	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	WI-ADM-PPMS 08-02
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	2
		PAGE NUMBER	1 of 1
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	03 January 2020
		DOCUMENT TYPE	PAPER / PDF FILE
SUBJECT	APPLICATION FOR AUTHORITY TO IMPORT		

PERSON RESPONSIBLE: Administrative Officer V

MATERIALS & EQUIPMENT: N/A

STEPS:

1.0 Prepare request Letter for Authority to Import from Bureau of Import Services (BIS), Department of Trade and Industry (DTI) with the following requirements:

- 1.1 Application Form for Government Importation (LOI 1307)
- 1.2 Certificate of Liquidation of previous importation
- 1.3 Pro forma Invoice
- 1.4 Abstract of Bids
- 1.5 Notice of Award
- 1.6 Purchase Order
- 1.7 Undertaking of duly authorized representative

2.0 Forward request Letter and supporting documents to the Director for review and approval.

3.0 Request cash for payment of application fee from Disbursing Officer.

4.0 Pay application fee for Authority to Import upon submission of all needed requirements at DTI, Makati.

5.0 Receive DTI Official Receipt (OR) and submit to Disbursement Officer for liquidation.

6.0 Follow-up status of Authority to Import after five (5) working days thru telephone.

7.0 Once approved, pick up Authority to Import together with the Pro forma Invoice, stamped “cleared” from BIS-DTI.

8.0 Attach approved Authority to Import and Pro forma Invoice to Application for Letter of Credit opening / Telegraphic Transfer.

SAFETY REQUIREMENT: N/A

DOCUMENTED INFORMATION: DULY SIGNED SUPPLIER’S QUOTATION

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	WI-ADM-PPMS 08-05
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	1
		PAGE NUMBER	1 of 2
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	03 January 2020
SUBJECT	**APPLICATION TO PURCHASE FOREIGN EXCHANGE FOR PAYMENT OF MEMBERSHIP, TRAINING FEE, TESTING AND ANALYSIS**		

PERSON RESPONSIBLE: Administrative Officer V

MATERIALS & EQUIPMENT: N/A

STEPS:

A. Application thru Telegraphic Transfer

1.0 Request for quotation in peso to Land Bank of the Philippines.

2.0 Prepare P.O./W.O. and D.V. upon receipt of the quotation.

3.0 Prepare Application to Purchase Foreign Exchange to LBP with the following attachments:
- Application Letter
- Proforma Invoice
- LBP Quotation
- Organizations'/company's bank details
- Copy of Approved P.O./W.O.
- Check payment

4.0 Receive acknowledgment receipt.

B. Application thru Demand Draft

1.0 Request for quotation in peso to Land Bank of the Philippines.

2.0 Prepare P.O./W.O. and D.V. upon receipt of the quotation.

3.0 Prepare Application to Purchase Foreign Exchange to LBP with the following attachments:
- Application Letter
- Proforma Invoice
- LBP Quotation
- Organizations'/company's bank details
- Copy of Approved P.O./W.O.
- Check payment

3.1 Upon receipt of Demand Draft from LBP, prepare Letter to be signed by the Chief, ADM and mail to concerned supplier/agency abroad.

4.0 Receive acknowledgment receipt.

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	**WI-ADM-PPMS 08-05**
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	**1**
		PAGE NUMBER	**2 of 2**
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	**03 January 2020**
SUBJECT	**APPLICATION TO PURCHASE FOREIGN EXCHANGE FOR PAYMENT OF MEMBERSHIP, TRAINING FEE, TESTING AND ANALYSIS**		

SAFETY REQUIREMENT: N/A

DOCUMENTED INFORMATION: Approved Purchase / Work Order
Land Bank Peso Quotation

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	WI-ADM-PPMS 08-04
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	1
		PAGE NUMBER	1 of 1
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	03 January 2020
		DOCUMENT TYPE	PAPER / PDF FILE
SUBJECT	IMPORTATION OF GOODS PROCEDURE		

PERSON RESPONSIBLE: Administrative Officer V

MATERIALS & EQUIPMENT: N/A

STEPS:

1.0 Request for quotation in peso to Land Bank of the Philippines.

2.0 Prepare P.O. and D.V. upon receipt of LBP quotation.

3.0 Apply for Authority to Import at Bureau of Import Services (BIS), DTI with attached Proforma Invoice duly signed by the supplier and the Agency Head and all other needed requirements.

4.0 Prepare Application to Purchase Foreign Exchange to LBP with the following attachments:
- 4.1 Application Letter
- 4.2 Proforma Invoice
- 4.3 BIS,DTI Authority
- 4.4 LBP Quotation
- 4.5 Supplier's bank details
- 4.6 Approved P.O.
- 4.7 Affidavit duly notarized
- 4.8 Certification duly notarized
- 4.9 Letter of Undertaking duly notarized
- 4.10 Check payment

5.0 Receive Notice of Arrival from courier.

6.0 Prepare letter of authority of broker to get copy of original documents from the concerned carrier / vessel and to facilitate release of shipment.

7.0 Prepare letter to Bureau of Custom and pay custom duties and taxes and other incidental expenses due thereon.

8.0 Receive goods/items.

SAFETY REQUIREMENT: N/A

DOCUMENTED INFORMATION: Letter of Instruction No. 1307
Tariff and Customs Code of the Philippines (TCCP)
Land Bank Application for Foreign Exchange

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	WI-ADM-PPMS 08-06
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	2
		PAGE NUMBER	1 of 4
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	03 January 2020
		DOCUMENT TYPE	PAPER / PDF FILE
SUBJECT	**ISSUANCE, CONTROL AND DISPOSAL OF ITDI PROPERTY**		

PERSON RESPONSIBLE: Administrative Officer III
Administrative Officer I
Administrative Assistant II
Administrative Aide VI
BAC Secretariat

MATERIALS & EQUIPMENT: N/A

STEPS:

A. ISSUANCE

1.0 Prepare issuance documents such as Inventory Custodian Slip (ICS) or Acknowledgement Receipt for Equipment (ARE), and Inspection and Acceptance Report (IAR).

Note: ICS/ARE shall be signed and dated by the Head Property & Procurement Section under "Received from" portion and the recipient or user of the property shall acknowledge receipt by signing under "Received by" portion.

2.0 Input in the property database the newly acquired equipment/property for preparation of inventory report.

3.0 File ICS/ARE in the end-user's file folder alphabetically for ready reference.

In case of retirement/resignation of end-user

1.0 Prepare a list of end-user's accounted equipment/property.

2.0 Assist the end-user to determine the status of equipment/property as to transfer, for condemnation, or for return.

3.0 If transfer, prepare new ICS/ARE to be signed and dated by the resignee/retiree under "Received from" portion and the recipient or new user under "Received by" portion.

For condemnation/return equipment/property, acknowledge the receipt of said equipment/property by issuing Acknowledgement Receipt for Return Equipment (ARRE) conformed by the end-user and noted by the division chief.

4.0 Mark/stamp "Condemned, "Transfer", or "Return" on the ICS/ARE in end-user's file folder and update in the property database.

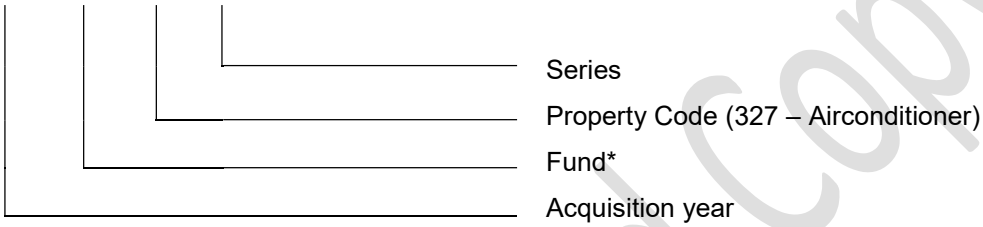
Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

5.0 File new ICS/ARE to recipient's file folder.

B. CONTROL

1.0 Assign property number to newly acquired ITDI equipment/property following this format:

11 – GFE – 327 – 1000



* GFE – General Fund Equipment, GFS – General Fund Semi-Expendable,
GIAE – Grant-in-Aids Equipment, GIAS – Grant-in-Aids Semi-Expendable

2.0 Record newly acquired ITDI property in the Equipment/Property Index Card that includes the following details: Property Number, Amount, Supplier, Date Acquired, Purchase Order Number, Funds source, End-user, and Division.

3.0 Prepare and affix property sticker duly signed by the Inventory Committee members, to the equipment/property with the following details: Location, End-user, Property Number, Item Description, Condition, and Date Acquired.

Physical Count/Inventory of ITDI Property

1.0 Set meeting with the Inventory Committee members.

2.0 Prepare schedule of inventory activities.

3.0 Prepare a master list of equipment/property indicating the period covered.

4.0 Conduct physical count of all ITDI equipment/property per division, per end-user.

4.1 Check condition, status and location of item/equipment and note in the master list the changes of its condition.
4.2 List equipment/property found without property sticker/label within the vicinity.

5.0 Make necessary changes in the ITDI property database.

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

5.1 Update the status of counted ITDI properties.
5.2 Separate report for disposed/transferred/donated properties.
5.3 Identify each item found on the list items without property sticker and update the database as necessary.

6.0 Prepare Report on the Physical Count of Property, Plant and Equipment (RPCPPE) per division, per individual subject for approval of the Head of the Agency in triplicate copies.

7.0 Secure signature of Inventory Committee Chairman and Supply Officer in the RPCPPE. Chief Administrative counter sign and approve by the Director.

8.0 Submit RPCPPE one (1) copy each to COA and Accounting Section for reconciliation and file the third copy for PPMS use/reference.

C. DISPOSAL

1.0 Receive unserviceable equipment/property from end-user, issue ARRE and place it in the provided warehouse.

2.0 Mark/Stamp “Unserviceable” or “Condemned”, date and location on the ICS/ARE and make necessary changes in the property database.

3.0 Prepare Inventory and Inspection Report on Unserviceable Property (IIRUP) and indorse report to Disposal Committee for inspection and approval.

4.0 Take pictures of the properties for disposal duly classified per lot as follows: metals, wood, plastic, and glass.

5.0 Submit IIRUP, Appraisal Report and pictures to COA for further inspection of the technical inspector.

6.0 Prepare invitation to Auction Sale and publish invitation in conspicuous places and at the ITDI web page.

7.0 Assist interested bidders in the inspection of unserviceable property and issue Certificate of Inspection.

8.0 As to BAC Secretariat, issue canvass form to complying bidders, conduct bidding of Auction Sale, and prepare Notice of Award.

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

9.0 Serve Notice of Award to winning bidder.

10.0 Supervise the winning bidder in the hauling of unserviceable properties witnesses by the Disposal Committee member/s.

11.0 Submit IIRUP to Accounting Section, FMD with attached copy of the following:

- Appraisal Report
- Official Receipt of Sale
- Abstract of Bids
- Bid Bonds
- Copy of Notice of Award
- Transmittal Letter

12.0 Separate report of disposed properties in the ITDI property database.

SAFETY REQUIREMENT: N/A

DOCUMENTED INFORMATION: Training Handbook on Property & Supply Management System

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	**WI-ADM-PPMS 08-01**
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		PAGE NUMBER	**1 of 1**
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	**03 January 2020**
		DOCUMENT TYPE	**PAPER / PDF FILE**
SUBJECT	**PURCHASE OF COMMON SUPPLIES AND MATERIALS FROM PROCUREMENT SERVICE, DBM**		

PERSON RESPONSIBLE: Administrative Officer I

MATERIALS & EQUIPMENT: N/A

STEPS:

1.0 Prepare Purchase Request of common office supplies and materials for one quarter consumption.

2.0 Forward prepared PR to Administrative Officer V for review and signature then forward to Chief Administrative for approval.

3.0 Record in the logbook then release to Budget for fund allocation.

4.0 If PR is approved, prepare Agency Procurement Request (APR) in three (3) copies and Obligation Receipt (OR) in two (2) copies and one copy of Disbursement Voucher (DV). Attach approved PR and latest price list provided by Procurement Service, DBM.

5.0 Forward to AOV to check the correctness and completeness of documents and affix signature on APR and initial on DV.

6.0 Route the documents to the following responsible persons:

a. Chief, Administrative Division for approval and signature of APR and DV.
b. Accounting Section, FMD for pre-audit and attachment of ALOBS.
c. Director (if transaction is above P 300,000.00 pesos) or Deputy Director (if transaction is below P 300,000.00 pesos) for final approval.
d. Cashier, FMD for preparation of Check.

7.0 Once Check is approved, serve APR and payment to Procurement Service, DBM. Secure copy of APR and OR and ask for delivery or pick-up date.

SAFETY REQUIREMENT: N/A

DOCUMENTED INFORMATION: N/A

Prepared by:	Approved by:
Administrative Officer V, ADM-PPMS	Chief, ADM

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	**WI-ADM-PPMS 08-03**
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	**2**
		PAGE NUMBER	**1 of 1**
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	**03 January 2020**
		DOCUMENTE TYPE	**PAPER / PDF FILE**
SUBJECT	**SUPPLIER PERFORMANCE RATING**		

PERSON RESPONSIBLE: Administrative Officer V / PPMS Head

MATERIALS AND EQUIPMENT: N/A

DEFINITION OF TERMS:

Listed - a status of supplier wherein accreditation is maintained.
Conditional - a status of supplier with one to three times below passing mark.
Delisted - a status of supplier disqualified and removed from the List of Qualified Suppliers.

STEPS:

1.0 PPMS Head will rate all suppliers with Purchase Order requisitioned by the division. Use Supplier Performance Sheet (ADM-PPS F3). Indicate the corresponding PO Number and date of PO on the back portion of Supplier Performance Sheet.

2.0 Compute the average score per transaction and determine the general average score on annual basis using the following:

Where:

E (Excellent)	=	5.0
VG (Very Good)	=	Below 5.0 to 4.0
S (Satisfactory)	=	Below 4.0 to 3.0
F (Fair)	=	Below 3.0 to 2.0
P (Poor)	=	Below 2.0

3.0 Using said data, check the appropriate box on the front page of Supplier Performance Sheet and indicate the general average score together with the corresponding final rating.

4.0 Passing Mark is set at 3. A rating lower than 3 puts the supplier in a conditional status. A supplier with more than 3 times below passing mark is disqualified and delisted from the List of Accredited Supplier wherein correspondence is sent informing of their status of performance.

5.0 The List of Accredited Suppliers is updated annually whenever there are changes.

6.0 A delisted supplier may apply for re-accreditation after 3 months.

7.0 A Report on Supplier's Performance is prepared annually.

SAFETY REQUIREMENT: N/A

DOCUMENTED INFORMATION: Purchase / Work Order

Prepared by:	Approved by:
Administrative Officer V, PPMS	Chief, ADM

PERSON RESPONSIBLE: *Science Research Analyst,*
Science Aide with supervision of Technical Staff

MATERIALS AND EQUIPMENT:

Plant *material,* fresh, 3.0 kg. except Manila elemi gum
Laboratory *scale* water distillation set-up consisting of:
- Erlenmeyer Flask, 6 L.
- Clevenger *tube/oil separator*
- Condenser
- Rubber tubing
- Submersible pump
- Electric Stove
- Wire gauze
- Cork
- Cotton
- Pail/*basin*
- *Ice*
- *Vial/amber bottle (narrow mouth)*
- *Funnel*
- *Dropper*
- *Filter paper*
- Sodium sulfate, anhydrous
- *Tap* water

STEPS:

1.0 Preparation of sample.
- 1.1 If flowers, distill as fresh.
- 1.2 If leaves, air-dry for 2-3 days, then cut.
- 1.3 If rhizomes/bark, cut, slice, then air-dry.
- 1.4 Remove wilted/brown/fermented *plant material,* weeds *and* other extraneous matter.

2.0 Water distillation of essential oils.
- 2.1 Weigh the plant material and place it in the Erlenmeyer flask. Add *tap* water to more than half the level of the material. Connect the Clevenger tube, then the condenser.
- 2.2 *Fill the pail or basin with tap water until the submersible pump is fully submerged in the water.*
- 2.3 Connect the inlet/*outlet* of the condenser to *the* water submersible pump. Turn on the pump. Keep the water running throughout the operation. *Add ice to the water in the pail when the water in the Erlenmeyer flask started to boil to keep the condenser cooled throughout the extraction.*
- 2.4 Turn on the stove. When the water boils, the steam rises together with the essential oil vapors. These are led to the *cooled* condenser where they are converted into a liquid (condensation).
- 2.5 Since water and oil are mutually insoluble, two layers will be formed in the Clevenger tube. Since most of the oils are lighter than water, these float at the upper layer while water stays at the bottom.

2.6 Collect the oil in a vial thru a small outlet at the Clevenger tube.
2.7 Purify the oil using anhydrous sodium sulfate to remove traces of water and other impurities. Let stand overnight or for a few hours. Decant the oil and transfer in another vial preferably amber bottle or if clear, wrap the vial with a dark cover or aluminum foil.
2.8 Place the vial with the oil in the refrigerator or store in a cool place.

SAFETY REQUIREMENTS: Wear appropriate PPEs.

REFERENCE DOCUMENT:

- EX-CED-PS-024 Training Manual on Production of Essential Oils

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	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	2
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SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	1 September 2016
SUBJECT	**PREPARATION OF CONCENTRATED CRUDE PLANT EXTRACT**		

PERSON RESPONSIBLE: *Science Research Analyst,*
Science Aide with supervision of Technical staff

MATERIALS AND EQUIPMENT:

Plant sample, *fresh, 1.0 Kg/dried, 500 g*
Ethanol (95%)/organic solvent/ distilled water, 2.0 L
Soxhlet *extraction apparatus*
Rotary evaporator *with vacuum pump*
Water submersible pump
Water Bath
Erlenmeyer flask, 4L
Evaporating dish
Filtration set-up (iron stand, iron ring, funnel, *filter* paper, receiving flask)
Amber bottle (wide mouth)

STEPS:

1.0 Preparation of *p*lant *s*ample.
- 1.1 If leaves, air-dry for 2-3 days, then cut.
- *1.2* If rhizomes/bark, cut, slice, then air-dry.

2.0 Extraction
- 2.1 By maceration in cold condition.
  - 2.1.1 Soak the sample in the solvent for *24-48 hours*, stirring the mixture *occasionally*.
  - *2.1.2 Filter the mixture and concentrate the filtrate using rotary evaporator at 60 °C under vacuo to about 20 mL.*
  - *2.1.3 If semi-solid or solid extract is required, transfer the extract from the rotary evaporator to an evaporating dish and concentrate further using water bath at 60 °C.*
  - *2.1.4 Collect the extract in an amber bottle and stopper tightly. Label the extract.*
- 2.2 By Soxhlet apparatus at required temperature.
  - 2.2.1 Place the ground plant *sample* in a bag of muslin cloth or filter paper.
  - *2.2.2 Put the bag in the Soxhlet apparatus and add the solvent by running it through the bag of plant sample.*
  - *2.2.3 Allow the plant sample to soak in the solvent overnight.*
  - *2.2.4 Extract the plant sample in the Soxhlet apparatus for six hours at the required temperature.*
  - *2.2.5 Collect the extract and filter.*
  - *2.2.6 Concentrate using rotary evaporator and continue with 2.1.3 and 2.1.4.*

Prepared by:	Approved by:
Senior Science Research Specialist, CED-PS	Chief, CED

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	**WI-CED-PS 05-02**
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	***2***
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SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	**1 September 2016**
SUBJECT	**PREPARATION OF CONCENTRATED CRUDE PLANT EXTRACT**		

SAFETY REQUIREMENT: Use of PPE.

***REFERENCE DOCUMENT*:**

- EX-CED-PS-009 Remington's Pharmaceutical Sciences, 18th edition
- WI-CED-PS 05-01 Extraction of Essential Oils

Prepared by:	Approved by:
Senior Science Research Specialist, CED-PS	Chief, CED

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	WI-CED-PS 05-03
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	1
		PAGE NUMBER	1 of 3
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	1 September 2016
SUBJECT	**IDENTIFICATION OF ESSENTIAL (VOLATILE) OILS USING DANI-GC 1000**		

PERSON RESPONSIBLE:

Senior Science Research Specialist
Science Research Analyst

MATERIALS AND EQUIPMENT:

DANI-GC
Ultra High Purity Helium
Ultra High Purity Oxygen
Ultra High Purity Nitrogen
Instrument Grade Air
Capillary column
(depends on the volatile oil to be analyzed)
Syringe, 01 to 1 uL
Essential (volatile) oil standard
Essential (volatile) oil to be analyzed

STEPS:

1.0 Preparation of materials.
- Prepare a set of standards for identification or quantification.
- Ensure gauge of gases are above 500 psi.

2.0 START-UP

2.1 Fully OPEN gases (counterclockwise). Should be 60 psi.
- Ultra High Purity Nitrogen
- Ultra High Purity Hydrogen
- Instrument Grade Air
- Ultra High Purity Helium

2.2 Circuit breaker should be in UPRIGHT position.
2.3 In the UPS, wait for the number 888 to appear then press and hold the ON button until the "beep" stops. Wait for the number 220 to appear before switching ON the extension cord. (There will be a click sound.) Computer then will automatically turn on.
2.4 Turn ON GC. (Lever at the back of GC should be in upright position. There will be a click sound.)
2.5 Wait for a few minutes before pressing ENTER on the GC.
2.6 On the deskstop, wait for all the icons to appear then double click CLARITY icon.
2.7 CLARITY window will open, click LOG-IN.
2.8 A window will open asking to enter username, choose OK.
2.9 A window will open asking to send method to instrument, choose NO.
2.10 Instrument Method window will open, click FILE then click OPEN METHOD and choose a method:

- For Routine Conditioning choose Routine Conditioning SPME ICS.MET (routine conditioning method depends on the type of capillary column connected, use this method every time the GC was turned-on)
- For Prolong Conditioning choose Prolonged Conditioning SPME ICS.MET (prolonged conditioning method depends on the type of capillary column connected, use this method when the GC was not turned-on for a long time)

2.11 A window will open asking to send method to instrument, choose YES.
2.12 In the Instrument Method window, move the cursor to the GC icon and choose CONTROL (keypad w/ hand), another window will open and check if the method you send to the GC is right otherwise modify or create a method.
2.13 In the Instrument Method window, click SINGLE ANALYSIS icon (vial w/syringe) and write a filename then click OK.
2.14 In the Instrument Method window, move the cursor to the GC icon and choose DEVICE MONITOR, DEVICE MONITOR window will open.
2.15 Check in the DEVICE MONITOR window if the GC is READY.
2.16 In the Instrument Method window, click the DATA ACQUISITION icon (monitor w/ chromatogram), DATA ACQUISITION window will open.
2.17 In the DATA ACQUISITION window, click ANALYSIS then choose SET ZERO.
2.18 In the DEVICE MONITOR window check again if the GC is READY then press START on the GC.
2.19 After conditioning, sample analysis can now be started.

3.0 SAMPLE ANALYSIS

3.1 In the Instrument Method, click FILE then click OPEN METHOD and choose a method. (Method depends on the volatile oil to be analyzed.)
3.2 A window will open asking to send method to instrument, choose YES.
3.3 In the Instrument Method window, move the cursor to the GC icon and choose CONTROL (keypad w/ hand), another window will open and check if the method you send to the GC is right otherwise modify or create a method.
3.4 In the Instrument Method window, click SINGLE ANALYSIS icon (vial w/syringe) and write a filename then click OK.
3.5 In the Instrument Method window, move the cursor to the GC icon and choose DEVICE MONITOR, DEVICE MONITOR window will open.
3.6 Check in the DEVICE MONITOR window if the GC is READY.
3.7 In the Instrument Method window, click the DATA ACQUISITION icon (monitor w/ chromatogram), DATA ACQUISITION window will open.
3.8 In the DATA ACQUISITION window, click ANALYSIS then choose SET ZERO.

4.0 SHUTDOWN

4.1 In the INSTRUMENT METHOD window, click FILE then click OPEN METHOD and choose SHUTDOWN.MET method.
4.2 A window will open asking to send method to instrument, choose YES.

4.3 Check in the DEVICE MONITOR, if FID TEMP is LESS THAN 200°C then it is OK to shutdown.
4.4 Close CHROMATOGRAM, DATA ACQUISITION, DEVICE MONITOR and INSTRUMENT METHOD window.
4.5 Close CLARITY window.
4.6 Log off computer.
4.7 Shutdown computer.
4.8 Turn off GC (lever at the back).
4.9 Turn off extension cord.
4.10 In the UPS, press and hold the OFF button until the "beep" stop then wait for number 888 to appear before pulling down the circuit breaker (should be in horizontal position). (There will be a loud beep, signal that power supply is cut-off.)
4.11 Close gases (clockwise).

SAFETY REQUIREMENT: Use of PPE.

REFERENCE DOCUMENT:

- EX-CED-PS-025 Instruction Manual: DANI-GC 1000

PERSON RESPONSIBLE:

Supervising Science Research Specialist,
Senior Science Research Specialist,
Science Research Analyst
Science Aide

MATERIALS AND EQUIPMENT:

Plant material
Solvents for sample preparation/extraction
Reagents for tests/analyzer
Filtration Set-up
Water Bath
Evaporating dish
Test tubes
Test tube rack
Separatory funnel
Funnel
Filter paper
Beakers
Erlenmeyer flask
Stirring rod
Grinder (Wiley)/*Blender/Osterizer*
Drying Oven
Rotary evaporator with vacuum pump
Spatula
Graduated Cylinder
NaCl
Dragendorff's reagent
Mayer's reagent
Ferric chloride T.S.
Distilled water
5% Na_2CO_3
Dichloromethane
Acetic anhydride T.S.
Sulfuric acid, concentrated
n-Hexane
80% ethanol
Hydrochloric acid concentrated
2 M Hydrochloric acid
Magnesium ribbon
Benzene
28% Ammonia solution

STEPS:

1.0 Extraction

1.1 *Extraction by maceration is done in the cold. Soak/macerate the plant material in the solvent for 48 hours*, stirring the mixture once in a while. *Filter the mixture and concentrate using rotary evaporator at 60 °C under vacuum and further concentrate using water bath at 60 °C to obtain a solid or semi-solid extract.*

2.0 Analysis. Use the desired / needed aliquot extract to accomplish the different analytical tests.

2.1 Test for alkaloids *(Preliminary)*
- 2.1.1 Add five (5) mL 2M HCl to the extract.
- 2.1.2 Heat the mixture over water bath with stirring *for 5 minutes*.
- 2.1.3 Cool the solution.
- 2.1.4 Add a small amount of NaCl to the solution to prevent false positive result.
- 2.1.5 Stir and filter the solution.

2.1.6 Wash the residue with enough 2M HCl until the filtrate reached 5 mL volume.
2.1.7 Add 2-3 drops of Dragendorff's reagent to 1 mL filtrate. Formation of orange precipitate indicates the presence of alkaloids.
2.1.8 Add 2-3 drops of Mayer's reagent to another 1 mL of filtrate. Formation of white precipitate indicates the presence of alkaloids.
2.1.9 Describe the results further as:
(+) - Slight turbidity
(++) - Definite turbidity
(+++) - Heavy precipitation

2.2 *Test for alkaloids (Confirmatory)*
2.2.1 Add enough 28% ammonia solution to the remaining three mL extract until the solution is alkaline.
2.2.2 Extract the alkaline solution three times with 10 mL dichloromethane. (Reserve the upper alkaline aqueous layer for the test of quaternary bases.)
2.2.3 Combine the dichloromethane extracts and evaporate to dryness.
2.2.4 Take up the dichloromethane residue with five mL of 2M HCl and stir over steam bath for 2 minutes.
2.2.5 Cool the solution.
2.2.6 Filter and divide the filtrate into two equal portions.
2.2.7 Test each portion separately with Dragendorff's and Mayer's reagents. Formation of orange precipitate indicates the presence of alkaloids and formation of white precipitate indicates the presence of alkaloids.
2.2.8 Record results as follows:
(+) - Slight turbidity
(++) - Definite turbidity
(+++) - Heavy precipitation

2.3 Test for fats and oils
2.3.1 Moisten pieces of filter paper with the extract.
2.3.2 Dry the moistened pieces of filter paper with the extract. A greasy/*oily* appearance after drying indicates the presence of fats and oils.

2.4 Test for quaternary bases and/or amine oxide
2.4.1. Acidify the aqueous alkaline solution from the confirmatory test (2.1.2) with 2M HCl.
2.4.2. Filter and divide the filtrate into two equal portions.
2.4.3. Test each of the filtrate separately Dragendorff's and Mayer's reagents. A score of (++) or (+++) in both tests maybe taken as an indication of the presence of quaternary bases and/or amine oxide.

2.5 Test for tannins
2.5.1 Extract the alcoholic extract with hot water and filter.

2.5.2 Test the filtrate with ferric chloride T.S. Dark colored precipitate indicates the presence of tannins. A blue-black color indicates the presence of hydrolyzable tannins, while a brownish-green color may indicate the presence of condensed tannins.

2.6 Test for saponins

2.6.1 Dissolve the alcoholic extract in about 10 mL distilled water in test tube and stopper.

2.6.2 Shaken vigorously for 30 seconds and allow to stand for 10 minutes. Formation of a "honeycomb" froth greater than 2 cm height from the surface of the liquid *that* persisted after 10 minutes may indicate the presence of saponins.

2.7 Test for Free Fatty Acid

2.7.1 *For plant extracts with poor frothing effect (from test for saponins),* add a few drops of 5% Na_2CO_3 solution. *Formation of dense and stable froth indicates the presence of free fatty acid.*

2.8 Test for unsaturated Steroids and Triterpenes

2.8.1 Dissolve a small amount of the substance in *dicloromethane* and treat with acetic anhydride.

2.8.2 Add concentrated sulfuric acid. A bluish green to dark green, red, pink, purple or violet color may be observed which indicate the presence of unsaturated steroids and/or triterpenes.

2.9 Test for 2-deoxysugar

2.9.1 Defat extract with hexane repeatedly until most of the colored pigments have been removed.

2.9.2 Warm the defatted extract to remove the residual hexane.

2.9.3 Add three mL of 1.0% $FeCl_3$ solution to the extract.

2.9.4 Transfer the mixture to a test tube. With the test tube in an inclined position, add cautiously 1.0 mL of conc. sulfuric acid letting the the acid run along the sides of the tube.

2.9.5 *Allow* the mixture to stand *and observe.* A reddish-brown color which may turn blue or purple indicates the presence of 2-deoxysugars.

2.10 Test for Flavonoid

2.9.2 Defat extract with hexane and discard the hexane extract.

2.9.3 Take the residue with 10 mL of 80% ethanol.

2.9.4 Filter the solution and divide into three (3) test tubes.

2.9.5 One test tube will serve as the control.

2.9.6 Treat the next test tube with 0.5 mL conc. hydrocholoric acid and observe the color change. Warm in a water bath for 15 minutes and note the color change. *A strong red or purple color indicates the presence of Leucoanthocyanins.* (Bate – Smith & Metcalf Test)

2.9.7 Treat the third test tube with 0.5 mL conc. HCl and add 3-4 pieces of magnesium turnings. Observe the color change within 10 minutes. *The formation of colors ranging*

from ornage to red to crimson and magenta and occasionally to green or blue indicates the presence of –benzopyrone nucleus. (Wilstatter "Cyananidin" Test).

2.10 Test for Anthraquinones

2.10.1 Add 10 mL of distilled water to 1 g plant extract.
2.10.2 Filter and discard the residue.
2.10.3 Extract the aqueous filtrate twice with 5 mL portions of benzene.
2.10.4 Combine the benzene extracts and divide into two portions.
2.10.5 Reserve one portion as control.
2.10.6 Treat the other portion with 5 mL ammonia solution and shake.
2.10.7 Compare the 2 test tubes. A red coloration in the lower ammoniacal layer may indicate the presence of anthraquinones.

SAFETY REQUIREMENT: Use of PPE.

REFERENCE *DOCUMENT*:

- EX-CED-PS-022 A Guidebook to Plant Screening: Phytochemical and Biological, Revised Edition
- WI-CED-PS 05-02 Preparation of Concentrated Crude Plant Extract

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	**WI-CED-PS 05-05**
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	*3*
		PAGE NUMBER	**1 of 1**
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	**1 September 2016**
SUBJECT	**PREPARATION AND GRINDING OF PLANT MATERIAL**		

PERSON RESPONSIBLE: Science Aide

MATERIALS AND EQUIPMENT:

Plant material to be prepared, 3kg
Heavy - duty Mill (Wiley)
Drying Oven
Plastic bag
Drying rack
Sieve of different meshes

STEPS:

1.0 Preparation of sample

1.1 If leaves, air-dry for 2-3 days, then cut.
1.2 If rhizomes/bark, cut, slice, then air-dry.
1.3 Dry the material in oven or air–dry until crisp/brittle.

2.0 Grinding

2.1 Continuously feed the mill with dry sample, taking into consideration the sieve size that is being used and required by the client for powder size.
2.2 Collect the ground plant material into a receiving plastic bag.
2.3 Sieve the powder manually or mechanically to produce a uniform mesh size.

SAFETY REQUIREMENT: Use of PPE.

REFERENCE DOCUMENT:

- EX-CED-PS-027 Instruction Manual: Heavy-duty Mill
- WI-CED-PS 05-01 Extraction of Essential Oils

Prepared by:	Approved by:
Senior Science Research Specialist, CED-PS	Chief, CED

	DEPARTMENT OF SCIENCE AND TECHNOLOGY INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE	DOCUMENT CODE	WI-CED-PS 05-06
	WORK INSTRUCTIONS MANUAL	REVISION NUMBER	2
		PAGE NUMBER	1 of 1
SECTION	PRODUCT REALIZATION	EFFECTIVITY DATE	1 September 2016
SUBJECT	**CONCENTRATION OF PLANT MATERIAL**		

PERSON RESPONSIBLE: *Science Research Analyst,*
Science Aide with supervision of Technical staff

MATERIALS AND EQUIPMENT:

Plant extract, 3L
Rotary evaporator with *vacuum pump*
Water submersible pump
Vacuum pump
Water bath
Evaporating dish
Spatula
Amber bottle *(wide mouth)*

STEPS:

1.0 Fill the round bottom flask with *plant extract* to half the *volume* of the flask and place in rotary evaporator, setting the required temperature and pressure for the solvent used.

2.0 Turn on the *rotary evaporator with the necessary accessories and concentrate the extract* until the solvent is removed from the *plant extract.*

3.0 The solvent is collected into a container as recovered solvent.

4.0 Transfer the concentrated *plant* extract (about 20mL) into an evaporating dish and *continue concentration* in water bath at 50 ^{0}C – 60 ^{0}C to remove residual solvent. *A semi-solid or solid extract was peoduced.*

SAFETY REQUIREMENT: Use of PPE.

REFERENCE DOCUMENT:

- EX-CED-PS-028 Instruction Manual: Rotary Evaporator
- EX-CED-PS-022 A Guidebook to Plant Screening: Phytochemical and Biological, Revised Edition

Prepared by:	Approved by:
Senior Science Research Specialist, CED-PS	Chief, CED