Forensic Chemistry Section

M-Vac DNA Sampling Method

1. Scope

This document outlines the methods for sampling various items for DNA using the M-Vac system.

2. Safety

2.1 Disposable lab coats and disposable gloves will be worn during instrument preparation and during the sampling of evidence.

2.2 Safety glasses and disposable face masks will be available for use when heavily bloodstained items are being processed.

3. Contamination Prevention

3.1 Prior to evidence examinations, the bench top will be cleaned with a minimum of 10% bleach solution, followed by alcohol and lined with clean brown paper.

3.2 The user will maintain the five following points of sterility by not allowing contact with non-sterile surfaces:

3.2.1 Cap/septum on solution bag. Use solution until it is done.

3.2.2 Spike in the solution line. Tubing may be used more than once.

3.2.3 Port on the solution line with the green stopper. The green remains with the tube.

3.2.4 Port on the M-Vac bottle assembly.

3.2.5 Head of the wand. This is the portion that contacts the sampled item.

4. Function Check

4.1 When the *power* is turned on, fans in the rear of the instrument begin to circulate internal air, creating positive pressure and inflating the bladder.

4.2 Do not leave the *solution pressure* on with the door open.

4.3 *Vacuum pressure* on a new system should measure between 10 and 12, with an airflow of around 4. The M-Vac should not be used in casework if either value drops significantly since the previous sampling.

5. Preparing the M-Vac for Use

5.1 Break open the solution bag and remove the protective cap, exposing the septum. Hang the solution bag on the door adjacent to the bladder.

5.2 Attach the vacuum hose to the M-Vac using the quick connect fitting.

5.3 Attach the solution line to the solution bag by pushing while twisting by a quarter turn.

5.4 Open the M-Vac assembly packaging and grab by the tubing.

5.5 Pull the on/off switch to the OFF position.

5.6 IMPORTANT: *Put the head of the wand into the holder.*

5.7 Grasp the blue ring (left hand), tighten the cap, loosen it, and then tighten again.

5.8 Attach the bottle to the holder with the notch facing out (blue on blue). A "fouled filter" occurs when the bottle comes off and the liquid contacts the exposed filter.

5.9 Attach the larger bore tubing.

5.10 Close the door gradually around the bladder.

5.11 Power on the M-Vac and then pressurize the system.

6. Sampling

6.1 Rock the head of the wand back and forth on the surface of the evidence item to "find flat." Keep 360 degree contact with the evidence as much as possible. If you see pools of solution on the surface, the head is not flat. Stop the liquid from flowing and vacuum over the wet areas to collect the bulk liquid. This is called a "dry pass."

6.2 Overlap when sampling. Always sample (solution flowing) in a vertical direction, moving the head forward (away from the user) and back (toward the user). Dry pass vacuuming may be done horizontally, or side to side.

6.3 Maintaining contact of the "trailing edge" of the wand head with the surface is most important. When sampling fabric, the user may have to lift the leading edge of the head to prevent gathering of the cloth in front of the wand.

7. Filtering

7.1 Remove the bottle first.

7.2 Open the filter bag.

7.3 Detach the large hose (vacuum line) and attach to port (vacuum on).

7.4 Swirl the sampling bottle and pour the liquid onto the filter.

7.5 Turn off the vacuum and reattach the hose.

7.6 Pour the filtered liquid back into the sampling bottle and repeat the filtration steps two additional times.

7.7 Release pressure before turning the vacuum back on by working the hose off or untwisting the bottle top.

7.8 If the sample is particularly dirty, use a 40um pre-filter (50mL).

7.9 The DNA is retained on the filter membrane.

7.10 When finished, remove the concentration filter from the vacuum tube and cover to dry.

8. Bardole Method for Washing DNA from Small Items

8.1 Add sterile buffer to a sterile collection bottle.

8.2 Place the evidence item in the bottle with the buffer.

8.3 Agitate using a vortex mixer.

8.4 Attach a concentration filter to the vacuum hose and initiate vacuum.

8.5 Swirl the sampling bottle and pour the liquid onto the filter.

8.6 If the evidence is heavy or sharp, trap the item with a sterile instrument to prevent potential damage to the filter membrane.

8.7 The DNA is retained on the filter membrane.

8.8 When finished, remove the concentration filter from the vacuum tube and cover to dry.

9. Preparation for DNA Testing

9.1 The dry filter membrane is cut out of the concentration filter apparatus using a sterile scalpel.

9.2 The filter membrane may be cut in half to retain a portion for future testing. In most cases, the entire filter membrane will be extracted for DNA.

9.3 The filter membrane will be cut using the scalpel or clean scissors to facilitate placement in a 2mL microcentrifuge tube.

9.4 If retention is necessary, the filter halves will be cut and placed in separate microcentrifuge tubes.

9.5 Microcentrifuge tubes will be submitted to the Biology Section as though they are epithelial DNA samples.