



B93 Use of the SPEX 6750 Freezer Mill® for Extraction Preparation of Limited DNA Samples

Sherri L. Fentress, MS, Pamela G. Jarman, MSc, and Daniel E. Katz, MFS, Delaware Office of the Chief Medical Examiner, 200 South Adams Street, Wilmington, DE 19801*

The goal of this presentation is to provide insight into the potential benefits of the SPEX 6750 Freezer Mill® for practical application in forensic DNA analysis.

This presentation will impact the forensic community and/or humanity by demonstrating how the use of the freezer mill would decrease the time needed for sample preparation for DNA extraction and could increase the product yield for limited DNA sample sources.

The DNA Unit of the Delaware Office of the Chief Medical Examiner (OCME) is currently validating several procedures at different stages of the DNA analysis process. The project described in this abstract focuses on the preparation aspect of the extraction procedure for nuclear DNA samples. It investigates the use of the SPEX 6750 Freezer Mill® to potentially increase the efficiency and/or yield for extraction. The freezer mill uses extreme cold temperature and magnetic force to reduce any sample to a fine powder in a matter of seconds. For example, preliminary validation studies for mitochondrial bone and tooth extraction have revealed that this can occur in as little as 30 seconds. Though the major benefit of the procedure is the decrease in the time and sample handling involved with extraction preparation (especially for bone samples), another important benefit is the optimization of extraction yield due to increasing the surface area that is exposed to the extraction reagents.

This project will examine the application of freezer mill grinding to a variety of problematic and/or limited DNA sample sources and the potential to improve the DNA yields of these samples. Samples tested will include but are not limited to condoms, swabs of touch transfer, microscope slides, stains on multiple types of fabric, bone, latex gloves, and hair clumps without roots. The optimal grinding time for each type of sample and the amount of ground sample to extract will be determined. One should keep in mind that not all sample types will be evaluated for freezer mill use because it may be neither practical nor necessary for some samples.

Organic and non-organic extraction systems will be compared, and real-time PCR will be used for quantitation of all extractions. Amplification and typing will be performed using the Powerplex® 16 system on the ABI Prism® 310 Genetic Analyzer® platform. Results will be evaluated for yield and quality of profile.

The presentation will compare the results for each of the extraction procedures (with and without the freezer mill) and give an overall evaluation for each of the sample types used including the optimal grinding times and extraction amounts.

Freezer Mill, DNA Yield, Limited Sample