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Analysis of variance. One-way ANOVA.

Investigated experimental factor:  Pb 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    0.0376       0.0125  4.2883 0.0147
Residuals  24    0.0702       0.0029       -       -

*  - Distribution of variables in variance classes:
   treatment    mean      sd    sem tukey snk duncan NA. scott_knott
1   Control 9.3600  0.0597 0.0204     a   a      a   a           a
2  0.5 mg/L 9.3314  0.0598 0.0204    ab  ab     ab  ab           a
3  1.0 mg/L 9.2814  0.0318 0.0204    ab   b      b  ab           b
4  1.5 mg/L 9.2700  0.0594 0.0204     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   0.0286   0.7557 0.3314    0.3314 0.6628
2  Control - 1.0 mg/L   0.0786   0.0538 0.0306    0.0154 0.0590
3  Control - 1.5 mg/L   0.0900   0.0226 0.0226    0.0076 0.0282
4 0.5 mg/L - 1.0 mg/L   0.0500   0.3293 0.0959    0.0959 0.2877
5 0.5 mg/L - 1.5 mg/L   0.0614   0.1729 0.1052    0.0541 0.1752
6 1.0 mg/L - 1.5 mg/L   0.0114   0.9786 0.6962    0.6962 0.6962

*  - Normality (Shapiro-Wilk) and homogeneity (Bartlett) tests applied to residuals:
                              values
p.value Shapiro-Wilk test     0.0668
p.value Bartlett test         0.4531
coefficient of variation (%)  0.5800
first value most discrepant  10.0000
second value most discrepant  7.0000
third value most discrepant  24.0000


*   - The estimated marginal means (EMMs) of factors values:
 Concentration emmean      SE df lower.CL upper.CL
 Control         9.360 0.02044 24    9.318    9.402
 0.5 mg/L        9.331 0.02044 24    9.289    9.374
 1.0 mg/L        9.281 0.02044 24    9.239    9.324
 1.5 mg/L        9.270 0.02044 24    9.228    9.312

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)     0.0286 0.0289 24   0.989  0.3993
 Control - (1.0 mg/L)     0.0786 0.0289 24   2.718  0.0360
 Control - (1.5 mg/L)     0.0900 0.0289 24   3.114  0.0284
 (0.5 mg/L) - (1.0 mg/L)  0.0500 0.0289 24   1.730  0.1447
 (0.5 mg/L) - (1.5 mg/L)  0.0614 0.0289 24   2.125  0.0881
 (1.0 mg/L) - (1.5 mg/L)  0.0114 0.0289 24   0.395  0.6960

P value adjustment: fdr method for 6 tests

*   - Calculated p values of pair factor contrasts:
                   contrasts.vals      p.vals
Control - (0.5 mg/L)      0.02857143 0.39930419
Control - (1.0 mg/L)      0.07857143 0.03596271
Control - (1.5 mg/L)      0.09000000 0.02836390
(0.5 mg/L) - (1.0 mg/L)   0.05000000 0.14472604
(0.5 mg/L) - (1.5 mg/L)   0.06142857 0.08809546
(1.0 mg/L) - (1.5 mg/L)   0.01142857 0.69603063
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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)        0.02857143 0.39930419 0.2658944         FALSE
Control - (1.0 mg/L)        0.07857143 0.03596271 0.1751514         FALSE
Control - (1.5 mg/L)        0.09000000 0.02836390 0.1751514         FALSE
(0.5 mg/L) - (1.0 mg/L)     0.05000000 0.14472604 0.1751514         FALSE
(0.5 mg/L) - (1.5 mg/L)     0.06142857 0.08809546 0.1751514         FALSE
(1.0 mg/L) - (1.5 mg/L)     0.01142857 0.69603063 0.3816342         FALSE
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