

APPENDICES

APPENDIX A: PERMITS AND LETTERS

Parental Consent



Kalayaan Ave., Brgy. Combo, Makati City
Mikati Science High School
S.Y. 2022-2023

PARENTAL CONSENT

I, Angelita O. Suyat, am allowing my son, John Mikko O. Suyat from Grade 12-Del Mundo to leave his class on February 16, 20, 21, and 22 to conduct their study entitled Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*). It will be understood that he will not return to her class during the days on which they are excused. It will also be understood that my daughter will be absent from his classes during the experimentation period and that she must comply with her missed requirements.

In addition, I am allowing my daughter to conduct the Phytochemical Analysis of their guyabano extract for their research within the school premises on Saturday, February 18.

Moreover, I am also allowing my son to handle chemicals and brown dog ticks, in a safe environment while wearing proper laboratory gear, for I acknowledge that this is part of their overall study.

Warm regards,

Angelita O. Suyat



Kalayaan Ave., Brgy. Combo, Makati City
Mikati Science High School
S.Y. 2022-2023

PARENTAL CONSENT

I, Karen S. Aguenza, am allowing my daughter, Bernadette Kimberly S. Aguenza from Grade 12-Del Mundo to leave her class on February 16, 20, 21, and 22 to conduct their study entitled Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*). It will be understood that she will not return to her class during the days on which they are excused. It will also be understood that my daughter will be absent from her classes during the experimentation period and that she must comply with her missed requirements.

In addition, I am allowing my daughter to conduct the Phytochemical Analysis of their guyabano extract for their research within the school premises on Saturday, February 18.

Moreover, I am also allowing my daughter to handle chemicals and brown dog ticks, in a safe environment while wearing proper laboratory gear, for I acknowledge that this is part of their overall study.

Warm regards,

Karen S. Aguenza



Kalayaan Ave., Brgy. Combo, Makati City
Mikati Science High School
S.Y. 2022-2023

PARENTAL CONSENT

I, Janice C. Alberto, am allowing my daughter, Angela Nicole C. Alberto from Grade 12-Del Mundo to leave her class on February 16, 20, 21, and 22 to conduct their study entitled Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*). It will be understood that she will not return to her class during the days on which they are excused. It will also be understood that my daughter will be absent from her classes during the experimentation period and that she must comply with her missed requirements.

In addition, I am allowing my daughter to conduct the Phytochemical Analysis of their guyabano extract for their research within the school premises on Saturday, February 18.

Moreover, I am also allowing my daughter to handle chemicals and brown dog ticks, in a safe environment while wearing proper laboratory gear, for I acknowledge that this is part of their overall study.

Warm regards,

Janice C. Alberto



Kalayaan Ave., Brgy. Combo, Makati City
Mikati Science High School
S.Y. 2022-2023

PARENTAL CONSENT

I, Claire Macale, am allowing my son, Lee Ramzes M. Ibañez from Grade 12-Del Mundo to leave his class on February 16, 20, 21, and 22 to conduct their study entitled Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*). It will be understood that he will not return to his class during the days on which they are excused. It will also be understood that my son will be absent from his classes during the experimentation period and that he must comply with her missed requirements.

In addition, I am allowing my son to conduct the Phytochemical Analysis of their guyabano extract for their research within the school premises on Saturday, February 18.

Moreover, I am also allowing my son to handle chemicals and brown dog ticks, in a safe environment while wearing proper laboratory gear, for I acknowledge that this is part of their overall study.

Warm regards,

Claire Macale

Excuse Letter



Kalayaan Ave., Brgy Cembo, Makati City
Makati Science High School
S.Y. 2022-2023

February 13, 2023,

To whom it may concern:

Good day!

We, the sixth research group from Grade 12-Del Mundo, with a study titled **Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*)**, will conduct our data collection process starting February 16, 2023. Unfortunately, the experimentation procedure will coincide with school hours as it will last a week.

In line with this, we ask permission to be excused from your class. Attached below is the table of the specific dates, along with the location and purpose of our absence.

<i>Date</i>	<i>Location</i>	<i>Purpose</i>
February 16 (Thursday)	MSHS Laboratory	Plant extraction
February 20 (Monday)	MSHS Laboratory, Laboratory with Drying Oven (Outside MSHS)	Nanoparticle synthesis
February 21 (Tuesday)	PNRI, DLSU Manila & Biñan	Nanoparticle characterization
February 22 (Wednesday)	MSHS Laboratory	In vitro assay

Should there be any class requirements that we might miss on these days, may we still be granted the opportunity to comply with them.

We believe that your approval will be of great help in the success of our data collection process.

Thank you!

Protocol Letter



Kalayaan Ave., Brgy Cembo, Makati City
Makati Science High School
S.Y. 2022-2023

PROTOCOL LETTER

We, the sixth research group from Grade 12-Del Mundo, with a study entitled **Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*)**, will conduct an experiment in the school laboratory involving an in vitro assay with brown dog ticks. The researchers acknowledge that the usage of brown dog ticks may cause harm and infestations when improperly handled. With this, the researchers prepared the following protocols for proper handling, using, and disposing of the aforementioned organism:

- i. The ticks will be brought to the school laboratory in sealed containers. These containers will be placed in a safe place where they will not be prone to damage caused by accidents, heat, and other external factors that may break the containers. The containers will only be opened under safe circumstances and when it is time to conduct the in vitro assay. This will be strictly followed to avoid the ticks from escaping the containers and contaminating the laboratory.
- ii. During the experimentation process, a biohazard sign will be posted at the laboratory entry, indicating that access is restricted. Only the researchers and designated teachers will be allowed to enter, given that they are wearing the appropriate protective clothing (laboratory gown, face masks, gloves, and safety glasses).
- iii. The ticks will be evenly distributed among the Petri dishes using sterile tweezers. After the ticks have been placed in their respective dishes, the tweezers will be sterilized and then properly disposed of by wrapping them in plastic before being thrown in the trash. Unused ticks will be kept in one container and will remain sealed until the end of the experiment.
- iv. The researchers will ensure that the ticks in the Petri dishes and the initial containers will not escape ensuring safety and cleanliness.
- v. Once the experiment is done, all containers with ticks, dead or alive, will be sealed and submerged in Amitraz, a commercially available acaricide. These containers will be brought to the nearest restroom, where their contents will be poured into the toilet for proper disposal. The researchers will guarantee that the contents of the containers will be poured entirely into the toilet and that no leak or spill will occur. The researchers will ensure that the toilets will be flushed twice to guarantee that no trace of the ticks will be left behind.
- vi. The used containers and needles will be cleaned with ethanol before proper disposal. Face masks, gloves, hairnets, goggles, and any other equipment will be disposed of. All

of these will be put inside a plastic bag. Lab gowns used by the researchers shall be properly sterilized through the use of hot water, rubbing alcohol, and laundry detergent. (Not all at the same time.) The researchers will thoroughly wash their hands using hand soap.

- vii. The table/s where the containers were placed will be sanitized using tissue and ethanol.

The protocols listed above are in accordance with the recommendations of the Centers Disease Control and Prevention and Yale Environmental Health and Safety. The researchers will ensure that all these will be strictly followed.

APPENDIX B: CERTIFICATIONS AND FORMS

Plant Certification



Department of Agriculture
BUREAU OF PLANT INDUSTRY
 Crop Research and Production Support Division
 692 San Andres Street, Malate, Manila, Philippines
 Email Address: crpsd@buplant.da.gov.ph
 Tel. No.: (02) 8525-7909, (02) 8525-2987 | Website: buplant.da.gov.ph

PLT-ID-CRPSD-088-23
 March 6, 2023

PLANT IDENTIFICATION/CERTIFICATION

1. Local/Common Name:	Guyabano (Tag.), Soursop (Engl.)
2. Family / Scientific Name:	Annonaceae / <i>Annona muricata</i>
3. Collector's Name & Address:	Bernadette Kimberly S. Aguenza, Angela Nicole C. Alberto, Lee Ramses M. Ibañez, John Mikko O. Suyat Makati Science High School 9 Kalayaan Ave., Brgy. Cembo, Makati City
4. Collection Site/Source:	Calauan, Laguna
5. Date of Collection:	January 29, 2023
6. Types of Sample:	() Whole plant (x) Leaves () Stem () Roots () Flowers () Fruits () Seeds () others
7. Status of Sample:	Semi-Dried
8. Description/Remarks:	See attached sheet
9. References:	See attached sheet

Identified and certified by:

ZHEENA B. ESTANOL
 Project Assistant II

Noted by:

MARICEL R. MAMALAYAN
 OIC, Chief Crop Improvement Plant
 Genetics Resources Section

Approved by:

ASTHER V. HAGLIWANAN
 OIC-Chief, CRPSD

Family Name : Annonaceae
Common Name : Guyabano (Tag.), Soursop (Engl.)
Scientific Name : *Annona muricata* Linn.

DESCRIPTION/REMARKS:

Guyabano fruit is medium-sized, evergreen, monocious tree up to 20(-30) m tall and 80(-200) cm in diameter; all living parts exude viscid, white latex when injured. Bark rough to somewhat scaly, dark grey to grayish-brown. Crown dense, conical in young and shaded trees, becoming rounded spreading in the older tree. Leaves thin leathery, obovate-elliptic to elliptic 5-25 cm x 3.5-12 cm broadest or above the middle; dark green and shined above, dull pale green underneath; petiole 1.5-4 cm long, shallowly grooved on the adaxial side, sparsely lateral and short. Fruit barrel- or pear-shape, 30-100cm x 25-50 cm, with short pyramidal protuberances or warts; firm or soft, golden yellow, fleshy perianth surrounding the seeds.

Edible pulp constitutes 25-40 % of the fruit's weight. Food value per 100 g of edible pulp of ripe and young (value in brackets) fruits are as follow: water 72-77.2 g (85.2 g), protein 1.3-2 g (2 g), fat 0.1-0.4 g (0.6 g), carbohydrates 18.9-25.4 g (11.5 g), fiber 0.8-1.1 g (2.6 g), ash 0.8-1.4 g (0.7 g), calcium 22-37 mg (53 mg), phosphorus 18-38 mg (20 mg), iron 0.4-1.1 mg (0.4 mg), sodium 2 mg (3 mg), potassium 407 mg (323 mg), vitamin A 175-140 IU (30 IU), thiamine 0.03-0.09 mg (0.12 mg), riboflavin 0.05 mg (0.05 mg), niacin 0.9-4 mg (0.5 mg), vitamin C 8-10 mg (12 mg), energy value is 395-410 kj (210 kj) per 100 g. Fresh seed contains 57.6% water and 600 kj energy per 100 g, mainly in the form of carbohydrates (34.9-38.4 g per 100 g).

REFERENCE:

Soepadmo E. 1992. Edible Fruits and Nuts. Plant Resources of Southeast Asia No. 2. E. W. M. Verheij and R. E. Coronel (Editors) PROSEA Bogor Indonesia Pp. 86-91.

Parasite verification



Republic of the Philippines
DEPARTMENT OF EDUCATION
 National Capital Region
 Schools Division of Makati
MAKATI SCIENCE HIGH SCHOOL
 Kalayaan Avenue, Barangay Cembo, Makati City 1214, Metro Manila

CERTIFICATE OF AUTHENTICITY

This is to certify that the acquired samples presented by the researchers **SUYAT ET. AL.** is a species of the family *Ixodidae* with the scientific name of ***Rhipicephalus sanguineus***.

Given this 14th day of February at ASUC Pataras

Verified by:

YVONNE P. MAGNO, DVM
 Licensed Veterinarian
 License No. 11327

Noted by:

Dianne A. Ramil
 Research Adviser

UV-Vis Form



DE LA SALLE UNIVERSITY
 Vice Chancellor for Research and Innovation
 Central Instrumentation Facility

F O R M	No.	
	Revision No.	
	Effectivity Date	
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UV-Vis ANALYSIS FORM

CIF Control No.:

USER INFORMATION					
Name of Faculty/ Principal Investigator:	Dianne A. Ramil	Contact No.:	09754478972		
		Email Address:	dianneramil@makatiscience.edu.ph		
Name of Student/Researcher:	Aguenza, Bernadette S. Alberto, Angela Nicole C. Ibanez, Lee Ramses M. Suyat, John Mikko O.	Contact No.:	09499675517		
		Email Address:	john.suyamoodle@makatiscience.edu.ph		
Institution / Organization:	Makati Science High School				
Address:	9 Kalayaan Ave., Brgy Cembo, Makati, 1214 Metro Manila				
INFORMATION ON THE SAMPLE PREPARATION					
UV Analysis for Solutions		UV Analysis for Solids and Liquids		UV Analysis Using ISR Attachment	
Solvent Used: <small>(Note: If the solvent is not water, the solvent must be provided by the client upon request)</small>	Preferred solvent: <small>(Note: If the solvent is not water, the solvent must be provided by the client upon request)</small>	Type of Sample:	<input type="checkbox"/> Film <input checked="" type="checkbox"/> Powder <input type="checkbox"/> Others: _____		
Dilution Factor:	Dilution Factor:	Type of Data Needed:	<input checked="" type="checkbox"/> Absorbance <input checked="" type="checkbox"/> Transmittance <input type="checkbox"/> Reflectance		
Hazardous:	<input type="checkbox"/> Yes, handle with caution. <input checked="" type="checkbox"/> No. <input type="checkbox"/> Others: _____		The analysis needs to be done within 3 days from the submission date. <input type="checkbox"/> Yes (Note: Rush analysis will incur additional cost) <input checked="" type="checkbox"/> No		
Sensitivity to Environmental Factors	<input checked="" type="checkbox"/> Light <input type="checkbox"/> Temperature, store at _____ °C. <input type="checkbox"/> Not sensitive				
SAMPLE and ANALYSIS INFORMATION					

Date of Submission:	February 21, 2023	Experiment Module	Wavelength Range	No. of Trials
Sample Name/Code:				
Remarks/Other information about the sample:	Synthesized using guyabano leaf ethanolic extract	<input checked="" type="checkbox"/> Wavelength Scan (Spectrum Module)	200-800 nm	1
Items acquired from the Lab: (to be filled up by CIF staff)		<input type="checkbox"/> Specific Wavelength Scan (Photometric Module)	Wavelength Point	No. of Standards
		Concentration of Standards		

TERMS AND CONDITIONS
I understand and agree to the following: a. Unpaid samples will not be analyzed and processed. b. Succeeding experiments for the submitted samples can only be carried out upon instruction and upon payment preferably within 7 days after the release of initial results. c. The UV-Vis spectra, which will be sent via e-mail, shall be in pdf format containing the experiment results. d. That the DLSU Spectroscopy Laboratory does not provide spectral interpretation of the results of the experiments. e. That the raw and processed electronic data files will be automatically deleted after one (1) year from the analysis date. f. That I must claim my samples within 7 working days after the e-mail release of the results. I understand that unclaimed samples will be disposed of accordingly. g. That the DLSU Spectroscopy Laboratory staff shall not be held liable for the sample degradation or solvent evaporation of my sample. h. That the DLSU Spectroscopy Laboratory will not be held liable for the breakage of solvent bottles, sample containers, which occurred during transport. Signature over printed name:
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> John Mikko O. Suyat Student/Researcher </div> <div style="text-align: center;"> Dianne A. Ramil Faculty/Principal Investigator </div> </div>

TO BE FILLED-UP BY THE CIF PERSONNEL			
Analysis Date:		Total Cost (Php):	
Processed by:		OR Number:	
Release Date of Results:		No. of Samples Remaining (For Contracted Clients):	

FTIR Form



Republic of the Philippines
DEPARTMENT OF EDUCATION
National Capital Region
Schools Division of Makati
MAKATI SCIENCE HIGH SCHOOL
Kalayaan Avenue, Barangay Cembo, Makati City 1214, Metro Manila

February 14, 2023,

DR. CARLO ARCILLA
Director, DOST-PNRI
Commonwealth Ave., Diliman, Quezon 1101

Greetings!

The undersigned are Grade 12 students from Makati Science High School, currently conducting a study entitled **Acaricidal Potential of Copper Nanoparticles Synthesized using Guyabano (*Annona muricata*) Leaf Ethanolic Extract against Brown Dog Ticks (*Rhipicephalus sanguineus*)**.

We are humbly asking for the assistance of your good office in the characterization of our copper nanoparticles through the Fourier-Transform Infrared Spectroscopy (FTIR). The samples will be delivered to the PNRI Central Avenue Gate and will be received by the security guard on duty.

Aside from the official copy to be retrieved in person, we request that the certification be sent digitally in this email, as well.

Thank you in advance for your kind assistance!

Respectfully,


John Mikko O. Suyat


Bernadette Kimberly S. Aguenza


Lee Ramses M. Ibañez


Angela Nicole C. Alberto

Noted by:


Dianne Alamil
Research Adviser

SEM Form

F No. CIF-IEM-TRF01
 O Revision No. 03
 R Effectivity Date June 1, 2022
 M Page 1 of 1



DE LA SALLE UNIVERSITY
 Vice President for Research and Innovation
 Central Instrumentation Facility
 Integrated Electron Microscopy Laboratory

IEM SEM-EDS ANALYSIS/ TEST REQUEST FORM

Control No.:

USER INFORMATION (Please fill out ALL information)			
Name of Faculty/Manager Principal Investigator:	Dianne A. Ramil	Contact No.:	09754478972
		E-mail Address:	dianneramil@makatscience.edu.ph
Name of Student/Requestor Researcher:	John Mikko O. Suyat	Contact No.:	09499675517
		E-mail Address:	john.suyamoodle@makatscience.edu.ph
Institution/Organization/Company:	Makati Science High School		
Address:	9 Kalayaan Ave., Brgy. Cembo, Makati		
SAMPLE INFORMATION (Please fill out ALL information)			
1. Nature of the sample: <input checked="" type="checkbox"/> Conductive <input type="checkbox"/> Non-conductive <small>Coating may be necessary for a certain material to get satisfactory imaging, please check if you will allow for this condition and will shoulder additional cost for 500 P/pc sample</small> <input type="checkbox"/> No <input type="checkbox"/> Yes <small>if NO, see NOTES 4</small>		4. Electro Static Discharge sensitive (ESD) <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <small>Note: for ESD sensitive devices conductive coating maybe necessary to protect the material or device.</small>	
3. Sample Dimension in mm (L x W x H) or (dia. x thick.) Ideally <100 nm (samples are nanoparticles) <small>See NOTES 5</small>		5. Rush sample (~1.5 day @1 image): Normal lead time is 1 sample @ 3 working days (except Sat/Sun and Holidays) <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <small>Note: Rush analysis is charged additional ~ 30% of analysis cost!</small>	
ANALYSIS REQUEST (Please fill out ALL information)			
Date of Submission/ shipped:	February 22, 2023	How many images required?	2
Date sample arrived in IEM:		Target magnification	1 µm and 2 µm
Sample name / code:	N/A	EDS requirement	No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>
Special handling instructions:	Do not expose to light unless necessary for the SEM.	IF YES to EDS pls. choose	Point <input type="checkbox"/> Mapping <input type="checkbox"/>
REQUIRED: Please draw or insert a photo of the area/ point in which you wish to take an image or analyze, add extra sheet if necessary. See NOTES 3			
NOTES: PLEASE READ CAREFULLY 1. One (1) analysis = 1 image, sample can have many analyses, so please specify the region of interest (ROI). Cost charging is PER IMAGE 2. CIF-IEM will inspect the samples and take photo if necessary, before performing any analysis to record its condition. If it finds the sample unsuitable for analysis, IEM will inform the requestor to send a new sample at the requestor's expense. CIF IEM is not liable for any damages incurred during shipment to CIF. 3. If the region of interest is NOT SPECIFIED, IEM will select the area, otherwise any additional unspecified area or not agreed upon will be BILLED SEPARATELY 4. Non-conductive samples may need conductive coating to get a better image and prevent charging up of samples which may cause absence of images, if no coating is selected by the requestor, then IEM reserves the right to select the best image setting and still charge the requestor for the services rendered- satisfied or not. 5. Sample dimension ideally should not be more than 5mm thickness or height (based on orientation) so that will fit in the chamber. If the sample is too large and (2) is not specified, IEM reserves the right to cut the sample and get a portion necessary for the analysis.			
TERMS AND CONDITIONS			

F No. CIF-IEM-TRF01
 O Revision No. 03
 R Effectivity Date June 1, 2022
 M Page 1 of 1



DE LA SALLE UNIVERSITY
 Vice President for Research and Innovation
 Central Instrumentation Facility
 Integrated Electron Microscopy Laboratory

I understand and agree to the following:

- That I have read the "NOTES" carefully and I FULLY AGREE with its contents.
- That I will be billed according to the agreed cost with IEM and analysis will commence upon payment of the agreed cost.
- That the requested images will be sent via e-mail, in .jpg, .bmp or .pdf format (for EDS report).
- That the IEM Laboratory does not provide interpretation of the EDS results as well as the SEM images and is free from any liabilities if third parties used it for other purposes other than what is intended to.
- That the raw and processed electronic data files will be automatically deleted after 2 months from the date of release of analysis.
- Submitted samples must be retrieved within 5 working days after the e-mail release of the results. All samples not claimed after this period will be disposed of accordingly.
- That if I wish to have my sample returned by shipment or courier, I will shoulder all the expenses. That the DLSU IEM Laboratory will not be held liable for the sample degradation, breakage during re-packaging and shipment.
- That any papers for publication using the DLSU IEM should acknowledge the DLSU CIF-IEM Facility.
- If the client requested an on-line live analysis, a fix charge of 500 Php for the first hour will be charged to the client. The cost charging will start upon when the client sees sample in the SEM screen ready for magnified imaging.

Signature over printed name/ Date. John Mark O. Suwat Dianah A. Rama
 Student/Researcher/ Requestor Faculty/Principal Investigator/ Manager

TO BE FILLED-UP BY THE CIF-IEM PERSONNEL ONLY

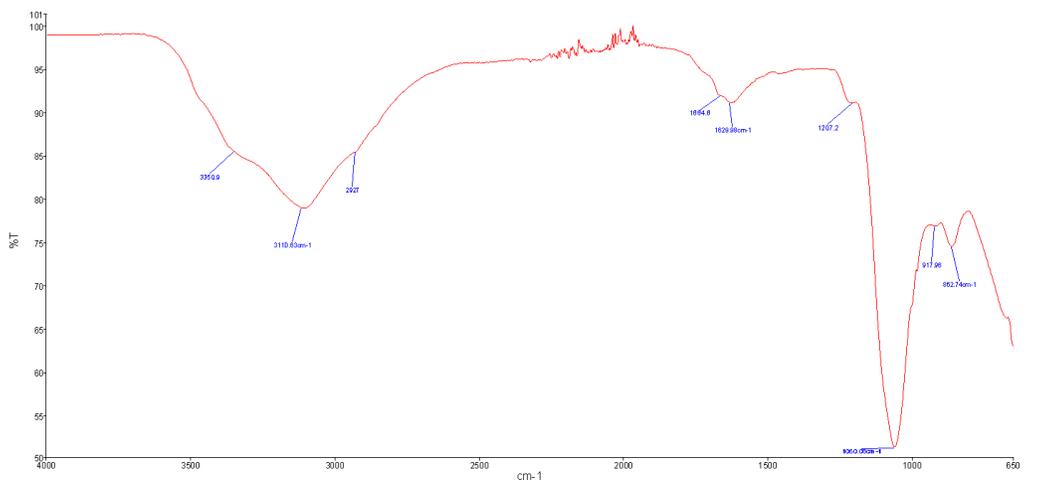
Analysis Date:		Contract no. (bulk submission only)	
Processed / Received by:		Total Cost (Php):	
Release Date of Results:		OR Number:	
Results released by:		Date of release:	

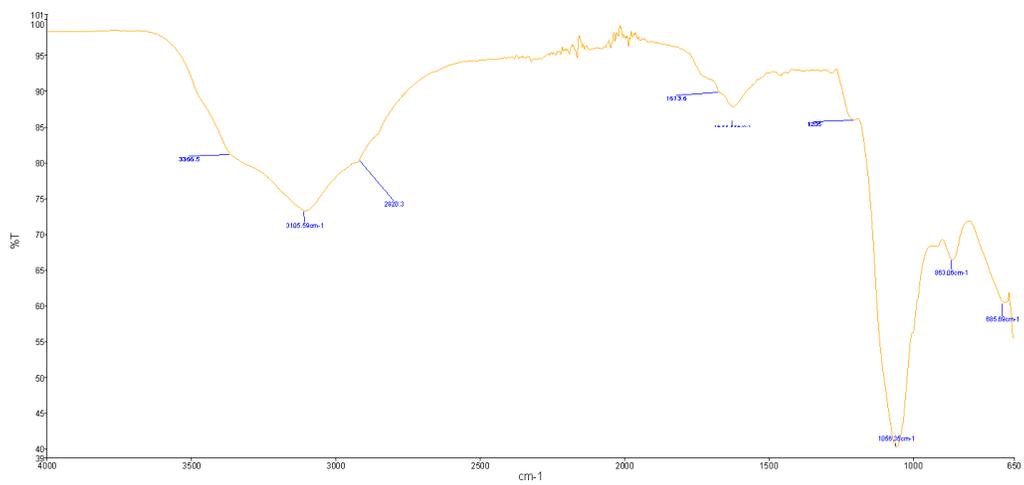
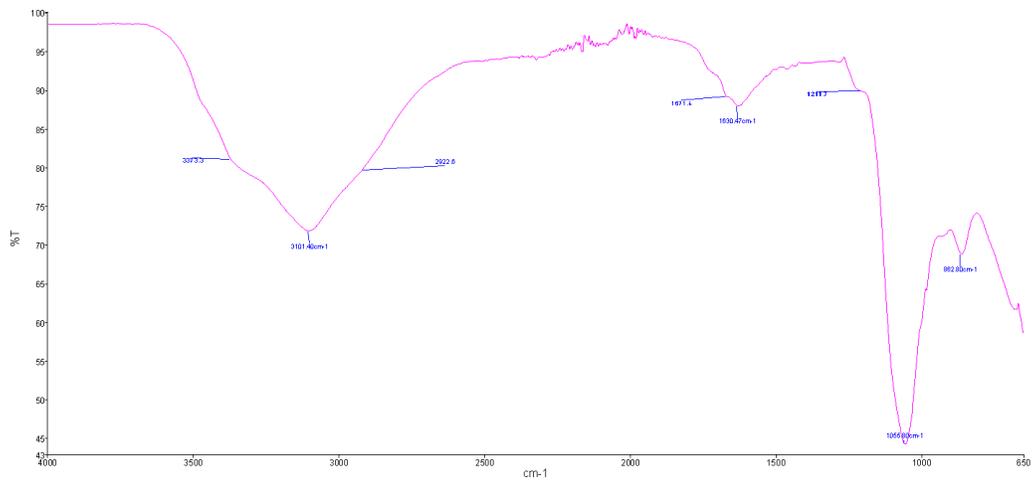
APPENDIX C: RESULTS

In vitro assay results

Cleaned Results (Number of Dead Ticks)																									
TREATMENT	1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	4.5	4.6	
5%	A	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	
	C	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	
10%	A	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	
	B	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	
	C	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	
20%	A	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	
	B	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	
	C	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	
30%	A	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	B	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	
	C	0	0	0	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
40%	A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	
	C	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	
(+)	A	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	B	0	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	C	0	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
(-)	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Three trials of FTIR





UV-Vis Peak Pick Table

Spectrum Measurement Report

Data Set: **Suyat_DAR - RawData**

<Peak Pick Table>

No.	P/V	Wavelength	Abs.	Description
1	↑	632.00	10.00000	
2	↑	502.00	10.00000	
3	↑	447.50	10.00000	
4	↑	420.00	10.00000	
5	↑	394.00	10.00000	
6	↑	371.00	10.00000	
7	↑	349.50	10.00000	
8	↑	329.50	10.00000	
9	↑	312.50	10.00000	
10	↑	292.00	10.00000	
11	↑	272.00	8.87971	
12	↑	256.00	10.00000	
13	↑	223.50	6.70416	
14	↓	723.50	9.01716	
15	↓	540.50	9.09883	
16	↓	463.50	9.09015	
17	↓	431.00	9.01847	
18	↓	408.50	9.02218	
19	↓	379.00	9.15694	
20	↓	361.50	8.01075	
21	↓	332.50	6.58752	
22	↓	315.00	5.33391	
23	↓	297.00	4.52354	
24	↓	281.50	6.38760	
25	↓	265.50	4.33797	
26	↓	240.00	3.87791	
27	↓	221.00	4.91582	

APPENDIX D: GANTT CHART

Research Steps and Tasks To Accomplish	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Topic Defense	█								
Writing of Chapter 1	█	█							
Writing of Chapter 2		█	█						
Writing of Chapter 3			█	█	█	█			
ODP Defense				█					
Preparation for Experimentation					█	█			
Gathering of Materials					█	█			
Collection and Verification of Guyabano Leaves					█	█			
Drying of Guyabano Leaves						█			
Extraction of Guyabano Leaf Extract						█	█		
Phytochemical Analysis of Guyabano Leaf Ethanolic Extract						█	█		
Synthesis of the Copper Nanoparticles						█	█		
Characterization of Copper Nanoparticles						█	█		
Collection and Verification of Ticks						█	█		
In vitro testing of acaricide using contact bioassay						█	█		
Data Analysis							█	█	
Revision of Methodology and Other Parts							█	█	
Writing of Chapter 4							█	█	█
Writing of Chapter 5								█	█

APPENDIX E: EXPENDITURES

Expense	Cost
Reagents	Php 927
UV-Vis	Php 850
SEM	Php 1,380
Drying Oven	Php 650
Delivery Fees	Php 470
Inoculation Needles	Php 175
Stool Cups	Php 100
Other Expenses	Php 1,040
Total	Php 5,592

APPENDIX F: DOCUMENTATION

Shade drying of guyabano leaves



Extraction of guyabano leaf ethanolic extract



Phytochemical screening of guyabano leaf ethanolic extract



Guyabano-mediated Copper nanoparticles (CuNPs)



In vitro assay of acaricide

