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: pH of culture medium

* - The components of observed variance:

	df	type I SS	mean square	F value	p>F
treatments	3	0.0535	0.0178	8.1148	<0.001
Residuals	24	0.0528	0.0022	-	-

* - Distribution of variables in variance classes:

	treatment	mean	sd	sem	tukey	snk	duncan	NA.	scott_knott
1	Control	9.3600	0.0597	0.0177	a	a	a	a	a
2	0.5 mg/L	9.2686	0.0590	0.0177	b	b	b	b	b
3	1.0 mg/L	9.2600	0.0283	0.0177	b	b	b	b	b
4	1.5 mg/L	9.2514	0.0308	0.0177	b	b	b	b	b

* - The raw multiple comparisons test:

	pair	contrast	p(tukey)	p(snk)	p(duncan)	NA
1	Control - 0.5 mg/L	0.0914	0.0065	0.0013	0.0013	0.0052
2	Control - 1.0 mg/L	0.1000	0.0028	0.0015	0.0007	0.0025
3	Control - 1.5 mg/L	0.1086	0.0012	0.0012	0.0004	0.0012
4	0.5 mg/L - 1.0 mg/L	0.0086	0.9857	0.7342	0.7342	1.0000
5	0.5 mg/L - 1.5 mg/L	0.0172	0.9010	0.7732	0.5237	1.0000
6	1.0 mg/L - 1.5 mg/L	0.0086	0.9857	0.7342	0.7342	1.0000

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

	values
p.value Shapiro-Wilk test	0.8713
p.value Bartlett test	0.1644
coefficient of variation (%)	0.5000
first value most discrepant	7.0000
second value most discrepant	9.0000
third value most discrepant	8.0000

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

Concentration	emmean	SE	df	lower.CL	upper.CL
Control	9.360	0.01772	24	9.323	9.397
0.5 mg/L	9.269	0.01772	24	9.232	9.305
1.0 mg/L	9.260	0.01772	24	9.223	9.297
1.5 mg/L	9.251	0.01772	24	9.215	9.288

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)	0.09143	0.0251	24	3.648	0.0026
Control - (1.0 mg/L)	0.10000	0.0251	24	3.990	0.0016
Control - (1.5 mg/L)	0.10857	0.0251	24	4.332	0.0014
(0.5 mg/L) - (1.0 mg/L)	0.00857	0.0251	24	0.342	0.7353
(0.5 mg/L) - (1.5 mg/L)	0.01714	0.0251	24	0.684	0.7353
(1.0 mg/L) - (1.5 mg/L)	0.00857	0.0251	24	0.342	0.7353

P value adjustment: fdr method for 6 tests

*   - Calculated p values of pair factor contrasts:

	contrasts.vals	p.vals
Control - (0.5 mg/L)	0.091428571	0.002552977
Control - (1.0 mg/L)	0.100000000	0.001622399
Control - (1.5 mg/L)	0.108571429	0.001363505
(0.5 mg/L) - (1.0 mg/L)	0.008571429	0.735346754
(0.5 mg/L) - (1.5 mg/L)	0.017142857	0.735346754
(1.0 mg/L) - (1.5 mg/L)	0.008571429	0.735346754

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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)       0.091428571 0.002552977 0.008192202          TRUE
Control - (1.0 mg/L)       0.100000000 0.001622399 0.008192202          TRUE
Control - (1.5 mg/L)       0.108571429 0.001363505 0.008192202          TRUE
(0.5 mg/L) - (1.0 mg/L)    0.008571429 0.735346754 1.000000000         FALSE
(0.5 mg/L) - (1.5 mg/L)    0.017142857 0.735346754 1.000000000         FALSE
(1.0 mg/L) - (1.5 mg/L)    0.008571429 0.735346754 1.000000000         FALSE
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