

Analysis of variance. One-way ANOVA.

Investigated experimental factor: Ni Concentration
 Factors name: Control; 0.5 mg/L; 1.0 mg/L; 1.5 mg/L;
 Investigated experimental response: Dry biomass

* - The components of observed variance:

	df	type I SS	mean square	F value	p>F
treatments	3	263.8465	87.9488	119.8536	<0.001
Residuals	24	17.6113	0.7338	-	-

* - Distribution of variables in variance classes:

	treatment	mean	sd	sem	tukey	snk	duncan	NA.	scott_knott
1	Control	22.8857	1.3656	0.3238	a	a	a	a	a
2	0.5 mg/L	18.8614	0.8692	0.3238	b	b	b	b	b
3	1.0 mg/L	16.3200	0.5012	0.3238	c	c	c	c	c
4	1.5 mg/L	14.7700	0.2523	0.3238	d	d	d	d	d

* - The raw multiple comparisons test:

	pair	contrast	p(tukey)	p(snk)	p(duncan)	NA
1	Control - 0.5 mg/L	4.0243	0.0000	0.0000	0.0000	0.0000
2	Control - 1.0 mg/L	6.5657	0.0000	0.0000	0.0000	0.0000
3	Control - 1.5 mg/L	8.1157	0.0000	0.0000	0.0000	0.0000
4	0.5 mg/L - 1.0 mg/L	2.5414	0.0001	0.0000	0.0000	0.0000
5	0.5 mg/L - 1.5 mg/L	4.0914	0.0000	0.0000	0.0000	0.0000
6	1.0 mg/L - 1.5 mg/L	1.5500	0.0122	0.0024	0.0024	0.0024

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

	values
p.value Shapiro-Wilk test	0.6713
p.value Bartlett test	0.0025
coefficient of variation (%)	4.7000
first value most discrepant	7.0000
second value most discrepant	1.0000
third value most discrepant	9.0000

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

Concentration	emmean	SE	df	lower.CL	upper.CL
Control	22.9	0.324	24	22.2	23.6
0.5 mg/L	18.9	0.324	24	18.2	19.5
1.0 mg/L	16.3	0.324	24	15.7	17.0
1.5 mg/L	14.8	0.324	24	14.1	15.4

Confidence level used: 0.95

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

contrast	estimate	SE	df	t.ratio	p.value
Control - (0.5 mg/L)	4.02	0.458	24	8.789	<.0001
Control - (1.0 mg/L)	6.57	0.458	24	14.339	<.0001
Control - (1.5 mg/L)	8.12	0.458	24	17.724	<.0001
(0.5 mg/L) - (1.0 mg/L)	2.54	0.458	24	5.550	<.0001
(0.5 mg/L) - (1.5 mg/L)	4.09	0.458	24	8.936	<.0001
(1.0 mg/L) - (1.5 mg/L)	1.55	0.458	24	3.385	0.0024

P value adjustment: fdr method for 6 tests

* - Calculated p values of pair factor contrasts:

	contrasts.vals	p.vals
Control - (0.5 mg/L)	4.024286	8.613653e-09
Control - (1.0 mg/L)	6.565714	8.650240e-13
Control - (1.5 mg/L)	8.115714	1.634345e-14
(0.5 mg/L) - (1.0 mg/L)	2.541429	1.247106e-05
(0.5 mg/L) - (1.5 mg/L)	4.091429	8.443198e-09
(1.0 mg/L) - (1.5 mg/L)	1.550000	2.445273e-03

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*   - 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
Control - (0.5 mg/L)      4.024286 8.613653e-09 1.125760e-08      TRUE
Control - (1.0 mg/L)      6.565714 8.650240e-13 2.162560e-12      TRUE
Control - (1.5 mg/L)      8.115714 1.634345e-14 9.806073e-14      TRUE
(0.5 mg/L) - (1.0 mg/L)   2.541429 1.247106e-05 4.988486e-06      TRUE
(0.5 mg/L) - (1.5 mg/L)   4.091429 8.443198e-09 1.125760e-08      TRUE
(1.0 mg/L) - (1.5 mg/L)   1.550000 2.445273e-03 4.085445e-04      TRUE

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