Listed below is a summary of stated validation. Additional information can be provided upon request.

Validation Study/Research Project Number: 15-019-V
Testing Laboratory Section: Drug Chemistry
Title: Validation of Microcrystal Tests for the Testing of Suspected Controlled Substances

1. Scope of project:

To test the sensitivity, accuracy, and selectivity of microcrystal tests for the following commonly encountered controlled substances: cocaine, heroin, and methamphetamine.

Synopsis of Results:

Three microcrystal tests (cocaine, methamphetamine, and heroin) were validated, focusing on the testing parameters of selectivity, sensitivity, accuracy, reproducibility, and repeatability. The tests showed that microcrystal tests, when combined with color tests and a visual examination of the material, can be an effective means of presumptively indicating the presence of a controlled substance.

The results showed that the microcrystal tests for cocaine and methamphetamine were very selective. No adulterants, or other confounding compounds, commonly found in casework produced similar looking crystals (and optical properties) as cocaine and methamphetamine. Adulterants did distort some of the crystal formation, but not to the point of omission. The sensitivity of the tests was strong as well, reproducibly and repeatedly, producing consistent positive results down to 3% and 6% w/w cocaine/lactose and methamphetamine/lactose, respectively. Lastly, when three analysts tested a set of unknown samples blindly—not knowing if a controlled substance was present or not—there were no false positives and there was 1 false negative cocaine test and 4 false negative methamphetamine tests.

Unlike the cocaine and methamphetamine microcrystal test, the testing for heroin did indicate that several confounding compounds produced similar looking crystals. The sensitivity of the test was not as low as the other two tests. Heroin could be reliably and consistently detected at 12% w/w heroin/lactose, but detection was noted inconsistently at 6%. The blind accuracy trials revealed no false positives and 3 false negative results.

Finally, color/spot test data were collected using 2-3 color tests for each analyte (cocaine, methamphetamine, and heroin). The sensitivity of the spot tests closely followed the sensitivity of the microcrystal tests. It was important to note the color tests were extremely helpful to eliminate all but one of the confounding compounds that produced similar looking microcrystals as heroin (i.e. morphine). When microcrystal tests are combined with color/spot tests and the visual examinations of a trained analyst, additional discriminability is added to the microcrystal testing scheme, thus increasing the accuracy of the test.