



Research in Biotechnology and Environmental Science

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STATISTICAL GUIDE FOR AUTHORS

DESIGN

It is of utmost importance for the researchers to consider the following points when designing an experiment: the amount of replication, method of randomization, and system of blocking (if any). Blocking aims to reduce the main components of variability from the estimates of treatment effects and experimental error. Randomization is another technique used to confirm unbiased comparisons and estimates of error variance. Replication should be sufficiently performed for drawing a statistically significant conclusion between the treatments and controls.

Most experimental situations are handled by simple designs (completely randomized, randomized block, split-plot). In case you are planning a more complex design, you can contact our statistician at [Rovedar Publication Services](#).

ANALYSIS OF VARIANCE

Analysis of variance is used for the comparison of the variances within the group or between the groups to calculate whether the differences between groups are “big enough” to say that the groups come from different populations. Researchers can “make inferences about differences between means by looking at variances” (Crawley, 2002, p. 245).

REGRESSION

One of the goals of scientific research is to try to explain and predict phenomena. Regression is a technique to look at a number of explanatory variables and decide which ones have independent power to explain what is going on with the measured variable. Another type of regression mentioned in Tabachnick and Fidell (2001) is stepwise regression. Like sequential regression, this type of regression will count all of the area where the explanatory variables overlap with the response variable.

NON-PARAMETRIC TESTS

In case data are not normally distributed and are otherwise skewed, non-parametric tests should be used. In this regard, chi-square test is commonly run for data in the form of frequency, and the arcsine transformation, for binomial data. If the variance seems to vary as the square of the mean, a logarithmic transformation may be useful.

Do not confuse standard deviation and standard error. The standard deviation is a measure of variability in a sample or population. The standard error is a measure of the precision of an estimate.



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NOTES OF CONSIDERATION

Researchers should note that there is a difference between standard deviation and standard error. The standard deviation refers to the measure of variability in sample or population. On the other hand, standard error is a measure of the precision of an estimate.

Another point of consideration is that statistical significance is different from practical or biological significance. This means that statistically non-significant result does not demonstrate that there is no effect. On the other hand, it is indicative of no effect in the examined sample size.

PRESENTATION

The statistical analysis should be reported concisely without any extraneous detail to provide the chance for the reader to make independent judgments.

Considering the statistical software packages, researchers are expected to avoid the specific terminology of the employed brand of software since all readers are not familiar with the chosen statistical package.

While presenting the data, it is suggested to avoid too many decimal places, and one decimal is sufficient, especially when reporting the standard error. For instance, 1.7 is preferred to 1.7082.