

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: Optical density

* - The components of observed variance:

	df	type I SS	mean square	F value	p>F
treatments	3	14.7283	4.9094	159.1303	<0.001
Residuals	24	0.7404	0.0309	-	-

* - Distribution of variables in variance classes:

	treatment	mean	sd	sem	tukey	snk	duncan	NA.	scott_knott
1	Control	1.9309	0.2400	0.0664	a	a	a	a	a
2	0.5 mg/L	0.8889	0.2099	0.0664	b	b	b	b	b
3	1.0 mg/L	0.1670	0.0699	0.0664	c	c	c	c	c
4	1.5 mg/L	0.1539	0.1299	0.0664	c	c	c	c	c

* - The raw multiple comparisons test:

	pair contrast	p(tukey)	p(snk)	p(duncan)	NA
1	Control - 0.5 mg/L	1.0420	0.000	0.0000	0.0000
2	Control - 1.0 mg/L	1.7639	0.000	0.0000	0.0000
3	Control - 1.5 mg/L	1.7770	0.000	0.0000	0.0000
4	0.5 mg/L - 1.0 mg/L	0.7219	0.000	0.0000	0.0000
5	0.5 mg/L - 1.5 mg/L	0.7350	0.000	0.0000	0.0000
6	1.0 mg/L - 1.5 mg/L	0.0131	0.999	0.8902	0.8902

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

	values
p.value Shapiro-Wilk test	0.1849
p.value Bartlett test	0.0417
coefficient of variation (%)	22.3700
first value most discrepant	9.0000
second value most discrepant	1.0000
third value most discrepant	26.0000

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

	Concentration	emmean	SE	df	lower.CL	upper.CL
Control		1.931	0.0664	24	1.7938	2.068
0.5 mg/L		0.889	0.0664	24	0.7518	1.026
1.0 mg/L		0.167	0.0664	24	0.0300	0.304
1.5 mg/L		0.154	0.0664	24	0.0168	0.291

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)	1.0420	0.0939	24	11.098	<.0001
Control - (1.0 mg/L)	1.7639	0.0939	24	18.787	<.0001
Control - (1.5 mg/L)	1.7770	0.0939	24	18.927	<.0001
(0.5 mg/L) - (1.0 mg/L)	0.7219	0.0939	24	7.689	<.0001
(0.5 mg/L) - (1.5 mg/L)	0.7350	0.0939	24	7.829	<.0001
(1.0 mg/L) - (1.5 mg/L)	0.0131	0.0939	24	0.140	0.8898

P value adjustment: fdr method for 6 tests

* - Calculated p values of pair factor contrasts:

	contrasts.vals	p.vals
Control - (0.5 mg/L)	1.04200000	1.236778e-10
Control - (1.0 mg/L)	1.76385714	2.211442e-15
Control - (1.5 mg/L)	1.77700000	2.211442e-15
(0.5 mg/L) - (1.0 mg/L)	0.72185714	7.591971e-08
(0.5 mg/L) - (1.5 mg/L)	0.73500000	6.931099e-08
(1.0 mg/L) - (1.5 mg/L)	0.01314286	8.898392e-01

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*   - Benjamini-Krieger-Yekutieli multiple-stages comparison procedure
*   and the decision to reject the null hypothesis of equal means.

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	contrasts.vals	p.vals	BYK.pvals	BYK.rejection
Control - (0.5 mg/L)	1.04200000	1.236778e-10	1.649038e-10	TRUE
Control - (1.0 mg/L)	1.76385714	2.211442e-15	1.326865e-14	TRUE
Control - (1.5 mg/L)	1.77700000	2.211442e-15	1.326865e-14	TRUE
(0.5 mg/L) - (1.0 mg/L)	0.72185714	7.591971e-08	5.198325e-08	TRUE
(0.5 mg/L) - (1.5 mg/L)	0.73500000	6.931099e-08	5.198325e-08	TRUE
(1.0 mg/L) - (1.5 mg/L)	0.01314286	8.898392e-01	1.000000e+00	FALSE