

Analysis of variance. One-way ANOVA.

Investigated experimental factor: The type of cation
Factors name: Ni; Cd; Pb;
Investigated experimental response: Dry biomass

* - The components of observed variance:

	df	type I SS	mean square	F value	p>F
treatments	2	47.0697	23.5349	136.6994	<0.001
Residuals	18	3.0990	0.1722	-	-

* - Distribution of variables in variance classes:

	treatment	mean	sd	sem	tukey	snk	duncan	NA.	scott_knott
1	Pb	17.3786	0.3696	0.1568	a	a	a	a	a
2	Ni	16.3200	0.5012	0.1568	b	b	b	b	b
3	Cd	13.8086	0.3587	0.1568	c	c	c	c	c

* - The raw multiple comparisons test:

	pair contrast	p(tukey)	p(snk)	p(duncan)	NA
1	Pb - Ni	1.0586	4e-04	2e-04	2e-04 2e-04
2	Pb - Cd	3.5700	0e+00	0e+00	0e+00 0e+00
3	Ni - Cd	2.5114	0e+00	0e+00	0e+00 0e+00

* - Normality (Shapiro-Wilk) and homogeneity (Bartlett) tests applied to residuals:

	values
p.value Shapiro-Wilk test	0.0706
p.value Bartlett test	0.6677
coefficient of variation (%)	2.6200
first value most discrepant	6.0000
second value most discrepant	10.0000
third value most discrepant	15.0000

* - The estimated marginal means (EMMs) of factors values:

Concentration	emmean	SE	df	lower.CL	upper.CL
Ni	16.3	0.157	18	16.0	16.6
Cd	13.8	0.157	18	13.5	14.1
Pb	17.4	0.157	18	17.0	17.7

Confidence level used: 0.95

* - The contrasts between factors in terms of estimated marginal mMeans (EMMs):

contrast	estimate	SE	df	t.ratio	p.value
Ni - Cd	2.51	0.222	18	11.324	<.0001
Ni - Pb	-1.06	0.222	18	-4.773	0.0002
Cd - Pb	-3.57	0.222	18	-16.096	<.0001

P value adjustment: fdr method for 3 tests

* - Calculated p values of pair factor contrasts:

	contrasts.vals	p.vals
Ni - Cd	2.511429	1.915185e-09
Ni - Pb	-1.058571	1.521429e-04
Cd - Pb	-3.570000	1.181069e-11

* - Benjamini-Krieger-Yekutieli multiple-stages comparison procedure

* and the decision to reject the null hypothesis of equal means.

	contrasts.vals	p.vals	BYK.pvals	BYK.rejection
Ni - Cd	2.511429	1.915185e-09	1.915185e-09	TRUE
Ni - Pb	-1.058571	1.521429e-04	5.072203e-05	TRUE
Cd - Pb	-3.570000	1.181069e-11	3.543206e-11	TRUE