A NEW COLLECTION TECHNIQUE FOR TOUCH DNA: THE DNA-BUSTER

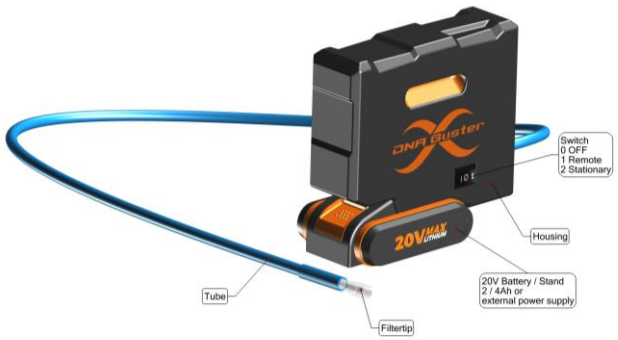

Figure 1: CAD model of the DNA-Buster v3.

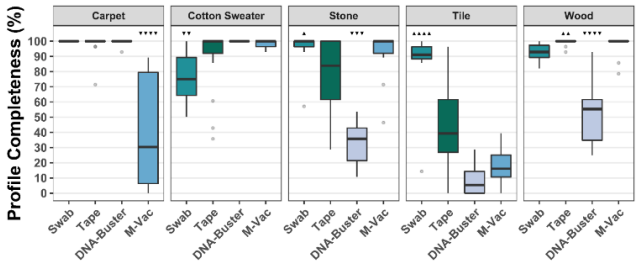

Figure 2: STR profile results. Boxplots show the completeness of DNA profiles per sampling method for the five surfaces examined. Arrows pointing up indicate significantly higher results, and arrows pointing down significantly lower results.

Have you ever wondered how crime scene samples are collected? Traditional methods like swabbing and taping have limitations, especially for touch DNA. From collected traces, unique DNA profiles using human markers (Short Tandem Repeats, STRs) can be generated to assign them to a person of interest, potentially resolving a criminal case. In this study, we investigated a novel and in-house dry-vacuuming device for crime scene sampling, the DNA-Buster.

Biological material is often collected as potential evidence in criminal investigations using swabs or tape. One common type of biological material left behind is touch DNA (1), transferred, e.g., from a person to an object via contact (2). However, securing touch DNA is challenging due to its low quantity, poor quality, and risk of contamination. Additionally, substrate properties can affect collection efficiencies. As a result, research is focused on developing more effective recovery techniques (3,4).

This study compared our innovative dry-vacuuming device, the DNA-Buster (Fig. 1), with traditional recovery techniques. The objective was to assess whether the DNA-Buster could efficiently collect touch DNA. For this, the collection performance of swabbing, taping, M-Vac® (wet-vacuuming), and DNA-Buster (dry-vacuuming) was evaluated for touch DNA applied on common traces, such as carpet, cotton sweaters, stone, tile, and wood. The study highlighted that dry-vacuuming is effective for textiles, but also emphasized that substrate-specific techniques are crucial for precise DNA recovery in forensic casework (Fig. 2). Future steps will focus on optimizing the device for DNA recovery, also from substrates beyond textiles.

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References:
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