B115 Potential for Brand Name Identification by Tomato Seed DNA Typing

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In recent years, DNA has been successfully extracted and analyzed from a variety of plant materials including seed pods, leaves and other vegetative matter from plant species such as *Cannabis sativa* (marijuana) and other ornamentals (Palo verde, *Sutera*). The ultimate goal of plant DNA typing is to extend the microscopic analysis of vegetative trace materials to further classify or individualize the sample. Since seeds are small, often adherent to clothing, and edible (stomach contents), they are a good choice to optimize for DNA typing from crime scene evidence. As a model system, the authors are using the amplified fragment length polymorphism (AFLP) method for DNA individualization of *Lycopersicum esculentum* (tomato) seeds that are common to many cuisines around the world.

The results indicate that high quality DNA could be extracted from fresh tomato seeds after they passed through the human digestive system using a commercially available plant DNA extraction kit. Although the sample weight was significantly less than the recommended amount for the kit, high quality and sufficient quantity of DNA was isolated from a single tomato seed to generate an AFLP profile. When DNA profiles were compared from different seeds, several variety-specific markers (DNA fragments) were identified. Although the sample size was small (n = 4 seeds each per 5 different tomato varieties), these markers look promising for tomato variety identification. Additional screening of larger tomato populations is in progress. Not only will new markers be identified and correlated with a tomato variety, but the percentages of shared markers can be estimated by comparisons of samples from the same variety and between varieties. A brief description of tomato varieties and their cultivation history will be provided in this presentation. Tomatoes have been extensively cultivated and many share a common genetic ancestry and so have been notoriously difficult to distinguish genetically due to high levels of inbreeding. The AFLP technology has been specifically developed to generate high marker saturation across plant genomes to overcome the inbreeding issue.

In addition, a comparison of fresh and processed tomato seeds and the subsequent recovery of DNA were performed. Fresh tomato seeds, both digested and undigested yielded an average of 62.5 ng/ 50 uL of DNA per seed embryo. Interestingly, DNA was not recoverable from processed tomato seeds from spaghetti sauces or canned tomatoes presumably due to the pressure and heat treatment during processing. Further studies are in progress to define if other forms of cooking (e.g., oven baking, boiling etc.) affect the ability to recover PCR quality DNA from tomato seeds. In summary, the data demonstrate that AFLP analysis is appropriate for individualization of unprocessed tomato seeds and may be useful for linkage of stomach contents back to a location, especially once variety-specific markers have been determined.

Forensic Botany, Plant DNA, Tomato Seed

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