

Handling Non-Detects in Analytical Run

Uttam Saha (11/15/2010)

The main approaches found in literature to handling non-detects are:

- (1) Conventional method (Nehls and Akland, 1973)
- (2) Cohen's maximum likelihood estimation (MLE) (Cohen, A.J., 1959)
- (3) Maximum likelihood estimation by delta and bootstrap methods (Shumway et al., 1989)
- (4) Regression on order statistics (ROS) (Helsel and Cohn, 1988; Helsel, 1990; Helsel and Hirsch, 1992), and
- (5) EPA delta lognormal statistics method (USEPA, 1991)

The methods numbered as 2-5 assign the suitable numbers to the non-detects estimated via statistical analysis of the detected numbers in the same population. That means, when we have a situation of assigning a number for one or more non-detect analytes of a single sample, these methods are not applicable. For example, balancing water chemistry of a particular sample. But these methods are great when we try to generate yearly trend of certain analyte. Each of these 4 methods has advantages and limitations.

In the situation of a particular sample, like balancing water chemistry, the only choice is to adopt the conventional method (Nehls and Akland, 1973). In this method non-detects are replaced with reporting limit (RL) or with some fraction of the RL, usually either $1/2 \times RL$ or $1/\sqrt{2} \times RL$; we have to decide which one we would adopt. Please note that even though conventional method is the only choice to deal with individual report with non-detect analytes, it is inferior to the methods numbered as 2-5 in terms of trend analysis for a population.

Literature Cited:

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