Deviation Request Form (DRF)

Directions: The Initiator will complete Sections A through C. Additional continuation pages can be included if necessary.

Initiator	K. Schell	**Date**	02-13-2020

A. Requested deviation applies to (Technical Procedure – include specific section):

Technical Procedure for the Identification of Plant Material and Plant Material Extracts - Version 1

5.6.6.3.2 For GC-MS analysis of plant material, soak approximately 100 milligrams of material in approximately 3 milliliters of methanol. Filter the methanol into a GC-MS vial.

B. Requested deviation:

Reduce the amount of material from approximately 100 milligrams to approximately 50 milligrams.

C. Necessity for the deviation:

Data produced from soaking approximately 100 milligrams has shown to produce very high abundances of cannabinoids, even when running on a 100 split method. This has caused carry-over on the GCMS instruments and the need to run additional blanks.

D. Technical review and Authorization (to be completed by the Quality Manager and/or Technical Leader)
Comments(to include merits and impacts):

Reducing the amount of material from 100 milligrams to approximately 50 milligrams will not affect the quality of GCMS data being produced from plant material cases, and will not affect the quality of casework.

Approved	☑	Yes	☐	No	Duration	1 year, or until next procedure revision
Signature	Amanda Battin Venable	Digitally signed by Amanda Battin Venable Date: 2020.02.13 14:22:14 -05'00'			Date	02-18-2020

E. Quality Assurance Authorization (to be completed by the Quality Manager, Forensic Scientist Manager or designee)

Acceptable within general QA guidelines and good laboratory practice?	☑	Yes	☐	No
Significant negative impact to Crime Laboratory Quality System?	☐	Yes	☑	No

Restrictions/limitations:

Effective 2/18/2020.

☑	Authorized	☐	Rejected	Signature	Timothy G. Suggs	Digitally signed by Timothy G. Suggs DN: cn=Timothy G. Suggs, o=North Carolina State Crime Laboratory, ou=Quality Manager, email=tsuggs@ncdoj.gov, c=US Date: 2020.02.14 07:00:44 -05'00'	Date	2/14/2020

Form approved for use by: Timothy G. Suggs Digitally signed by Timothy G. Suggs DN: cn=Timothy G. Suggs, o=North Carolina State Crime Laboratory, ou=Quality Manager, email=tsuggs@ncdoj.gov, c=US Date: 2014.12.19 09:01:52 -05'00'

Technical Procedure for the Identification of Plant Material and Plant Material Extracts

1.0 Purpose - This procedure specifies the required elements for the identification of plant material (not to include fungi) and plant material extracts.

2.0 Scope - This procedure applies to all plant material (not to include fungi) and plant material extract exhibits analyzed in the Drug Chemistry Sections of the State Crime Laboratory.

3.0 Definitions

- **Hashish** - Common name for the extracted resin of marijuana.
- **Performance verification –** The initial confirmation of the reliability of a previously or externally validated method or instrument.
- **Quality control (QC) check –** Periodic confirmation of the reliability of equipment, instrumentation, and/or reagents.
- **Reference material** – Material sufficiently homogeneous and stable, with reference to specified properties, which has been established to be fit for its intended use in measurement or in examination of nominal properties.

4.0 Equipment, Materials and Reagents

4.1 Equipment

- Microscope(s) –stereo and/or polarizing
- Balance
- Gas Chromatograph/Mass Spectrometer (GC-MS)

4.2 Materials and Reagents

- Marijuana/Hemp or Hashish/THC/cannabinoid reference material
- Weigh vessel
- Modified Duquenois-Levine reagent (Drug Chemistry Section Technical Procedure for Preliminary Color Tests)
- Suspected plant material/plant material extract exhibit
- Chloroform (ACS grade or higher)
- Methanol (ACS grade or higher)

5.0 Procedure

5.1 Standards and Controls - A primary or secondary reference material of marijuana/hemp and/or hashish shall be used for macro and microscopic comparison purposes.

5.2 Calibrations - N/A

5.3 Sampling - Plant material shall be sampled according to the Drug Chemistry Section Administrative Procedure for Sampling.

5.4 New Microscopes

5.4.1 New microscopes shall be installed according to the manufacturer's instructions. Refer to the user manual for each microscope model.

5.4.2 Stereomicroscopes shall be added to the FA Resource Manager, to include serial number and/or asset number.

5.4.3 See the Drug Chemistry Section Technical Procedure for Polarized Light Microscopy for new polarizing light microscopes.

5.5 Maintenance

5.5.1 Stereomicroscopes shall be serviced yearly by a certified vendor. Service records shall be maintained in the FA Resource Manager.

5.5.2 See the Drug Chemistry Section Technical Procedure for Polarized Light Microscopy for information regarding maintenance for polarizing light microscopes.

5.6 Application of Procedure on Evidence

5.6.1 Plant material shall be weighed according to the Drug Chemistry Section Technical Procedure for Balances and reported with applicable measurement assurance.

5.6.2 Plant material shall be viewed macroscopically and microscopically to verify the presence of visually recognizable morphological characteristics.

5.6.3 Macroscopic and microscopic characteristics of marijuana/hemp present in the exhibit shall be documented in the examination notes (i.e.; checking the box next to the characteristic(s) present).

5.6.3.1 An indication of hairs implies the observation of both cystolithic and glandular hairs for that exhibit, unless otherwise noted.

5.6.4 Macroscopic characteristics that may be observed include:

- Upright stalk attains a height of 3-16 feet, average 4-6 feet.
- Stalk varies in diameter up to two inches, averages less than one half inch.
- Plant has compound palmate leaves with 5-11 leaflets (usually seven), and odd in number.
- Leaf is similar in shape to a hand.
- Leaflets are pointed at both ends and vary up to about six inches length and to about 1.5 inches in width.
- Leaves are green, brown-spotted, or brown in color.
- Distinction between male and female plants is difficult except at maturity.

  Male: flowers are very prominent; mature ones shed pollen profusely.
  Female: flowers are inconspicuous and are found hidden among the small leaves at the ends of the stalk and branches.

- The plant branches at the nodes – a branch appearing immediately above each leaf. The branches occur at opposite points on the stalk with alternate pairs situated at right angles.

- Plant has a characteristic odor.
- Seeds have a lacy, mottled appearance like a melon or turtle's back.
- Seeds are ovoid in shape, mottled in color and are greenish-yellow to brown.
- Seeds are enclosed in bulbs or pods (hulls).
- One main tap root up to eight inches long. Smaller branches from the main root.

5.6.5 Microscopic Characteristics that may be observed include:

5.6.5.1 Leaves or leaflets

- Green, brown-spotted, or brown in color.
- Characteristically serrated.
- Veins end at sharp point of each serration or notch, best seen from the underside.
- Cystolithic hairs on upper side.
- Glandular hairs on lower side.
- Longer, sharper pointed hairs on underside.
- Effervescence with dilute hydrochloric acid.
- Sessile glands (i.e. trichomes without stalk) on lower epidermis.

5.6.5.2 Stems

- Fluted.
- Branches appear immediately above each leaf.
- Hairs.

5.6.5.3 Seeds (Fruit)

- Greenish-yellow to brown in color.
- Lacy, mottled appearance like a melon or a turtle's back.
- Ovoid in shape.
- Ridge around the greatest circumference.
- Inside similar to coconut meat.

5.6.5.4 Hairs

5.6.5.4.1 Cystolithic hairs

- Characteristic "warty" appearance; look like bear claws.
- Sphere of calcium carbonate at the base of the hair which effervesces in dilute hydrochloric acid.
- No plant which fails to show them can be marijuana/hemp.

5.6.5.4.2 Glandular hairs

- Wooly appearance; look like clubs with flattened, spherical heads.

5.6.5.5 Hulls (pods) - found on outside of seeds

- Green, brown or brown-spotted in color.
- Characteristically shaped.
- Cystolithic and glandular hairs on outer surface.

5.6.6 For plant material that exhibits the characteristic botanical features of marijuana/hemp, the following examination is considered an acceptable minimum criteria for positive identification:

5.6.6.1 Physical (macroscopic and microscopic) to include at least one of the following combinations of microscopic characteristics:

- Leaf/leaflets/leaf fragment(s) and hairs ***OR***
- Stem(s) and hairs ***OR***
- Seed(s) and hairs

NOTE: The indication of hairs, as noted in the combinations list above, shall include both cystolithic and glandular hairs.

AND

5.6.6.2 A positive Modified Duquenois-Levine color test. If a positive Duquenois-Levine color test cannot be obtained, see **5.6.6.3.1** (See the Drug Chemistry Section Technical Procedure for Preliminary Color Tests.)

AND

5.6.6.3 GC-MS analysis identifying either: Tetrahydrocannabinol(s) and/or Cannabidiol.

5.6.6.3.1 Retention time match to Tetrahydrocannabinol(s) and/or Cannabidiol Reference Material shall be used if a Modified Duquenois-Levine color test was not possible due to sample size or sample matrix. (See the Drug Chemistry Technical Procedure for Gas Chromatograph/Mass Spectrometry (GC-MS)).

5.6.6.3.2 For GC-MS analysis of plant material, soak approximately 100 milligrams of material in approximately 3 milliliters of methanol. Filter the methanol into a GC-MS vial.

5.6.6.4 Material identified by the criteria in **5.6.6** shall be reported as "Plant material belonging to the genus *Cannabis* containing Tetrahydrocannabinol(s) (THC)* and Cannabidiol(s) (CBD)*. Concentration of cannabinoid(s) not determined". *as determined by the analysis

5.6.7 For material that does not exhibit the characteristic botanical features of marijuana/hemp, the following shall be required:

5.6.7.1 A positive Modified Duquenois-Levine color test shall be obtained if sample size allows. If a positive Duquenois-Levine color test cannot be obtained, see **5.6.7.2.1.** (See the Drug Chemistry Section Technical Procedure for Preliminary Color Tests.)

AND

5.6.7.2 GC-MS analysis identifying either: Tetrahydrocannabinol(s) and/or Cannabidiol.

5.6.7.2.1 Retention time match to Tetrahydrocannabinol(s) and/or Cannabidiol Reference Material shall be used if a Modified Duquenois-Levine color test was not possible due to sample size or sample matrix. (See the Drug Chemistry Technical Procedure for Gas Chromatograph/Mass Spectrometry (GC-MS)).

5.6.7.2.2 For GC-MS analysis of materials satisfying **5.6.7**, no more than approximately 300 milligrams of material shall be used for analysis. Care should be taken during extractions to ensure solutions are not made overly acidic during extraction or left to sit for extended periods of time.

5.6.7.3 Material identified by the criteria in **5.6.7** shall be reported as "Tetrahydrocannabinol(s)* and Cannabidiol(s)*. Concentration of cannabinoid(s) not determined." *as determined by the analysis

5.7 Microscopic Examination of Hashish Using Chloroform

5.7.1 Chloroform can be used to aid in the visualization of plant particles of marijuana/hemp or hashish.

5.7.1.1 Marijuana/hemp or hashish cystolithic hairs look like bear claws.

5.7.1.2 For frequently seen cystolithic hairs, the marijuana/hemp or hashish standard is not required to be run with each test sample.

5.7.2 Application of Procedure on Evidence

5.7.2.1 Add a drop of chloroform to the microscope slide. View to ensure no hairs are present.

5.7.2.1.1 If hairs are present, steps will be taken until no hairs are present. This includes, but is not limited to, obtaining a new microscope slide or new solvent.

5.7.2.2 Place a small sample of suspected hashish or marijuana/hemp onto the slide.

5.7.2.3 Observe, under a relatively low magnification, using the polarizing light microscope.

5.7.2.4 The results of the microscopic examination shall be documented in the casefile.

5.7.3 Material identified by the criteria in **5.6.7** and further identified by the criteria in **5.7** shall be reported as "Tetrahydrocannabinol(s)* and Cannabidiol(s)*. Concentration of cannabinoid(s) not determined." *as determined by the analysis

NOTE: See the US Sentencing Commission Guidelines Manual for the Federal definitions of Hashish and Hashish Oil. Should the exhibit qualify under either of those definition, and there is indication the case will be prosecuted federally, the addition of "Hashish" or "Hashish Oil" shall be added to the end of the reporting statement in **5.7.3**.

5.8 Additional Reporting

5.8.1 If the net weight of the item is less than five grams, and consists of hand-rolled cigarettes or partial hand-rolled cigarettes, the paper will be included in the weight recorded/reported with applicable measurement assurance. The evidence can be cut open to expose the plant material for viewing and analysis.

5.8.1.1 For purposes of obtaining a sample for analysis, one unit shall be analyzed and reported with the weight of the paper. All other units in the population shall be left unanalyzed and no weight reported.

Example:
Description
Plastic bag containing multiple hand-rolled cigarettes.

Results
One hand-rolled cigarette was analyzed and found to contain X (see **5.6.6** or **5.6.7**).
Net weight of paper and plant material - 0.30 (+/- 0.XX) gram.

Remaining material – No chemical analysis.

5.8.2 In cases where sampling does not apply and multiple pieces of material may be needed to conduct a complete analysis, a clear description of what was analyzed shall be required.

Example:
Description
Plastic bag containing multiple pieces of hand-rolled cigarettes with minimal plant material present in each.

Results
Three pieces of hand-rolled cigarettes were analyzed and found to contain X (see **5.6.6** or **5.6.7**).
Net weight of paper and plant material – 0.50 (+/- 0.XX) gram.

Remaining material – No chemical analysis.

5.9 Calculations - N/A

5.10 Uncertainty of Measurement - See the Drug Chemistry Technical Procedure for Balances and the Drug Chemistry Procedure for Measurement Assurance.

6.0 Limitations - Not every cannabis exhibit contains every plant characteristic. The Forensic Scientist shall identify and document those that are present. The current procedures at the North Carolina State Crime Laboratory do not allow for the differentiation of "marijuana" from "hemp", as defined in North Carolina General Statues.

7.0 Safety - Mold that grows on cannabis is an inhalation hazard. Precautions (such as the use of an APR) shall be taken when handling molded plant material.

8.0 References

Marihuana Its Identification. Washington, D.C.: U.S. Treasury Department Bureau of Narcotics, United States Printing Office, 1948.

North Carolina, *General Statutes.* Article 5 "North Carolina Controlled Substances Act."

United States Sentencing Commission, *Guidelines Manual*, §3E1.1 (Nov. 2018)

Recommended methods for the identification and analysis of cannabis and cannabis products. New York: United Nations, 2009.

Nakamura, George R. and Thornton, J. I. "The Identification of Marijuana" *Journal of Forensic Science Society*, (1972), 12, 461.

User manual for appropriate stereomicroscope model(s).

9.0 Records

- FA Worksheets

10.0 Attachments - N/A

Revision History		
Effective Date	Version Number	Reason
11/25/2019	1	Original Document created from Version 11 of the now archived Technical Procedure for the Identification of Marijuana.