

COLLECTING AND PROCESSING BUCCAL CELL SAMPLES

James W. Schumm, Eun Young Song, Martha Burger, and Jangbir Sangha

The Bode Technology Group, Springfield, VA



Recently, we developed a new device and method of buccal sample collection. Here we provide new information regarding the reliability of the collection process, the longevity of collected samples, additional validation studies, and a description of reliable methods that can be used to process samples collected in this fashion.

We designed the buccal cell collection device specifically to address the need for a reliable, non-invasive, and efficient method of DNA sample collection that feeds directly into automated downstream processes. All components of the device including a support, handle, and membrane are compatible with oral sample collection. A filter paper collection area connected to a plastic handle is held in place from behind by an attached snap-on plastic support. A cap is provided to protect the sample from contamination while air drying and transport. A position on the handle is provided for bar code placement, either during manufacture or after collection.

The collection process is very simple and an individual can be trained in its effective use in just a few moments. Several swipes against the inside of a cheek provide sufficient buccal cells for 20 or more analyses. No secondary transfer to another surface with the accompanying potential loss of sample material is needed. The minimal training requirement removes the need for specialized personnel (and concomitant cost and time) to collect a DNA sample, in sharp contrast to methods for collection of blood samples.

DNA preparation from collected samples has been performed with a variety of methods. We will describe various commercial kits and protocols that have been used successfully to prepare DNA from the collector in either single sample or microplate formats. Options that prepare sample punches for direct amplification as well as those that release the DNA from the collector into solution will be provided.

We continue to validate characteristics of the collector and its use. In our initial tests, we were able to obtain full 13 CODIS STR profiles from each of 52 samples collected with this device. More recently, a State crime laboratory that has begun to use the device routinely publicly reported full profiles with 100% of the first 2500 samples collected with the device (with the exception of six cases in which it is suspected that the filter paper never touched the inside of the subject's cheek). Our in-house studies confirm that full profiles are obtained after collector storage for a full year in paper envelopes at room temperature.

Taken together, results with these materials and procedures indicate that use of the buccal cell collection device is a rapid, reliable, and convenient means for reference sample collection to support any small or large scale DNA collection application.