (mg/g): sorption capacity at any time t k_1 (g/mg/min): the pseudo first order rate constant
Pseudo-second order ²	$q_t = \frac{t}{\left(\frac{1}{k_2 q_e^2}\right) + \left(\frac{t}{q_e}\right)}$	q_e (mg/g): sorption capacity at equilibrium q_t (mg/g): sorption capacity at any time t k_2 (g/mg/min): the pseudo second order rate constant
Elovich ³	$q_t = \frac{1}{b} \ln(ab) + \frac{1}{b} \ln t$	a (mg/g/min): initial Cu(II) sorption rate b (g/mg): extent of surface coverage
<i>Isotherm model</i>		
Langmuir ⁴	$q_e = \frac{q_m K_L C_e}{1 + K_L C_e}$	q_m (mg/g): maximum sorption capacity K_L (dm ³ /mg): Langmuir constant
Freundlich ⁵	$q_e = K_f C_e^{1/n}$	K_f (mg/g) (L/g) ^{1/n} : Freundlich constant n : heterogeneity factor
Sips ⁶	$q_e = \frac{q_m K_S C_e^s}{1 + C_e K_S^s}$	K_s (dm ³ /g): Sips constant related to sorption affinity s : heterogeneity factor

TABLE S-II. Soil pH, SOC, oxido-reduction potential (Eh) and pseudo-total content of PTE, and content of macroelements from the topsoil layer, together with mean values of PTE content in leaves of ANA, ANV and ANS. Statistically significant differences are marked with asterisk (p<0.05 = *, p<0.01 = **, P<0.001=***)

Ele. (ppm)	ANAs	ANVs	ANSs		ANAL	ANVL	ANSL	
Cu	58.0 ± 0.1	31.9 ± 0.1	46.9 ± 1.0	***	19.9 ± 0.4	18.5 ± 0.5	15.7 ± 0.2	***
Fe	26,294 ± 182	28,994 ± 2044	41,817 ± 570	***	265 ± 32	222 ± 30	200 ± 13.7	
Ni	64.8 ± 5.0	63.2 ± 2.9	116 ± 6	***	34.9 ± 0.0	34.9 ± 0.2	44.9 ± 0.0	***
Mn	31.1 ± 0.1	34.2 ± 2.3	152 ± 7	***	45.9 ± 6.5	48.4 ± 0.0	12.2 ± 0.2	***
Cd	1.74 ± 0.24	1.5 ± 0.5	2.49 ± 0.00	**	n.d.	n.d.	1.24±0.25	***
Pb	82.2 ± 2.2	39.9 ± 5.1	65.0 ± 4.8	***	n.d.	n.d.	n.d	
Zn	234 ± 7	85.1 ± 6.9	95 ± 1	***	46.9 ± 1.4	48.8 ± 3.5	43.1 ± 2.7	
Ca	80,919 ± 991	11,354 ± 20	6,175 ± 59	***	51,413 ± 1,028	39,914 ± 473	26,430 ± 503	***
Na	226 ± 1	225 ± 16	406 ± 2	***	91.4 ± 18.3	88.8 ± 6	87.7 ± 19.9	
K	4,563 ± 132	5,514 ± 28	3,649 ± 4	***	14,334 ± 107	15,300 ± 276	17,417 ± 1,586	
Mg	16,308 ± 372	6,986 ± 487	6,038 ± 202		4,690 ± 540	4,415 ± 22	3,329 ± 38	***
pH	6.85 - 7.15	5.90 - 6.27	4.64 - 4.76					
Eh (mV)	271.0	212.2	370.2					
SOC (%)	4.0	3.4	2.6					

S – soil; L - leaf

TABLE S-III. BCF_L (soil to leaf) of PTE in ANA, ANV and ANS

Elements	ANA	ANV	ANS
Cu	0.34 ± 0.01	0.58 ± 0.01	0.34 ± 0.01
Fe	0.01 ± 0.001	0.01 ± 0.001	0.005 ± 0.0003
Ni	0.54 ± 0.04	0.55 ± 0.03	0.39 ± 0.02
Mn	1.48 ± 0.22	1.42 ± 0.09	0.08 ± 0.01
Cd	N/A	N/A	0.50 ± 0.10
Zn	0.20 ± 0.0004	0.58 ± 0.09	0.46 ± 0.03

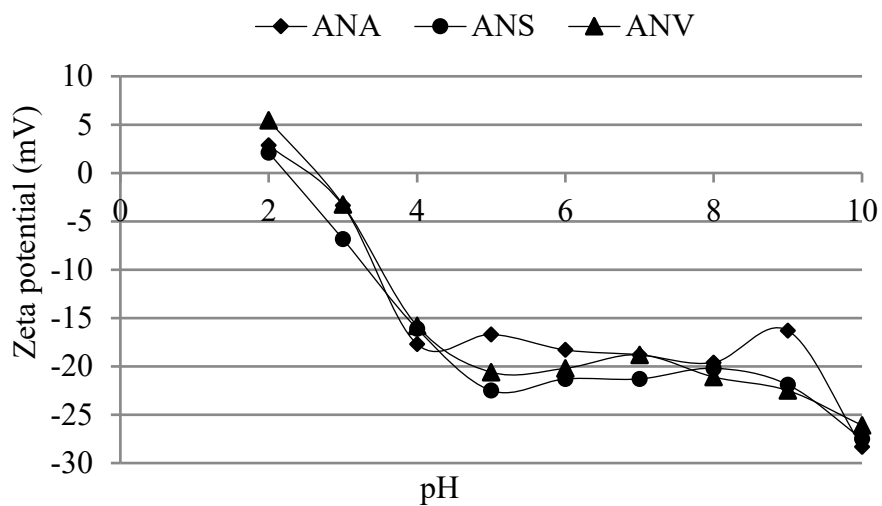


Fig. S-2. The zeta potential values of ANA, ANS and ANV under various pH values range

TABLE S-IV. Release of K^+ , Mg^{2+} , Na^+ , Ca^{2+} and H^+ due to biosorption of Pb^{2+}

	Total metal bound						Net amount of cation released (meq/g)		
	Pb^{2+}	K^+	Na^+	Mg^{2+}	Ca^{2+}	H^+	$R_{b/r}$	pHi	pHf
ANA	43.45	5.0	0.4	12.2	23.0	5.0	0.95	5.0	3.91
ANV	45.56	8.2	0.3	8.9	18.7	6.3	1.07	5.0	3.86
ANS	45.07	15.5	0.25	9.8	33.7	8.0	0.67	5.0	3.77

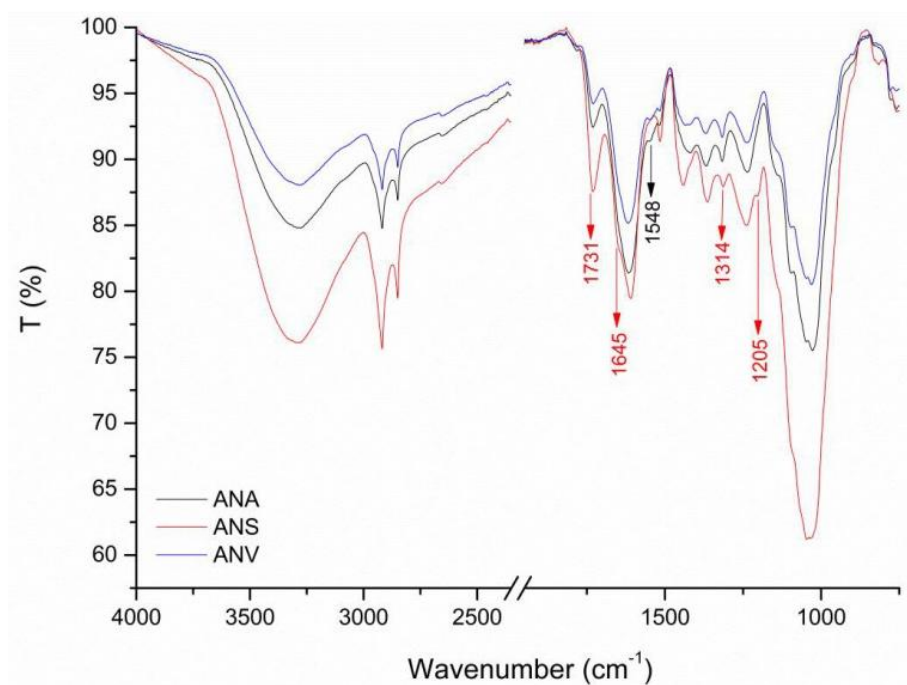


Fig. S-3. ATR-FTIR spectra of all samples

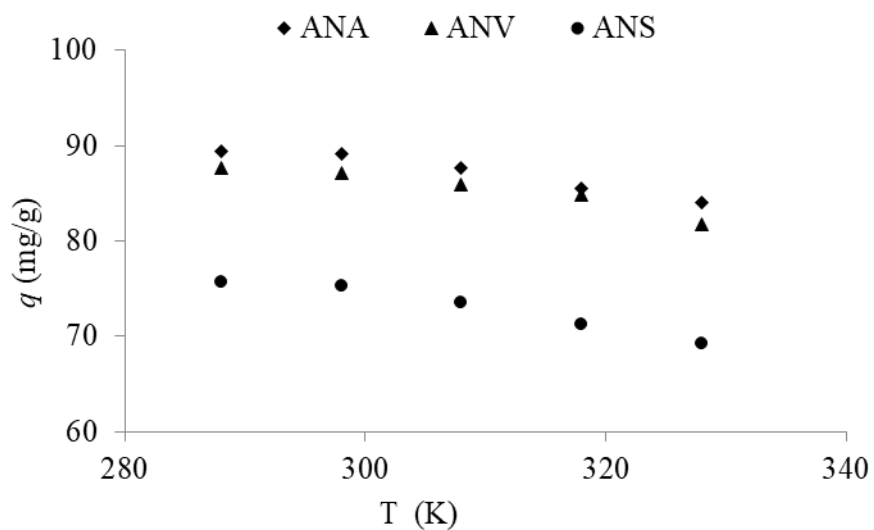


Fig. S-4. Effect of temperature on lead sorption capacity

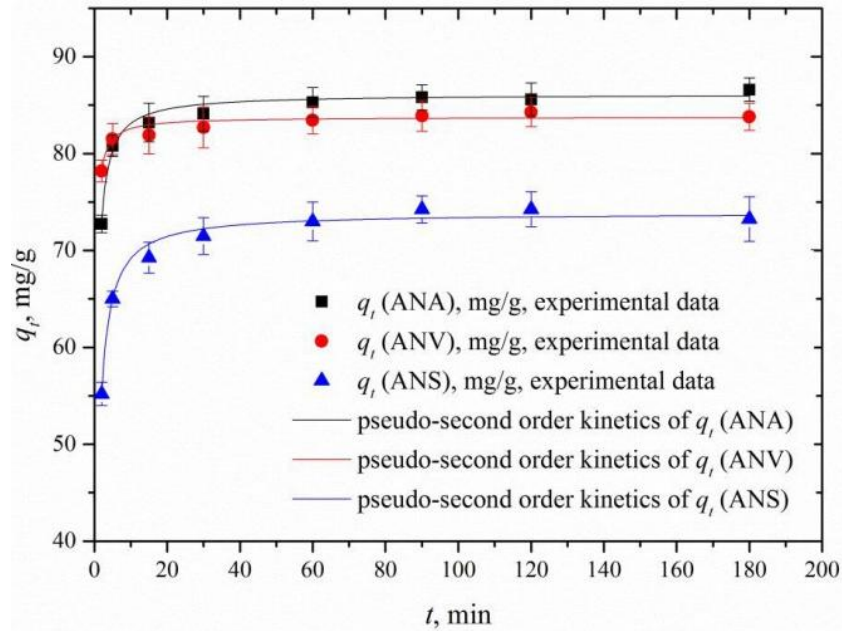


Fig. S-5. Sorption kinetics: sorbed amount of lead per mass of sorbents (q_t) as a function of time: experimental data (symbols) and the best fit predictions of the pseudo second order kinetics

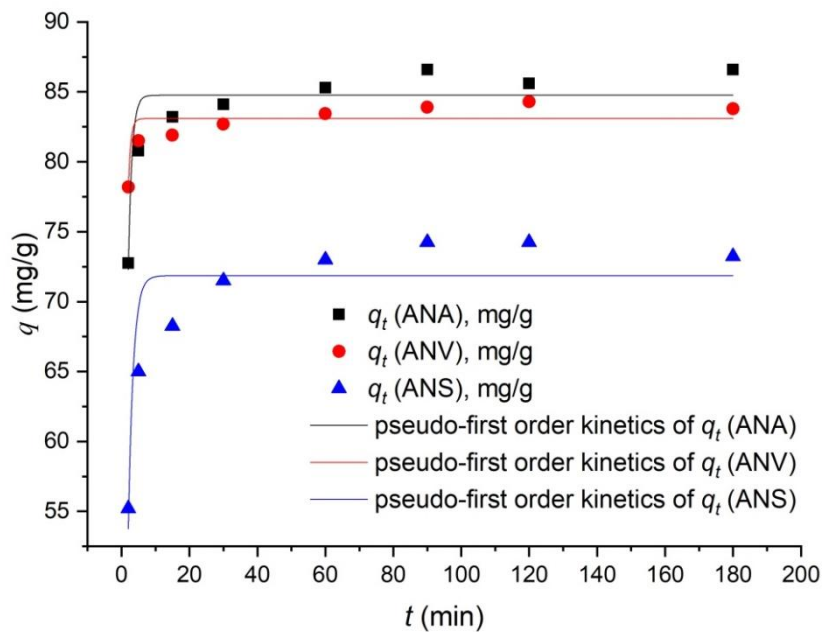


Fig. S-6. Sorption kinetics: the pseudo first order kinetics

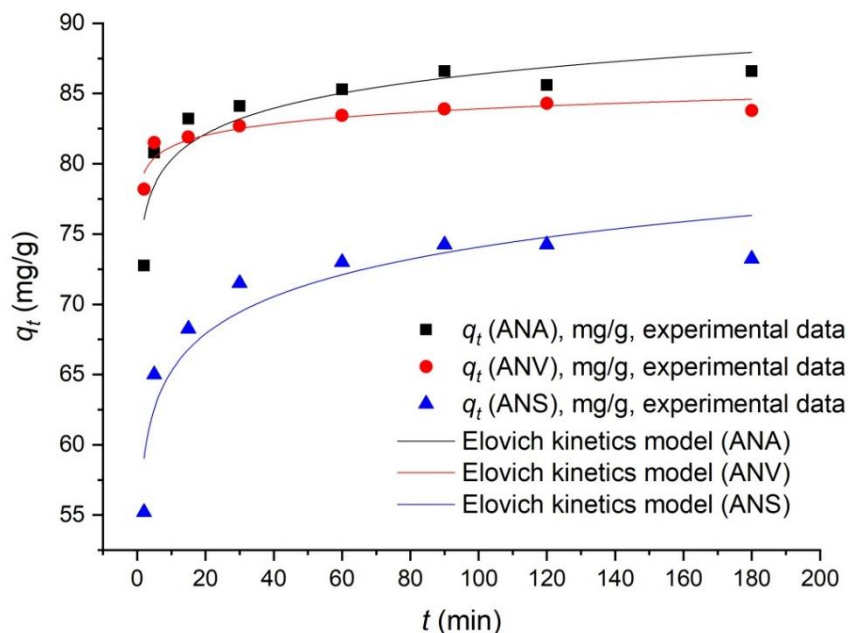


Fig. S-7. Sorption kinetics: the Elovich model

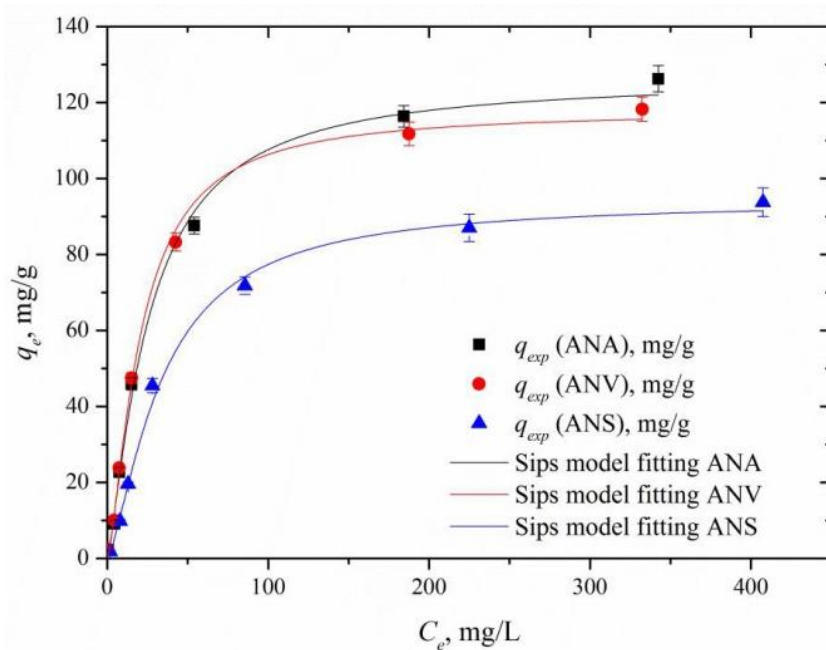


Fig. S-8. Experimental isotherm data and nonlinear Sips model fit of lead sorption onto ANA, ANV and ANS

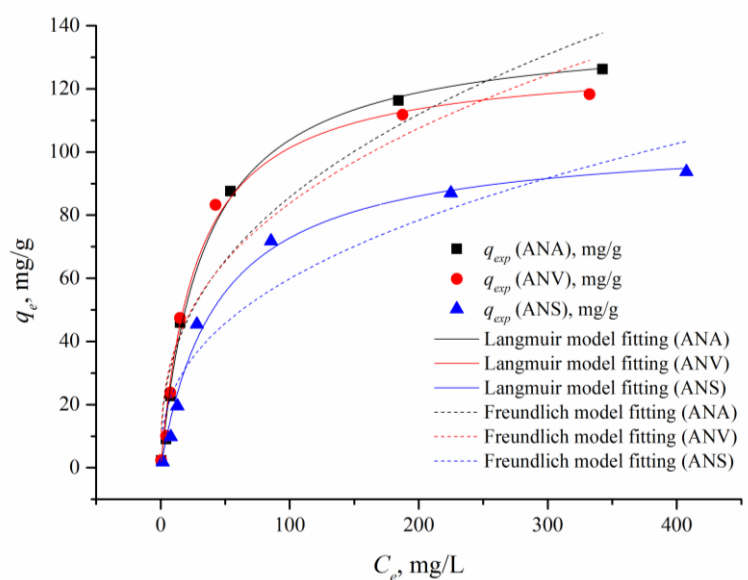


Fig. S-9. Experimental isotherm data and nonlinear Langmuir and Freundlich model fit of Pb(II) sorption onto ANA, ANV and ANS.

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