

## Bode Armor™: A Developmental Validation of a Robust Preservative Solution

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After attending this presentation, attendees will gain an increased understanding of Bode Armor, a preservative solution that can be applied to reference samples after collection to enhance sample stability.

This presentation will benefit the forensic science community by providing valuable data to laboratories who are looking to implement a solution to prevent degradation on their collected reference samples.

All fifty states in the United States collect DNA samples from convicted offenders and thirty-one states have legislation allowing for collection of DNA samples from qualifying arrestees<sup>1</sup>. The resulting DNA profiles may be entered into databases such as CODIS. As of June 2019, NDIS contains over 13.5 million offender profiles and over 3.5 million arrestee profiles<sup>2</sup>.

When a hit or match is made in CODIS, the original reference sample taken from the individual is re-analyzed to confirm the genetic profile. This confirmation can occur soon after the sample is taken, or it can occur many years after the sample was originally collected and analyzed. As DNA is a biological material, cellular breakdown and degradation can occur over time if steps are not taken to preserve the sample. Degradation of the reference sample can cause interpretation issues if reprocessing needs to occur.

The adoption of any new method or technology requires careful consideration to ensure that it does not impact any down stream processing in the laboratory. This developmental validation evaluated Bode Armor treated reference samples and their ability to yield a complete DNA profile following both traditional processing (extraction, quantification, and amplification) and direct amplification procedures. This validation included the required studies for accuracy, artifacts, contamination, knowns, precision, repeatability, reproducibility, sensitivity, and stability. All experiments listed were performed using the ThermoFisher GlobalFiler™/GlobalFiler™ Express, Promega PowerPlex® Fusion 6C, and QIAGEN® Investigator 24plex QS/24plex GO! amplification kits. Three amplification kits from three different manufacturers were chosen so that the resulting data would be valuable to most local, state, federal or international agencies. All amplified samples were separated on an Applied Biosystems™ 3500xL capillary electrophoresis instrument and analyzed utilizing appropriate analytical and stochastic thresholds for each amplification kit in GeneMapper® ID-X.

The resulting data showed that following manufacturer's recommendations, Bode Armor did not prevent the laboratory from obtaining accurate, reliable, and reproducible DNA profiling results. All DNA profile results obtained from Bode Armor treated samples were concordant with the previously obtained donor profiles.

The recommended application volume of Bode Armor is 100µl per reference sample. As expected, direct amplification procedures were impacted when the application volume was increased 2 or 3-fold. Traditional processing methods were not significantly impacted by the increased application volumes. Through this study, Bode Armor was shown to be a robust preservative solution that can enhance the stability of buccal reference samples while allowing for successful downstream analysis by DNA analysts.

Key Words: Bode Armor, Databasing, Stability

1. Hurst, Lisa "DNA Legislative Update." 18th Annual Forensic DNA Conference-Bode 2019 Phoenix, AZ April 24, 2019.
2. <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics>.