

Analysis of variance. One-way ANOVA.

Investigated experimental factor: The type of cation
Factors name: Ni; Cd; Pb;
Investigated experimental response: Total protein

* - The components of observed variance:

	df	type I SS	mean square	F value	p>F
treatments	2	109670.65	54835.324	21.3241	<0.001
Residuals	18	46287.38	2571.521	-	-

* - Distribution of variables in variance classes:

	treatment	mean	sd	sem	tukey	snk	duncan	NA.	scott_knott
1	Cd	296.0420	53.0339	19.1666	a	a	a	a	a
2	Pb	255.8789	50.7239	19.1666	a	a	a	a	a
3	Ni	126.6586	48.2602	19.1666	b	b	b	b	b

* - The raw multiple comparisons test:

	pair contrast	p(tukey)	p(snk)	p(duncan)	NA
1	Cd - Pb	40.1631	0.3227	0.1557	0.1557
2	Cd - Ni	169.3834	0.0000	0.0000	0.0000
3	Pb - Ni	129.2203	0.0004	0.0002	0.0004

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

	values
p.value Shapiro-Wilk test	0.1794
p.value Bartlett test	0.9755
coefficient of variation (%)	22.4200
first value most discrepant	19.0000
second value most discrepant	9.0000
third value most discrepant	4.0000

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

	Concentration	emmean	SE	df	lower.CL	upper.CL
Ni		127	19.2	18	86.4	167
Cd		296	19.2	18	255.8	336
Pb		256	19.2	18	215.6	296

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		-169.4	27.1	18	-6.249	<.0001
Ni - Pb		-129.2	27.1	18	-4.767	0.0002
Cd - Pb		40.2	27.1	18	1.482	0.1557

P value adjustment: fdr method for 3 tests

* - Calculated p values of pair factor contrasts:

	contrasts.vals	p.vals
Ni - Cd	-169.38343	2.038614e-05
Ni - Pb	-129.22029	2.310361e-04
Cd - Pb	40.16314	1.557090e-01

* - 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	-169.38343	2.038614e-05	6.115967e-05	TRUE
Ni - Pb	-129.22029	2.310361e-04	2.310894e-04	TRUE
Cd - Pb	40.16314	1.557090e-01	6.147526e-02	FALSE