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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:  Total protein

*  - The components of observed variance:
          df type I SS mean square F value    p>F
treatments  3   2482044  827347.851 160.853 <0.001
Residuals  24    123444    5143.502      -      -

*  - Distribution of variables in variance classes:
  treatment      mean       sd      sem tukey snk duncan NA. scott_knott
1   Control 773.8639 87.9719 27.1069     a   a      a   a            a
2  0.5 mg/L 604.8639 95.8620 27.1069     b   b      b   b            b
3  1.0 mg/L 126.6586 48.2602 27.1069     c   c      c   c            c
4  1.5 mg/L  86.7361 36.2820 27.1069     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 169.0000   0.0010 0.0002    0.0002 0.0004
2  Control - 1.0 mg/L 647.2053   0.0000 0.0000    0.0000 0.0000
3  Control - 1.5 mg/L 687.1278   0.0000 0.0000    0.0000 0.0000
4 0.5 mg/L - 1.0 mg/L 478.2053   0.0000 0.0000    0.0000 0.0000
5 0.5 mg/L - 1.5 mg/L 518.1278   0.0000 0.0000    0.0000 0.0000
6 1.0 mg/L - 1.5 mg/L  39.9225   0.7272 0.3081    0.3081 0.3081

*  - Normality (Shapiro-Wilk) and homogeneity (Bartlett) tests applied to residuals:
                             values
p.value Shapiro-Wilk test      0.4567
p.value Bartlett test          0.0880
coefficient of variation (%)  18.0200
first value most discrepant   10.0000
second value most discrepant   3.0000
third value most discrepant   11.0000


*   - The estimated marginal means (EMMs) of factors values:
 Concentration emmean   SE df lower.CL upper.CL
 Control         773.9 27.1 24    717.9      830
 0.5 mg/L        604.9 27.1 24    548.9      661
 1.0 mg/L        126.7 27.1 24     70.7      183
 1.5 mg/L         86.7 27.1 24     30.8      143

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)       169.0 38.3 24   4.409  0.0002
 Control - (1.0 mg/L)       647.2 38.3 24  16.883  <.0001
 Control - (1.5 mg/L)       687.1 38.3 24  17.924  <.0001
 (0.5 mg/L) - (1.0 mg/L)    478.2 38.3 24  12.474  <.0001
 (0.5 mg/L) - (1.5 mg/L)    518.1 38.3 24  13.516  <.0001
 (1.0 mg/L) - (1.5 mg/L)     39.9 38.3 24   1.041  0.3081

P value adjustment: fdr method for 6 tests

*   - Calculated p values of pair factor contrasts:
                   contrasts.vals       p.vals
Control - (0.5 mg/L)        169.00000 2.243085e-04
Control - (1.0 mg/L)        647.20529 2.415956e-14
Control - (1.5 mg/L)        687.12771 1.271571e-14
(0.5 mg/L) - (1.0 mg/L)     478.20529 8.367040e-12
(0.5 mg/L) - (1.5 mg/L)     518.12771 2.051241e-12
(1.0 mg/L) - (1.5 mg/L)      39.92243 3.080633e-01
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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)        169.00000 2.243085e-04 8.974355e-05          TRUE
Control - (1.0 mg/L)        647.20529 2.415956e-14 7.629423e-14          TRUE
Control - (1.5 mg/L)        687.12771 1.271571e-14 7.629423e-14          TRUE
(0.5 mg/L) - (1.0 mg/L)     478.20529 8.367040e-12 6.275280e-12          TRUE
(0.5 mg/L) - (1.5 mg/L)     518.12771 2.051241e-12 2.734987e-12          TRUE
(1.0 mg/L) - (1.5 mg/L)      39.92243 3.080633e-01 7.420315e-02         FALSE
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