

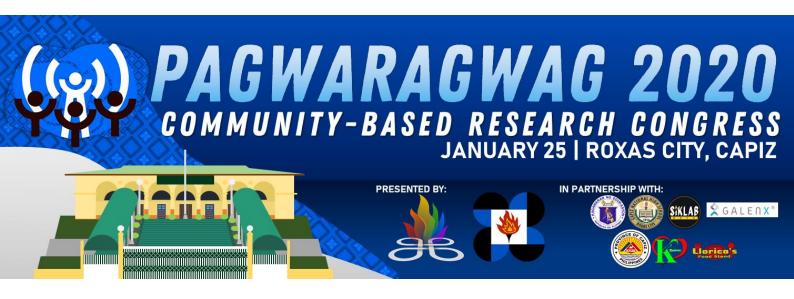
PAGWARAGWAG 2020

FINAL REPORT

RESEARCH BATCH 2020

PHILIPPINE SCIENCE HIGH SCHOOL - WESTERN VISAYAS CAMPUS

JANUARY 2020



FINAL REPORT







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JANUARY 2020

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ABOUT PAGWARAGWAG

Pagwaragwag is the official name of the community-based research congress of the Research 3 curriculum. It is a Hiligaynon word which means 'to publicize' or 'to broadcast' to everyone. The event's philosophy is anchored on the course objectives which are to: (1) effectively articulate ideas and information in different media in a variety of forms and contexts; and (2) be able to share their knowledge and findings with diverse groups of people.

Pagwaragwag aims to present research projects to a wider audience targeting laypersons specifically the elementary students, high school students, and teachers of different divisions in Region VI. Research projects by the scholars contribute to the scientific body of knowledge, however, the results of which should not only be published through various scientific journals but also shared with the public in a more friendly and enjoyable way. Through oral presentations, poster presentations, workshops, and gimmicks, scholars are able to engage with their community and inspire the next generation to pursue scientific research.

Since its original conception, Pagwaragwag has been held in a number of locations in Region VI including the provinces of Aklan, Antique, Iloilo, and Negros Occidental. This year's Pagwaragwag serves as the 9th iteration of the event and is the first to be based in Roxas City, Capiz.

ABOUT THE LOGO



Pagwaragwag is the fifth in a series of research events held annually by the scholars of Philippine Science High School. Each event is given its own logo, but all have similar elements to them: a stylized PSHS logo to represent the institution responsible for the event, and a hablon inspired background to represent the rich Western Visayan culture that PSHS-WV draws from. The core elements of the logo however, are what differentiate it from the rest. The logo features a radio tower rising above a group of people. The people represent us, and how it is through our collective effort that we contribute to the overall body of science through research. The radio tower represents Pagwaragwag, which means 'to broadcast', itself in a literal sense but figuratively it means that research and the knowledge we take from it should transcend boundaries and be communicated to the farthest reaches of our capability. Together, it appropriately symbolizes Pagwaragwag, an event where we all come together to communicate what we've learned from our research to communities beyond our usual scope.

PAGWARAGWAG 2020



Pagwaragwag 2020 was held on January 25, 2020 from 7:30 AM to 3:00 PM at Capiz National High School, Roxas City, Capiz. The event had a total of 469 registered participants including 108 high school students, and 39 high school teachers, 213 elementary students, and 109 elementary teachers.

The event was composed of three sub-events: an **oral presentation with research seminar-workshop** for high school students and a **community poster presentation with research gimmicks** for elementary students, and **teacher training** for the high school teachers.

EVENT PREPARATION

Pagwaragwag served as a conglomerate of the past Research 3 Events namely Pagbantala (oral presentation), Pagbalandra (poster presentation) and Pahisayod (research seminar-workshop and gimmicks). Since these have already been performed beforehand, similar preparations were necessary and the work units only needed to make improvements in their past outputs which they would like to implement in Pagwaragwag.

An operation manual was made which detailed what needed to be done before and during the event. Meetings were held during Research 3 Class that discussed the contents of the operation manual and gave out the task assignments that served as the contribution of each work unit for the conduct of the event. To help facilitate, volunteers from the Grade 11 Batch were also recruited.

As part of the requirements, all participating work units submitted the following updated outputs: PowerPoint presentations, technical, community, and headline posters, and their implementation plans for the research seminar-workshop and gimmicks. Each work unit was also

required to prepare a storage box which will contain all the materials they used for the event for easy transport.

Event Format

Merging three different events into a one-day event warranted some modifications from their original format in order to fit the time period and maximize the number of participants that can be accommodated.

For the high school audience, the oral presentation was merged with the research seminar-workshop. The number of skills taught in the research seminar-workshop was reduced from the original three in Pahisayod to increase the number of cycles that can be performed. With this merged format, the participants first learned the fundamental concepts about the research study which helped them when they proceeded to a hands-on activity afterwards to dive deeper into a specific concept or method since they have the background knowledge behind the skill they were being taught.

For the elementary pupils, the community poster presentation was conducted alongside the gimmicks. The two activities complemented each other since the community poster served as a visual aid in explaining the basic information about the research study while in the gimmicks, the children were introduced to a specific scientific concept related to the study through gamification and this was effective in reinforcing learned information.

DepEd Advisory

A letter was sent to the Department of Education - Capiz Division office. The letter was addressed to Dr. Salvador O. Ochavo Jr., CESO V Schools Division Superintendent, and Andres D. Quiachon, Science Education Program Supervisor. The letter requested permission to conduct Pagwaragwag as well as its endorsement to the elementary and secondary schools in the division. After the receipt of the letter, a DepEd advisory regarding the event was then released (see Appendix A).

Registration

The pre-registration system of the event was done through online submission. A link of the downloadable registration form was provided in the registration details. The accomplished registration forms were received using the official email address of the event. After reviewing the submissions, the participants were sent a confirmation email to inform them that they have been officially pre-registered.

PARTNERS & SPONSORS

Pagwaragwag 2020 was made possible with the cooperation of the following partners and sponsors:

PARTNERS







Department of Education -Division of Capiz



Province of Capiz

SPONSORS



Sipnayan, Kapnayan, Lipnayan at Agbuhay para sa Bayan



Contreras



Llorico's Food Stand



PANAY EAST COAST CONSTRUCTION AND SUPPLY

BENEFACTORS

Pagwaragwag was also done with the support of the following individual benefactors:

BENEFACTOR	AFFILIATION
LIM FAMILY IRENE GRACE LIM ANDREA LIM	PSHS-WVC Alumni Batch 2009 Batch 2013
CONTRERAS FAMILY SOFIA CONTRERAS ANDREA ISABEL CONTRERAS	PSHS-WVC Alumni Batch 2008 Batch 2011
IP FAMILY KENJI IP KEVIN IP	PSHS-WVC Alumni Batch 2010 Batch 2011
LONGNO FAMILY KATHLEEN JOYCE LONGNO	PSHS-WVC Alumna Batch 2010
CORAZON PANUNCIO SATO	Capiz National High School Batch 1985
NINGNING DEGOMA TOMIYAMA	Roxas City School for Philippine Craftsmen Batch 1980
NARCISA ARTATES	Former Principal, Capiz National High School
BERNICE MAE YU JECO	University of Tokyo

PRESENTERS

There were twenty work units from the PSHS-WVC Grade-12 Batch that presented their research studies during Pagwaragwag 2020. These work units formed in the Research curriculum are groups composed of not more than three scholars that work together on a research problem. Below are the work unit groups and their corresponding research titles:

Table 1. Summary of work unit presenters.

WORK UNIT	TITLE OF RESEARCH STUDY				
	WASTEWATER REMEDIATION STUDIES				
10	Organo-mineral composites from the shells of <i>Crassostrea iredalei</i> (slipper cupped oyster), <i>Perna viridis</i> (green shell), and <i>Telescopium telescopium</i> (horned snail) in the removal of chromium (VI) from water				
20	Column adsorption of cadmium (II) and lead (II) using rice husks and mango peels				
25	The quantification of the correlation between water nitrogen level and the phosphorus uptake of <i>Chlorella sorokiniana</i> (freshwater green alga) in simulated nutrient-contaminated freshwater				
	ANTIBACTERIAL STUDIES				
9	Formulation of liquid soap incorporated with <i>Mangifera indica</i> (mango) leaf extracts and evaluation of its antibacterial activity against <i>Staphylococcus</i> spp.				
21	Antibacterial activity of copper-chitosan complexes against zoonotic <i>Vibrio</i> parahaemolyticus				
	MATERIAL SCIENCE				
4	The extraction and isolation of polyethylene-based plastic-degrading bacteria from Iloilo City Engineered Sanitary Landfill, Mandurriao, Iloilo City				
15	Optimization of reaction parameters for the synthesis of silver nanoparticles using ascorbic acid and trisodium citrate				
22	Evaluation of the ultraviolet and visible light photocatalytic activity of undoped and nitrogen-doped titanium dioxide nanoparticles (N-TNPs) against low-density polyethylene (LDPE)				
29	Microplastic occurrence in the coastal sediments of selected barangays of Anilao, Iloilo, Philippines				

	AGRICULTURE
7	Seed germination potential of different local varieties of <i>Oryza sativa</i> (rice) as affected by different seed priming methods
8	The effect of salt stress on growth parameters of <i>Oryza sativa</i> (rice) variety NSIC Rc 442
11	Potential antifeedant bioactivity of Anethum graveolens (dill) essential oil against Cochlochila bullita (lace bugs) on Ocimum kilimandscharicum (sweet basil)
	HEALTH AND TOXICITY
14	The utilization of methanolic <i>Bixa orellana</i> (Annatto) seed extract as substitute for safranin in Gram staining
26	Larvicidal activity of <i>Citrofortunella microcarpa</i> (calamansi) peel essential oil agains third and early fourth instar <i>Aedes aegypti</i>
27	The use of <i>Clitoria ternatea</i> (blue ternate) ethanolic extract as a potential stain for bacteria
32	The effects of acetyl I-carnitine on the prevention of platelet storage lesions
	AQUATIC NATURAL RESOURCES
28	Monogenean and cestode infestation in the gills and intestines of <i>Clarias gariepinus</i> (African catfish) in Zarraga, Iloilo and <i>Chanos chanos</i> (Milkfish) in Dumangas, Iloilo
30	Measurement of eye turbidity of formalin-treated <i>Chanos chanos</i> (milkfish) using image analysis
	INDUSTRY, ENERGY, AND EMERGING TECHNOLOGY
2	Kinetic analysis of <i>Theobroma cacao</i> (UIT Variety) pod husks through gasification as an alternative to sub-bituminous coal
5	A novel application of a double convex-hemispherical lens configuration for a III-V tandem InGaP/GaAs/Ge multi-junction solar cell
6	Use of 1:7 rice bran wax to rice bran oil mixture as phase change material in increasing the efficiency of photovoltaic cells
	COMPUTER SCIENCE
17	Determining the maximum number of transaction records that the Apriori algorithm

DRY RUN

On the afternoon of January 24th, the day prior to the event, a dry run was organized for the high school students of Capiz National High School (Fig. 1-4). They were accommodated on the day before the event to open more slots to participants from other areas of the province on the event day. The students were able to witness and participate in the different poster presentations and gimmicks prepared by the twenty-two work units of PSHS-WVC.



Figure 1-4. Capiz National High School student participants in the dry run for Pagwaragwag.

EVENT PROPER

Overview

The entirety of the program ran from 7:30 AM until 3:00 PM. At the start of the event, the participants were received at the covered gym for the registration and opening program. After which, the participants proceeded to the different venues for the simultaneous activities. The event was then concluded with a closing program and group photo at the covered gym. Finally, before departure, cleanup was performed at all venues to ensure cleanliness.



INDICATIVE PROGRAM

07:30AM - 08:00AM REGISTRATION

08:00AM - 09:00AM OPENING PROGRAM

NATIONAL ANTHEM

PRAYER

WELCOMING ADDRESS

Mrs. Ma. Rita F. Villareal (CNHS Principal IV)

OPENING REMARKS

DepEd - Mr. Nicasio S. Frio (Asst Schools Division Superintendent) PSHS-WVC - Dr. Shena Faith M. Ganela (Campus Director)

READING OF HOUSE RULES

FORMAL OPENING

GROUP PHOTO

09:00AM - 12:00NN POSTERS AND GIMMICKS (ELEM)

PRESENTATION AND WORKSHOPS (HS)

TEACHER TRAINING

12:00AM - 01:00PM LUNCH

01:00PM - 02:00PM POSTERS AND GIMMICKS (ELEM)

TEACHER TRAINING

02:00PM - 02:30PM CLOSING PROGRAM

02:30PM - 03:00PM CLEAN-UP



Figure 5. Indicative program of the event.

Registration

As aforementioned, an online pre-registration was conducted to determine the expected number of participants. In the registration booth, participating students led by their teacher-chaperones were given attendance sheets for them to fill out in order to confirm their attendance (Fig. 6). The registration booth also served as the distribution area for the venue maps and stamp cards which was designed to help the participants in going around and experiencing the different activities prepared for them.



Figure 6. Teacher-chaperone at the registration area.

Opening Program

The opening program started with the singing of the national anthem and was led by Ms. Mary Angeli Leonida (Fig. 7). This was followed by a prayer headed by Ms. Ma. Anna Carigaba. Next, Mrs. Ma. Rita F. Villareal, Principal IV of Capiz National High School graced the event with her presence to deliver a welcoming address (Fig. 8). After which, Dr. Shena Faith M. Ganela, PSHS-WVC Campus Director, delivered her opening remarks (Fig. 9). The event host, Mr. JV Galan, then proceeded with the reading of house rules to properly orient participants in the dos and don'ts of the event (Fig. 10). Finally, Dr. Aris Larroder, Research 3 teacher and event adviser, formally opened Pagwaragwag 2020 which proceeded with the awarding of a Plaque of Appreciation to Capiz National High Schools as the host school and DepEd - Capiz Division as the host agency (Fig. 11 & 12). The opening ceremony was concluded with a group photo with the first batch of participants (Fig. 13).



Figure 7. Singing of the national anthem.



Figure 8. Welcoming address by Mrs. Ma. Rita F. Villareal.



Figure 9. Opening remarks by Dr. Shena Faith M. Ganela



Figure 10. Reading of House Rules.



Figure 11. Formal Opening of Pagwaragwag 2020 by Dr. Aris Larroder.



Figure 12. Awarding of Plaque of Appreciation.



Figure 13. Pagwaragwag 2020 group photo.

Simultaneous Activities

After the opening program, the participants dispersed into the different venues for the simultaneous sub-events. The elementary students stayed at the covered gym for the poster presentations and gimmicks, the high school students proceeded to the SSTC Building for the oral presentations and research seminar-workshops, and the teachers attended the teacher training at the Physics Laboratory.

The elementary students were encouraged to explore as many gimmick stations as they could and they were given stamp cards to keep track of their completed stations (Fig. 14). The participants were also given a map to help them navigate through the different venues (Fig. 15 & 16).



Figure 14. Stamp card for elementary participants.

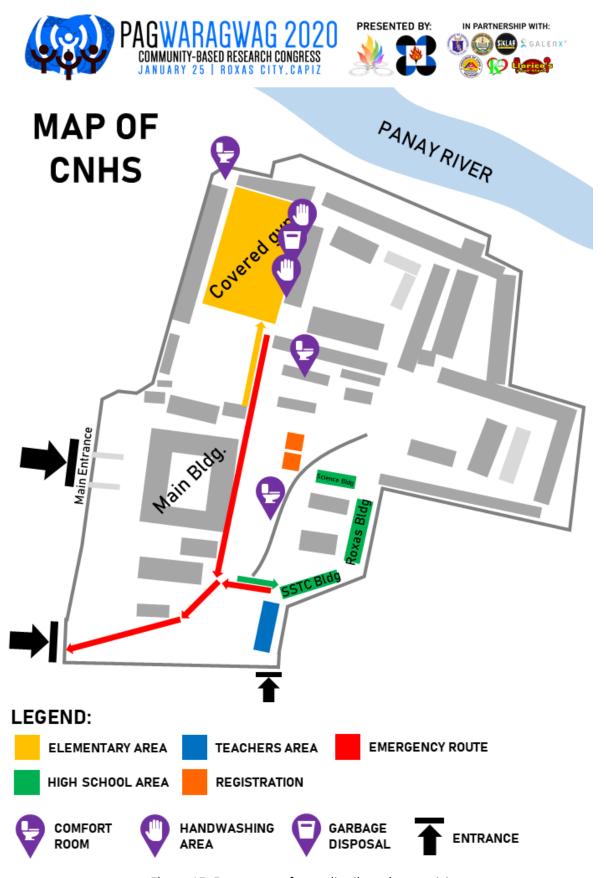


Figure 15. Front page of map distributed to participants.

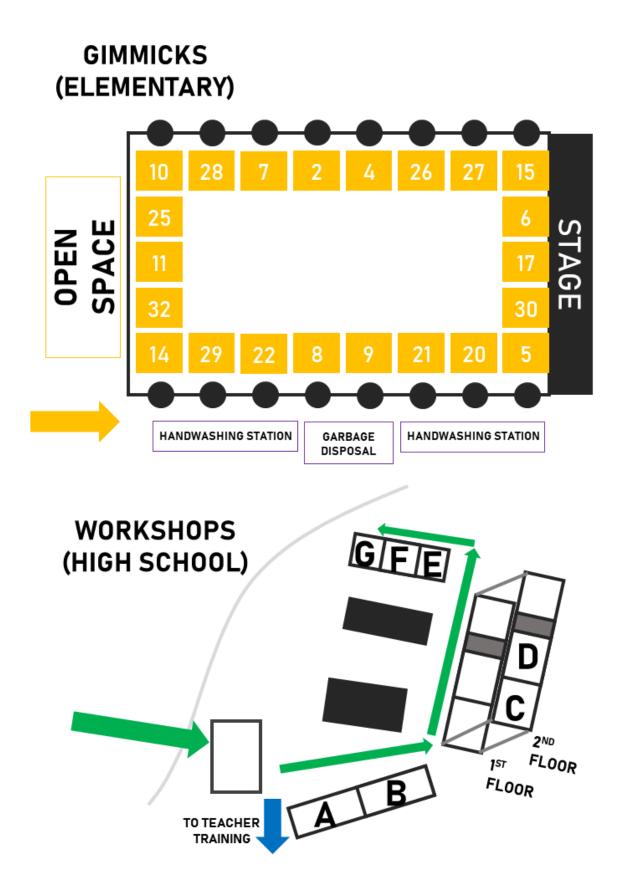


Figure 16. Backpage of map distributed to participants.

PAGWARAGWAG 2020 SUB-FVFNTS

Poster Presentation and Gimmicks

The poster presentation and gimmicks were aimed towards elementary students. The overall aim of this activity was to package research studies in a fun and engaging way that piques the interest of young minds. The community posters presented simplified information about the research study in very creative ways which could be easily understood by the participants.

The community poster was paired together with a gimmick which lets the participants learn and have fun at the same time by letting them play a gamified scientific concept in relation to the research study. Each work unit prepared their own stations and the participants were encouraged to explore and experience all the different gimmicks.

Oral Presentation and Research Seminar-Workshop

The oral presentation and the seminar-workshop was prepared for high school students. Through the oral presentations, the high school participants learned the following key information about the research studies performed by the work units: background of the study, objectives, methods, results and discussion, conclusion, and recommendations. This provided them with the background information that helped them when they proceeded to perform the skills taught in the seminar-workshop.

In the seminar-workshop, the work units each imparted one skill that was essential to the conduct of their study. This involved sharing knowledge on scientific concepts, laboratory procedures, and practical research lessons. It was made sure during preparation that enough materials were prepared so that after the presentation of the skill, the participants were able to perform it themselves.

Additional Posters

Aside from the community posters, the technical and headline posters of the work units were also displayed in the venue. The technical posters which are the most information-heavy of the three posters were placed inside the classrooms used for the oral presentation and research seminar-workshop while the headline posters, posters containing short and catchy descriptions of the research study, were placed in the covered gym area.





WORK UNIT OUTPUTS



SUMMARY OF RESEARCH GIMMICKS

Table 2. Summary of research gimmicks with their corresponding learning competencies.

Work Unit	Gimmick Title	DepEd Learning Competency	Code
2	Blow it away	Classify objects and materials as solid, liquid, and gas based on some observable characteristics	S3MT-Ic-d-2
4	Finding Macky Damak	Describe changes in properties of materials when exposed to certain conditions such as temperature or when mixed with other materials	S4MT-Ig-h-6
		Use the properties of materials whether they are useful or harmful	S5MT-la-b-1
		Identify beneficial and harmful microorganisms	S7LT-IIf-6
5	Way of the Light	Enumerate uses of light, sound, heat and electricity	S3FE-IIIi-j-3
		Describe how light, sound and heat travel	S4FE-IIIf-g-4
6	EveryCircuit	Infer the conditions necessary to make a bulb light up	S5FE-IIIf-6
7	Rice Bilis	Describe the parts of different kinds of plants	S3LT-IIe-f-8
		State the importance of plants to humans	S4MT-Ig-h-6 S5MT-Ia-b-1 S7LT-IIf-6 S3FE-IIII-j-3 S4FE-IIIf-g-4 P S5FE-IIIf-6 S3LT-IIe-f-8 S3LT-IIe-f-9 S3LT-IIe-f-9 S3LT-IIe-f-9
		Describe ways of caring and proper handling of plants	
8	Solve Salt Crimes with	Describe the parts of different kinds of plants	S3LT-IIe-f-8
	Rice Detective	State the importance of plants to humans	S3LT-IIe-f-9
		Describe ways of caring and proper handling of plants	S3LT-IIe-f-10
9	Ball in the Hole	Describe the effects of interactions among organisms in their environment	S4LTIIi-j-18
10	Labugay	Distinguish different contents of mixtures and separation techniques	
		Understand properties of matter and materials	S5MT-la-b-1

11	The Battle for Basil State the importance of plants to humans		S3LT-IIe-f-9
		Recognize that there is a need to protect and conserve the environment	S3LT-IIi-j16
		Describe certain types of harmful interactions among living things	S4LTIIi-j-16
14	Will It Color?	Identify beneficial and harmful microorganisms	S7LT-IIf-6
15	Perfect Combination	Describe the components of a scientific investigation	S7MT-la-1
17	Feed Me: The EatVentures of Apriori Bot	Employ the use of mobile devices to access information, communicate with others, and solve problems in daily life	LS6DL-DD- PSELE/AE/LS/ AE-5
20	Catch MEtals If You Can	, ,	
		Describe the appearance and uses uniform and non- uniform mixtures	S6MT-lac-1
21	21 Copper Describe different objects based on their characteristics (e.g. Shape, Weight, Volume, Ease flow)		S4MTlg-h-6
	Infer how friction and gravity affect movements of different objects		S4ESIVc-3
22	Shots Fired	Describe changes in properties of materials when exposed to certain conditions such as temperature or when mixed with other materials	S4MTIg-h-6
Infer t		Infer the importance of water in daily activities	S4ESIVc-3
25	25 ALGAEve it a Shot! Explain how living things depend on the environment to meet their basic needs Recognize that there is a need to protect and conserve the environment		S3LT-IIi-j15
			S3LT-IIi-j16
		Relate the importance of surroundings to people and other living things	S3ES-IVc-d-2

26	The Mighty Larvaengers	Express concentrations of solutions quantitatively by preparing different concentrations of mixtures according to the uses and availability of materials	S7MT-Id-3
		Investigate the relationship between the amount of force applied and the mass of the object to the amount of change in the object's motion	S8FE-Ia-15
27	Coloring Bacteria	Identify beneficial and harmful microorganisms	S7LT-IIf-6
28	Parasite Hunting	Focus specimens using compound microscope *handheld microscopes were used	S7LT-IIb-2
29	Pick Me Up!	Recognize the importance of recycle, reduce, reuse, recover, and repair in waste management	S5MT-le-g-3 S5LT-llh-8
		Discuss the interactions among living and nonliving things in estuaries and intertidal zones	S5LT-IIh-8
		Explain the need to protect and conserve estuaries and intertidal zones	S5LT-li-j-10
30	Computer Cops: Finding	Investigate properties and characteristics of light	S4FE-IIIh-5
	the Fake Formalin Fish	Relate characteristics of light such as color and intensity to frequency and wavelength	S7LT-IIb-2 S5MT-Ie-g-3 S5LT-IIh-8 S5LT-Ii-j-10
		Demonstrate the existence of the color components of visible light using a prism or diffraction grating	S8FE-If-26
		Explain the hierarchy of colors in relation to energy	S8FE-If-27
32	Make Hanap- Hanap the	Compare the stages in the life cycle of organisms	S4LTIIg-h13
	Platelets	Tell the benefits of separating mixtures from products in community	S6MTIg-j-3

SUMMARY OF RESEARCH SEMINAR-WORKSHOPS

Table 3. Summary of research seminar workshops with their corresponding target skill.

Work Unit	Workshop Title	Target Skill
2	Charlie and the Cacao Factory	Solving for Arrhenius equation using Excel
4	Streak or Treat	Proper streaking technique
5	Go Solar	Assembly of the Multi-junction Solar cell Concentrator Photovoltaic
6	Lit-Spice	Using Ltspice software in determining the theoretical analysis of different circuits
7	RiceUp	Use of STAR
8	Rice and Shine	Proper handling and usage of Vernier Calipers in measuring various objects
9	Let's talk about ME: Maceration Extract	Extraction process using maceration
10	Labugay	Use of pH paper and properties of acids and bases
11	The Art of the Lace Bug	Proper handling of lace bugs
14	Instagramsmear	Proper procedure in smearing
15	Perfect Combination	Calculating molarity
17	Prava: 101 in Slaying Computer Science	Basic Java programming
20	Power Column	Column packing and adsorption
21	Lab ka ba?: Aseptic Technique	Aseptic technique
22	Accuracy is Key	Measuring and transferring liquids
25	Gotta Count 'Em All	Counting algal cells through a haemocytometer.
26	Larvaengers Assemble!	Collection of mosquito larvae
27	Be Careful with My Bacteria	Bacterial staining
28	Inside a Fish	Microscopy
29	Micromeet!	Density separation
30	Software, Softwhat, Softwhy, Softhow	Data encoding and descriptive statistics

Work Unit 2

Kimberly Shayne S. Tukasim, Christian Marc P. Beñosa, and Mickel Lyle Angelo E. Pe

Kinetic analysis of *Theobroma cacao* (UIT Variety) pod husks through gasification as an alternative to sub-bituminous coal

Gimmick Title: Blow it away

DepEd Learning Competency: Classify objects and materials as solid, liquid, and gas based on some

observable characteristics (S3MT-Ic-d-2)

Workshop Title: Charlie and the Cacao Factory

Target Skill: Solving for Arrhenius equation using Excel



Community Poster



Technical Poster



COMMUNITY-BASED RESEARCH CONGRESS



Kinetic analysis of Theobroma cacao (UIT Variety) pod husk through gasification as an alternative to Sub-bituminous coal

Background

Objectives

- · Majority of the energy demands of the Philippines is satisfied by non-renewable source, particularly coal (Boharapi, et. al, 2015).
- Cacao pod husks represents 75% of the whole weight of the cacao which usually becomes waste, as it is usually unutilized (Cruz et al 2012).
- Furthermore, it shows good features to be used as activated carbon due to its cellulosic hemicellulosic content (Aregheore, 2002).

The study aims to evaluate the **kinetic** parameter of Theobroma cacao (UIT Variety) pod husks and coal blends as an alternative energy source through gasification.







Samples with ratio (cacao pod husk mass-coal mass): 0%-100%, 25%-75%, 50%-50%, 75%-25%, were subjected Thermogravimetric Analyzer (STA-8000) to analyze its thermal degradation over time. The proximate composition, obtained from the mass-time curve data, and activation energy were used to determine the best ratio of blends.

Sample **Preparation**







Thermal Analysis

Plotting of Kinetic Models

SCUSSIO

- the ash content is significantly greater when more coal is present.
- This leads to higher heat capacity and therefore takes more time to burn and/or should be gasified at a higher temperature.
- With that in mind, the best ratio of sample blends would be 75%-25% (cacao pod husk- coal mass), followed by 100%-0%. This conclusion was made due

• Despite having a nearly consistent R^2 value of ~0.74, Table 1. Summary of the best model, ash content, and activation energy with the corresponding ratio

Component (cacao pod husk mass- coal mass)	Best Model	Ash Content	Activation Energy (kJ/mol)
0%-100%	Random Pore Model	36.16	71.135
25%-75%	Random Pore Model	29.89	70.600
50%-50%	Random Pore Model	22.08	70.545
75%-25%	Random Pore Model	4.71	70.611
100%-0%	Random Pore Model	9.11	70.500

to the (1) higher rate constant as compared to other ratios. (2) proximate analysis, and (3) lower activation energy when comparing it based on the individual models.

Conclusion

Recommendation

- · The best ratio of blends was found to be 75%-25% (cacao pod husk mass-coal mass).
- Followed by 100%-0% which indicates that cacao pod husk can indeed be a substitute to coal.
- Smaller interval of gasification temperature to study the rate limiting behavior that could affect the reaction.
- Running an ash analysis and gas analysis to different determine composition and products formed during the gasification.

References:Aregheore E. 2002. Chemical evaluation and digestibility of Cocoa (Theobroma cacao) byproducts fed to goats. Trop Anim Health Pro 34: 339-348.

Boharapi A, Kale G, & Mahadwad O. 2015. Co-gasification of Coal and Biomass – Thermodynamic and Experimental STudy. IJRET: International Journal of Research in Engineering and Technology ISNI: 319-1163. 04(6):346-352.

Cruz G, Pirila M, Huuhtanen M, Carrión L, Alvarenga E, Keiski R. 2012. Production of Activated Carbon from cacao (Theobroma cacao) Pod Husk. J Civil Environment Engg. 2(2):1-6.

Headline Poster



Oral Presentation





Among the different models, the most applicable model was found to be <u>Random Pore Model</u> for the simulations of the data





REFERENCES

Silvane M. Service M. Annie S. Miller (March and March March

THANK YOU FOR YOUR
ATTENTION





Work Unit 4

Jeremy Sean O. Canja, Rex S. Hilis, and JV C. Galan

The extraction and isolation of polyethylene-based plastic-degrading bacteria from Iloilo City Engineered Sanitary Landfill, Mandurriao, Iloilo City

Gimmick Title: Finding Macky Damak

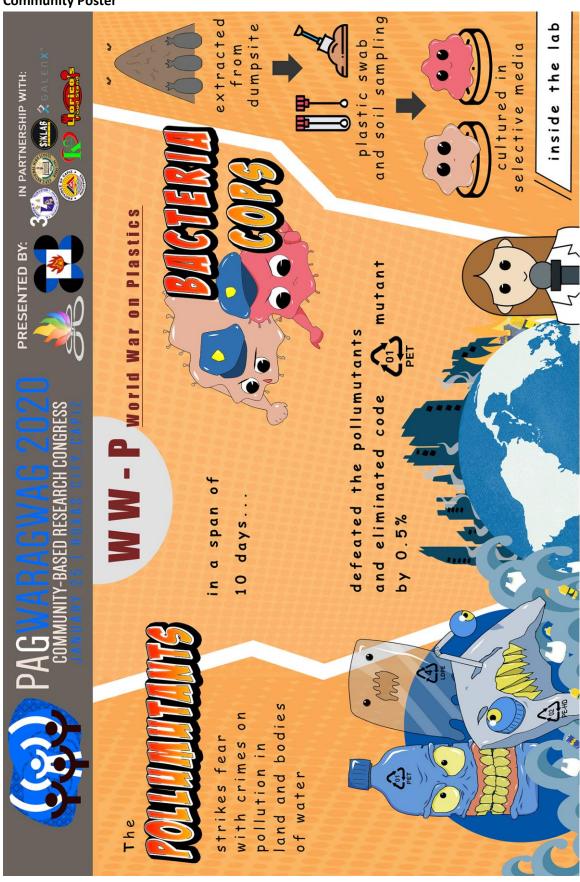
DepEd Learning Competencies: Describe changes in properties of materials when exposed to certain conditions such as temperature or when mixed with other materials (S4MT-Ig-h-6); use the properties of materials whether they are useful or harmful (S5MT-Ia-b-1) and; identify beneficial and harmful microorganisms (S7LT-IIf-6)

Workshop Title: Streak or Treat

Target Skill: Proper streaking technique







Technical Poster



The extraction and isolation of bacteria from Iloilo City Engineered Sanitary Landfill, Mandurriao, Iloilo City, and the assessment of their biodegradation potential on LDPE, HDPE, and PET.

Background



Due to the uncontrolled increase in the production rate of plastics (Sowmya et al. 2014), it slowly led to pollution on water and land. One promising field currently being studied to mitigate this problem is bioremediation (Mahdiyah et al. 2013).

Significance

Although the biodegradation field has been studied extensively especially in foreign countries, there is a lack of research here in the Philippines regarding this field.

Objectives

General objective

To isolate and assess the biodegradation potential of bacteria extracted from Iloilo City Engineered Sanitary Landfill on LDPE, HDPE, and PET.

Specific objectives

- 1. To extract plastic swab and soil samples from 5 randomly selected areas in the dumpsite
- 2. To isolate bacteria from plastic swab and soil samples extracted from the dumpsite.
- 3. To determine which isolated bacteria has the best bioremediating capability

References

Mahdiyah, D. and Mukti, B.H., 2013. Isolation of Polyethylene Plastic Degrading-Bacteria. Biosci. Inter, 2(3), pp.29-32.Singh, G., Singh, A.K. and Bhatt, K., 2016. Biodegradation of polythenes by bacteria isolated from soil. Int J Res Dev Pharm L Sci. 5(2): 2056-2062.

iowmya, H.V., Ramalingappa, M.K. and Thippeswamy, B., 2014. Biodegradation of polyethylene by Bacillus cereus. Adv. Polym. Sci., 4(2), pp.28-32.

Methods





Sample Collection

Plastic Preparation



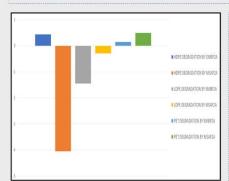


Bacteria Culture Cultivation

Plastic Degradation

Results and Discussion

A total of 28 colonies were isolated from plastic waste swab and soil samples taken from a dumpsite and was cultivated NA and TSB media. Bacterial strains EMBP2A and MSAP2A were subjected to the 3 types of plastics. Dry weight loss percentage is used to indicate the biodegradation rate of plastic during the incubation process. It showed that the plastics used have decreased their weight. Strain EMBP2A has decreased the weight of an HDPE to a highest percentage of 0.437% and PET to 0.147%. Strain MSAP2A has achieved a highest dry weight loss of 0.495% for PET.



A decrease in the weight of the plastics indicates that the bacteria can use plastic as an alternative carbon and energy source. The results falls a little behind that of Kathiresan and Bingham (2001) which have reported in their study that biodegradation using bacteria is ranging from 2.19 to 20.54% for polythene and 0.56 to 8.16% for plastics.

PET trend on the biodegradation process

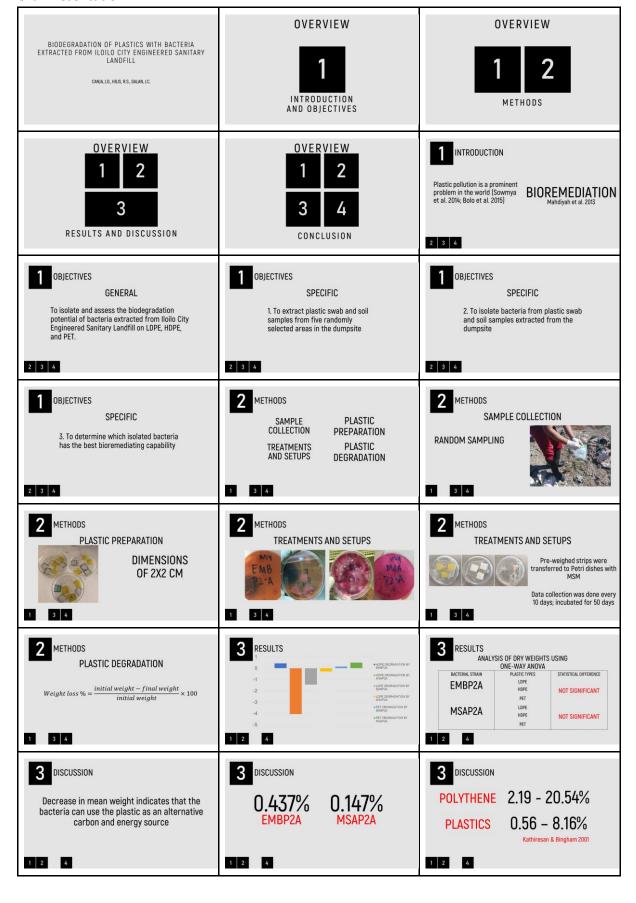
Conclusion

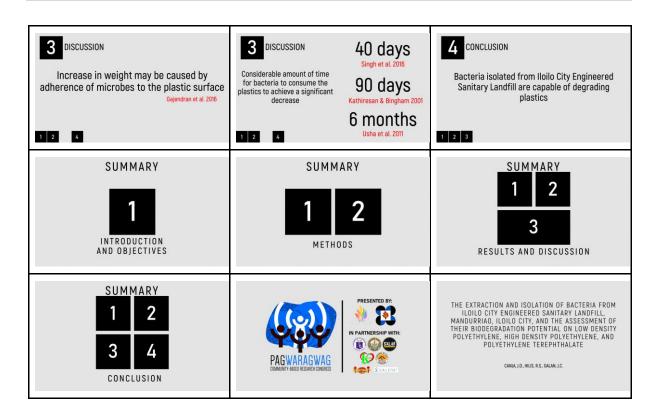
In a course of 10 days, the bacteria used were able to utilize the plastics as their sole carbon source during the incubation period.

Recommendation

Extend the incubation time for future studies because biodegradation process could be more extensive the longer the bacteria could feed on the plastics.







Ryan James M. Dumalag, Adonis F. Ebojo, and Jester L. Magan

A novel application of a double convex-hemispherical lens configuration for a III-V tandem InGaP/GaAs/Ge multi-junction solar cell

Gimmick Title: Way of the Light

DepEd Learning Competencies: Enumerate uses of light, sound, heat and electricity (S3FE-IIIi-j-3)

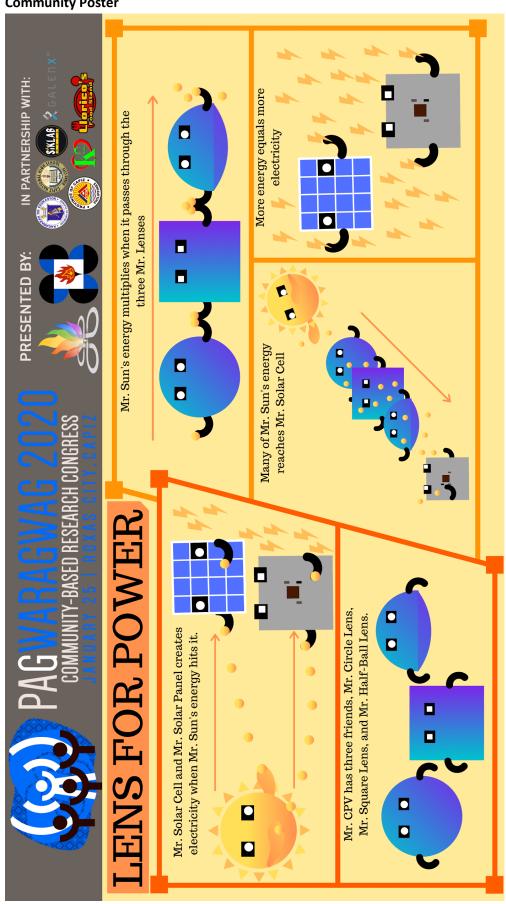
and; describe how light, sound and heat travel (S4FE-IIIf-g-4)

Workshop Title: Go Solar

Target Skill: Assembly of the Multi-junction Solar cell Concentrator Photovoltaic



Community Poster





A novel application of a compound convex-hemispherical lens configuration for a tandem III-V InGaP/GaAs/Ge multi-junction solar cell



BACKGROUND

Photovoltaics systems are used to convert the sun's radiant energies into electrical energy. This is done in an eco-friendly process where no chemicals are produced and movement is required. A concentrator photovoltaics (CPV) is an alternate to this device where lenses are used to collect more light. This, however, only works when the sun is within the acceptance angle of the system.

OBJECTIVES

The aim of this study is to determine the power output of a Fresnel lens CPV with the addition of a convex lens as a primary lens and a hemispherical lens as a secondary lens.

SIGNIFICANCE OF THE STUDY

The proposed CPV setup may be used as a cheap and affordable alternative to a CPV mounted on a solar tracker.

METHODS



Modelling

Measuring





Calculation







RESULTS AND DISCUSSION

Figure 1 shows that there is great increase in power output of the compound convex-hemispherical lens (CCHL) during midday (10:15-14:15). The increase in power output of the CCHL setup when compared to the Fresnel lens setup was determined to be 77.65% and 251.05% during the whole day and midday, respectively.

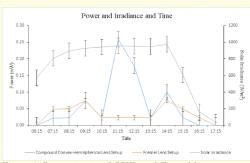


Figure 1. Power output of CCHL and Fresnel lens setup

Table 1 indicates that there is a significant difference during midday as the p-value is lower than 0.05 while there is no significant difference during the whole day as the p-value is greater than 0.05.

Table 1. The p-value for the difference in power output for the CCHL and Fresnel lens setup

Difference in Power	Z	Asymp. Sig. (2-tailed)	
Midday	-2.023	0.043	
Whole Day	-0.255	0.799	

CONCLUSION

The addition of a convex and hemispherical lens on a CPV improved the overall power yield of the setup.

RECOMMENDATION

Use a solar simulator to ensure that there are no external factors. A black cloth should also be used to prevent light reflection.





Cyrus Jehu P. Barrera, Mandy D. Umadhay, and Jasper C. Canson

Use of 1:7 rice bran wax to rice bran oil mixture as phase change material in increasing the efficiency of photovoltaic cells

Gimmick Title: EveryCircuit

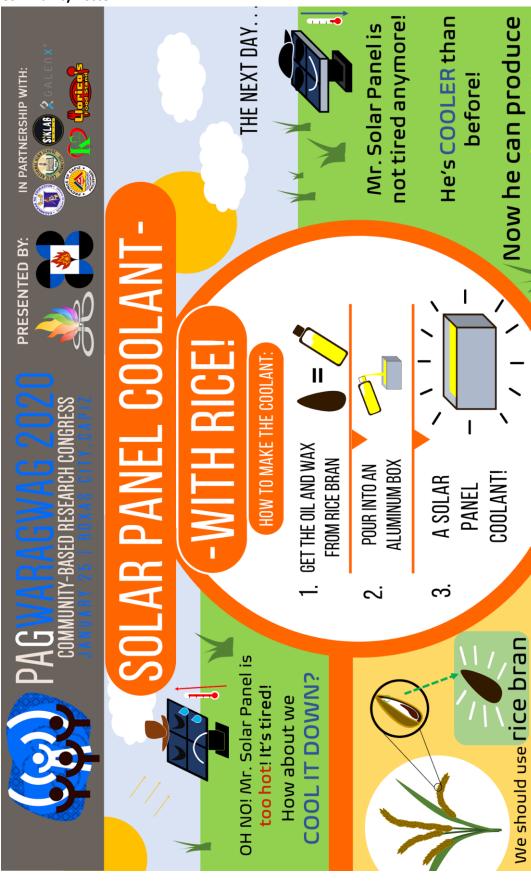
DepEd Learning Competency: Infer the conditions necessary to make a bulb light up (S5FE-IIIf-6)

Workshop Title: Lit-Spice

Target Skill: Using Ltspice software in determining the theoretical analysis of different circuits



Community Poster



more electricity

since it's renewable and it's a waste

anyway! Let's put it to good use!



Use of organic bio-based phase change material (PCM) in determining the efficiency of photovoltaic (PV) cells

Background



A PV cell's efficiency decreases when its temperature increases. Phase change materials (PCM) can absorb the heat of the PV cell.



However, some PCMs are not renewable and those that are renewable are used in food preparation.



A material that is renewable and does not compete in food source such as rice-milling waste is an ideal PCM source.

Objective

The goal of this research is to determine the potential of the rice bran wax and rice bran oil mixture as an organic rice-based PCM in determining the conversion efficiency of PV cells.

Significance of the Study

The study will help in making solar panels a better energy source alternative for fossil fuels.

Methods



Results and Discussion

1. Temperature

The melting point of the PCM was determined to be 30.06° C. The latent heat of fusion was $34.954\,\text{J/g}$ for the rice-based PCM.

The change in temperature over change in time is calculated as slope. The findings show that the PV cell with rice-based PCM had a slope of 0.050.

This implies that the PV cell with attached ricebased PCM coolant absorbed the heat during its phase-change process.

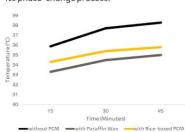


Figure 1. Temperature (°C) of PV cells of the PV/PCM systems

2. Power

The PV with the rice-based PCM had the highest power output computed, with a value of 0.02718 W.

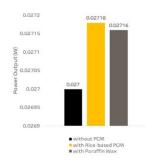


Figure 2. Computed power (W) of PV/PCM systems

3. Efficiency

The value of the efficiency of photovoltaic cells with the rice-based PCM attached to it was the highest among the three with 18.776%.

This is because it absorbs and discharges a large amount of energy during its phase change.

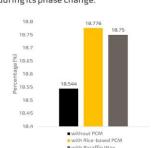


Figure 3. Computed conversion efficiency (%) of PV/PCM systems

Conclusion

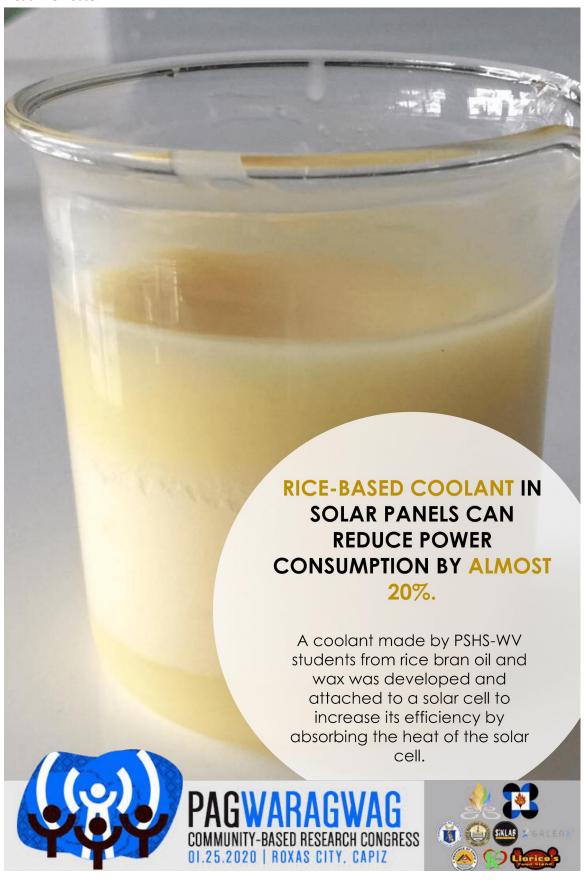
The incorporation of the rice-based material on the back surface of the PV cell has a positive influence on lowering the temperature of the PV cell and increasing its power and conversion efficiency.

Recommendation

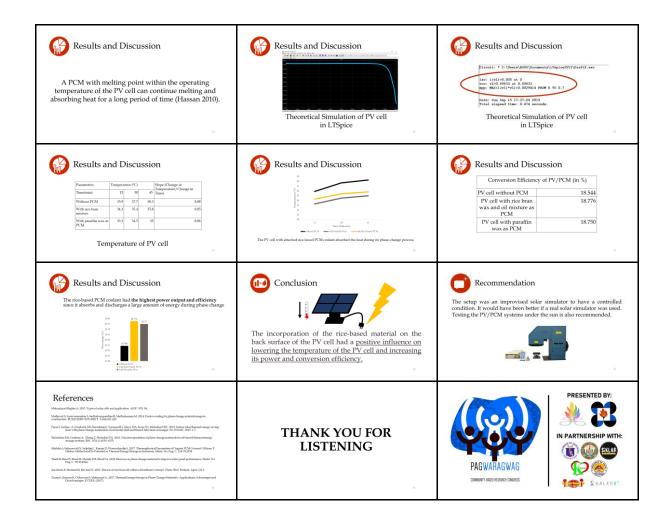
The setup was an improvised solar simulator to have a controlled condition. It would have been better if a real solar simulator was used. Testing the PV/PCM systems under the sun is also recommended.

REFERENCE:

REPERTURES.
Blowle PH, Eclache P, Kuznik F. 2013. Phase-change materials to improve solar panel's performance. Energy and Buildings, 62: 59-67.
Thaib R, Rizal S, Rizal M, Manila TM, Rizal TA. 2018. Beeswax as phase change material to improve solar panel performance. Mater. Sci. Eng. C. 30: 012024
Multhued S, Saravanasankar S, Sudhakarapandian R, Muthukannan M. 2014. Passive cooling by phase change material usage in construction. BUILD SERVENG REST. 3 (64):411-421







Mikko Legurpa and Marius Legurpa

Seed germination potential of different local varieties of *Oryza sativa* (rice) as affected by different seed priming methods

Gimmick Title: Rice Bilis

DepEd Learning Competencies: Describe the parts of different kinds of plants (S3LT-IIe-f-8); state the importance of plants to humans (S3LT-IIe-f-9) and; describe ways of caring and proper handling of plants (S3LT-IIe-f-10)

Workshop Title: RiceUp
Target Skill: Use of STAR



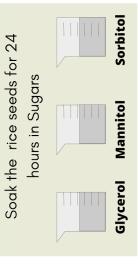
Community Poster

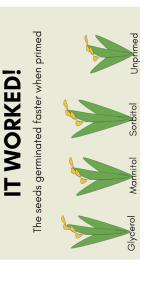


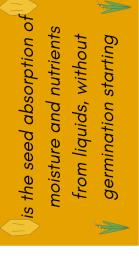
MAKING RICE GROW FASTER!



















Investigating the effect of different seed priming agents on seed germination of different local varieties of Oryza sativa (rice) in the Philippines

Background of the Study

55% of Filipino farmers do not use quality seeds which can affect yield. Seed priming is a technique used to **improve the overall** germination behavior of rice, the use of osmotic solutions in order to partially hydrate seeds up until a point necessary for germination process to start but not enough for radicle protrusion (Taylor et al. 1998). Currently most farmers in the country do not practice priming of any form. In this study, we will be comparing the effects of three osmopriming agents on two high value varieties of rice.

This research aims to investigate the effects of different osmopriming agents (glycerol, sorbitol and mannitol) on the seed germination behaviour of two local varieties (red and black) of Philippine rice (Oryza sativa) by;

- a. computing
- 1. no. of germinated seeds 1. germination %
- 2.length of shoot & root 2.germination rate index 2.germination rate index
- 1. germination %
 - 3. shoot: root ratio
- 3. shoot: root ratio

Significance of the Study

There are still knowledge gaps found in this field, some priming agents are still yet to be tested on rice or compared against other agents and the effect of seed priming on multiple local rice varieties still not been tested.

Methods



Seed Priming - Seeds were primed for 24



Germination Test - The number of germinated seeds were counted Everyday for 10 days.



Measuring - The shoot and root were measured using a vernier caliper.



Statistical Analysis - A Kruskal-Wallis Test was used to compare means.

Results & Discussion

- There is no significant difference between primed and unprimed seeds in germination percentage for both varieties. Seed priming can lead better germination percentage in many crops such as maize, wheat, rice, canola (Basra et al., 2005).
- There is a significant difference between primed and unprimed seeds in germination rate index (GRI) of both varieties. Imbibition of nutrients needed for Germination before germination itself would mean that seeds would be ready to germinate faster than unprimed seeds once they are sown (Elkheir et al., 2016).
- There is a significant difference between primed and unprimed seeds in shoot: root ratio (S:R Ratio) of black rice however none was found for red rice. This supports a previous study that shows seed priming improves the shoot/root ratio for primed seeds (Khan et al., 2011).

Conclusion

Seed priming leads to improved germination rate index in both red and black varieties of Oryza sativa.

Table 1. Parameters for Red Rice

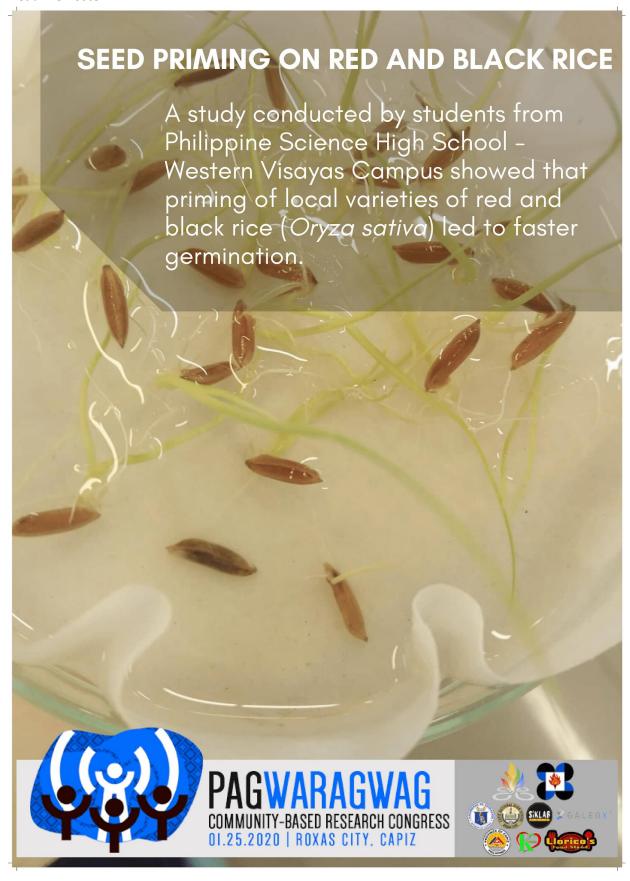
Treatment	Germination %	GRI	S:R Ratio
mannitol	98.00 ± 0	49.30± 0.254	0.85± 0.053
glycerol	98.00±1.018	50.33± 0.831	0.85± 0.062
sorbitol	98.00± 0.768	49.44± 0.229	0.82± 0.095
unprimed	97.56± 0.802	44.44± 1.338	0.81± 0.048
H Value	0.516	8.273	0.917
n Value	0.915	0.041	0.821

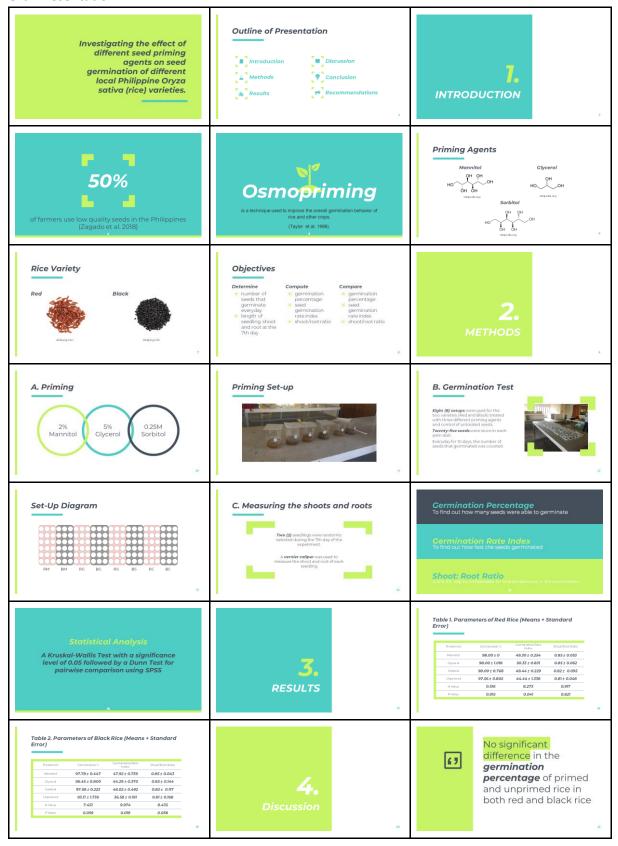
Table 2. Parameters for Black Rice

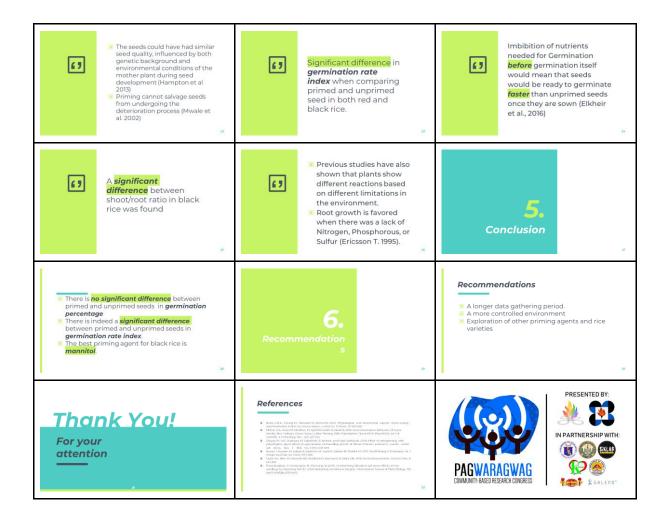
eatment	Germination %	GRI	5.R Ratio
nannitol	97.78 ± 0.447	47.92± 0.739	0.85± 0.043
lycerol	96.45±0.800	44.29± 0.370	0.85± 0.144
orbitol	97.58± 0.223	46.02± 0.492	0.82± 0.117
primed	93.11± 1.736	36.58± 0.191	0.81± 0.168
l Value	7.451	9.974	8.435
Value	0.059	0.019	0.038
	annitol lycerol sorbitol aprimed I Value	nannitol 97.78 ± 0.447 llycerol 96.45±0.800 sorbitol 97.58± 0.223 aprimed 93.11± 1.736 It Value 7.451	namitol 97.78 ± 0.447 47.92± 0.739 lyberol 96.45±0.800 44.29± 0.370 corbitol 97.58± 0.223 46.02± 0.492 primed 93.11± 1.736 36.58± 0.191 I Value 7.451 9.974

Recommendations

• Future studies could incorporate a longer data gathering period in order to compare yield, a more controlled environment and the use other priming agents and varieties.







Elaine S. Geroche, Nico Angelo O. Sombiro, and Jeremy Lance P. Villegas

The effect of salt stress on growth parameters of *Oryza sativa* (rice) variety NSIC Rc 442

Gimmick Title: Solve Salt Crimes with Rice Detective

DepEd Learning Competencies: Describe the parts of different kinds of plants (S3LT-IIe-f-8); state the importance of plants to humans (S3LT-IIe-f-9) and; describe ways of caring and proper handling of plants (S3LT-IIe-f-10)

Workshop Title: Rice and Shine

Target Skill: Proper handling and usage of Vernier Calipers in measuring various objects



IN PARTNERSHIP WITH:

SIKLAB SIKLAB

Community Poster



SEARCH FOR THE SHOOT AND ROOT ROBBERS

UPON SEEING THE #42 IMMEDIATEL> REPORTED THE SITUATION, PC SITUATION TO POLICE... ROOTS AND SHOOTS...?

*6ASP

6HT, PC 442

ONE PEACEFUI

ITS WA

OME WHEN...





DETECTIVE RICE JOINS THE CASE! I have a few saltspects in mind...

WHAT DID THE DETECTIVE DO?

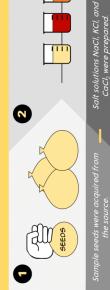
Roots and shoots

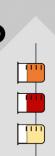
4

were measured

after the 10th day.

and weighted

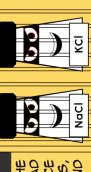


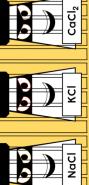












KCI WAS DISCOVERED TO BE THE MASTERMIND BEHIND VARIETY NSIC RC 442, AMONG THE THREE SALTSPECTS THE GROWTH OF THE ENTIRE ACT.



Salt Stress: Its effect on the germination parameters of Oryza sativa (rice) variety NSIC Rc 442

Background



Many studies have used NaCl solutions to study salinity tolerance in the germination of *Oryza sativa*, but little information exists regarding the effect of other salts on the germination of rice

This research chose to study and compare the effects of three different salts, NaCl, KCl, and CaCl2 on the germination of rice seeds variety NSIC

Objective

The aim of the study is to determine the effects of increasing salinity levels of sodium chloride (NaCl), potassium chloride (KCl), and calcium chloride (CaCl₂) on the germination parameters of Oryza sativa (rice) variety NSIC Rc 442

Specifically: To compare

- 1. Germination percentage,
- germination rate, and germination time
- 2. Leaf color of the seedlings after 10 days

To measure

- 1. Mean length and fresh weight of roots and shoots
- 2. Fresh weight of roots and shoots

Of rice seeds exposed to different types of salts (NaCl, KCl, and $CaCl_2$) at increasing salinity levels (control, 4 dS/m, 6 dS/m, and 8 dS/m) per set-up

Significance of the study

The study aimed to discover the effect of salt stress and if which of the salts causes more stress on the germination parameters of rice with the greater aim to contribute in the expansion of knowledge in the field

Methods













Results & Discussion

A one-way Analysis of Variance (ANOVA) at a 95% confidence interval (α = 0.05) was performed to evaluate the means. This test was performed using Statistical Packages for the Social Sciences (SPSS) version 23.

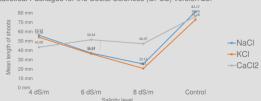


Figure 1. Trend analysis of mean lengths of shoots per salinity level

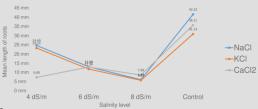


Figure 2. Trend analysis of mean lengths of roots per salinity level

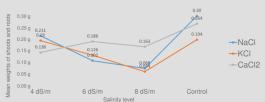


Figure 3. Trend analysis of mean weights of shoots and roots per salinity level

For seeds under both NaCl and KCl treatment, there exists a trend wherein increasing salinity levels results in a decrease in mean values of length of roots and shoots, and mean fresh weight of roots and shoots. However, this is not the case for CaCl₂, wherein it achieved the highest mean value of germination parameters at 6 dS/m, excluding the control treatment Seeds under the control treatment have the highest mean values of

Conclusion

All treatments have a significant effect on the germination parameters of Oryza sativa (rice) variety NSIC Rc 442. The trends showed that KCl had the worst effect on the mean shoot and root lengths and fresh weights, while CaCl₂ showed the least significant effect on the same parameters

References

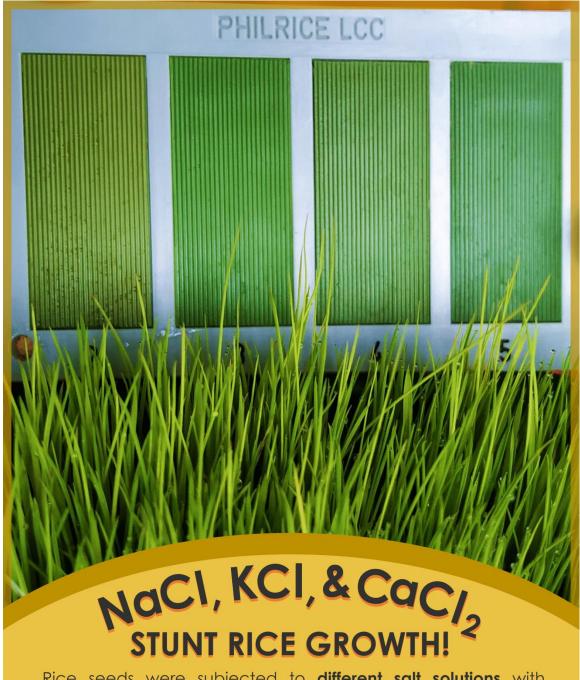
Balkan A, Genctan T, Bilgin O, Ulukan H. 2015. Response of rice (Oryza sativa L.) to salinity stress at germination and early seedling stages. Pak J Agri Sci. 52(2): 453-459.

Ologundudu AF, Adelusi AA, Akinwale RO. 2014. Effect of salt stress on germination and growth parameters of rice (*Oryza sativa* L.). Not Sci Biol. 6(2): 237-243.

Vibhuti, Shahi C, Bargali K, Bargali SS. 2015. Seed germination and seedling growth parameters of rice (Oryza sativa) varieties as affected by salt and water stress. Ind J Agri Sci. 85(1):

Recommendations

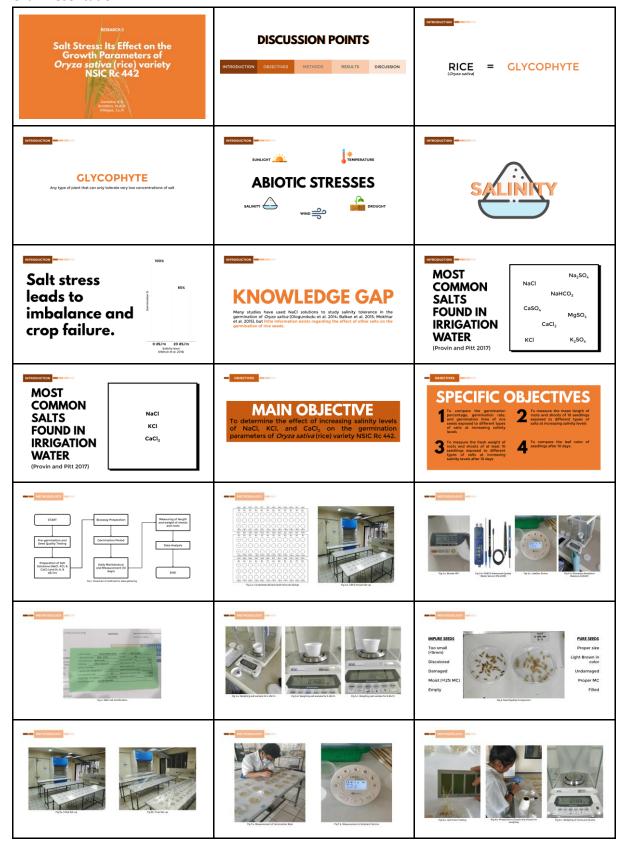
- 1. More replications in order to reduce error in the processed
- 2. Conduct study in a **field set-up** rather than a laboratory set-up.
- 3. Continue the study until yield to obtain conclusive results.

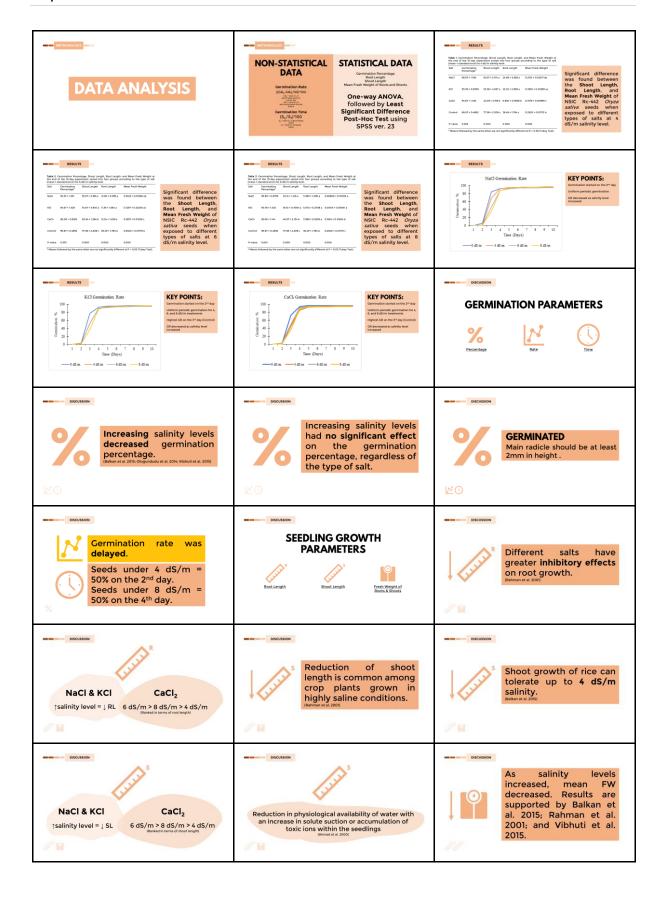


Rice seeds were subjected to **different salt solutions** with increasing concentrations during germination. All treatments showed **adverse effects** on growth to varying degrees.











Ceryl Grace B. Hembra, Rya Cessna B. Henderin, and Maureen Cosette G. Pareñas

Formulation of liquid soap incorporated with *Mangifera indica* (mango) leaf extracts and evaluation of its antibacterial activity against *Staphylococcus* spp.

Gimmick Title: Ball in the Hole

DepEd Learning Competency: Describe the effects of interactions among organisms in their

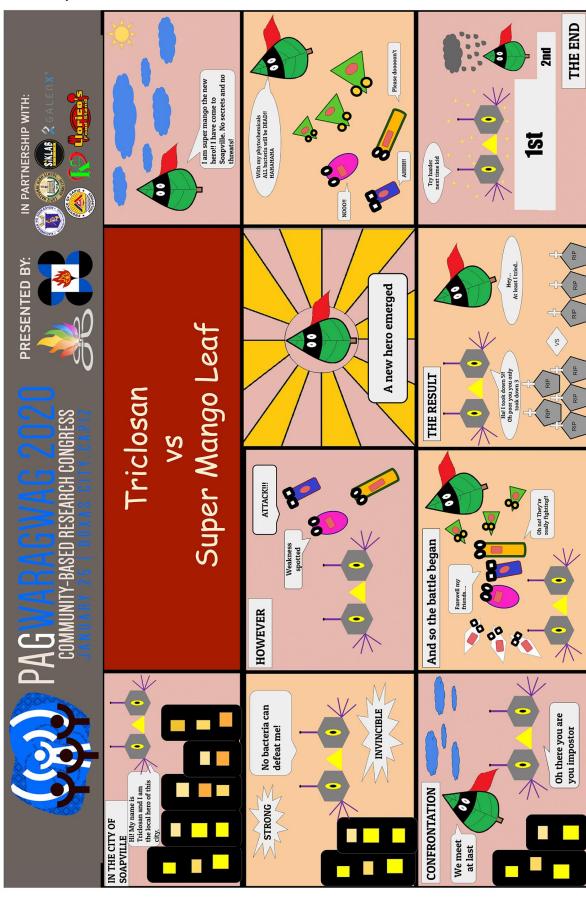
environment (S4LTIIi-j-18)

Workshop Title: Let's talk about ME: Maceration Extract

Target Skill: Extraction process using maceration



Community Poster





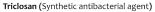


Formulation of a liquid soap incorporated with Mango (Mangifera indica) leaf extracts and evaluation of its antibacterial activity against Staphylococcus aureus

Background of the Study

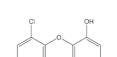
Mangifera indica (Mango) leaves

- presence of phytochemicals such as tannins, terpenoids, and flavonoids
- the potential reason of its antibacterial activity against Staphylococcus aureus, a gram positive bacteria that could cause skin infec-



- Commonly found in personal care products such as soaps
- Banned by the U.S. FDA
- long-term exposure would lead to different health risks such as bacterial resistance and abnormal hormonal changes.





This study aims to formulate a soap incorporated with M. indica leaves extract and to test its antibacterial activity against S. aureus.

Specifically, it aims to:

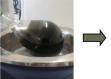
- 1. To develop a liquid hand soap
- ${\bf 2}_{\cdot}\;$ To evaluate the quality of the formulated liquid hand soap incorporated with M. indica leaves extract through physicochemical parameters
- 3. To determine the zones of inhibition (mm)
- 4. To determine if there is a significant difference between the zones of inhibition of the three formulated soaps.

Significance of the Study

The study will promote the use of natural base products and is also environment friendly







Extraction Oven dry Cold maceration Filtration

Rotary evaporator

Formulation Triclosan Extract Soap Base 50g palm oil Soap base Soap base

23.33g KOH 0.1mg Triclosan 1.25g extract 2.5g SLS 2.5g Paraben

Distilled water



Physicochemical рΗ

Density Foam Stability Free Caustic alkali



Agar-Well Diffusion

About 100 mg ml⁻¹ of the test liquid soap was dispensed into the wells. The plates were then incubated at 37°C for 24h.



Data Analysis

One-Way ANOVA

Results and Discussion

The soap base resulted to have a zone size close to the zone of the soap with the extract. This may be because palm oil contains tannins and steroids and has a low antibacterial activity (2 mm inhibition zone) against S. aureus.

Since all three soaps have the same base materials, most of the values for the tests were similar, if not all three then the two with Triclosan, and with mango extract. However, all three soaps did not pass the free caustic alkali test.

Table 1. Zones of inhibition (mm)

		. ,
	Mean	SD
Soap Base	0.60	0.14
Triclosan	1.40	0.20
Extract	0.87	0.06

Table 2. Free Caustic Alkali of formulated

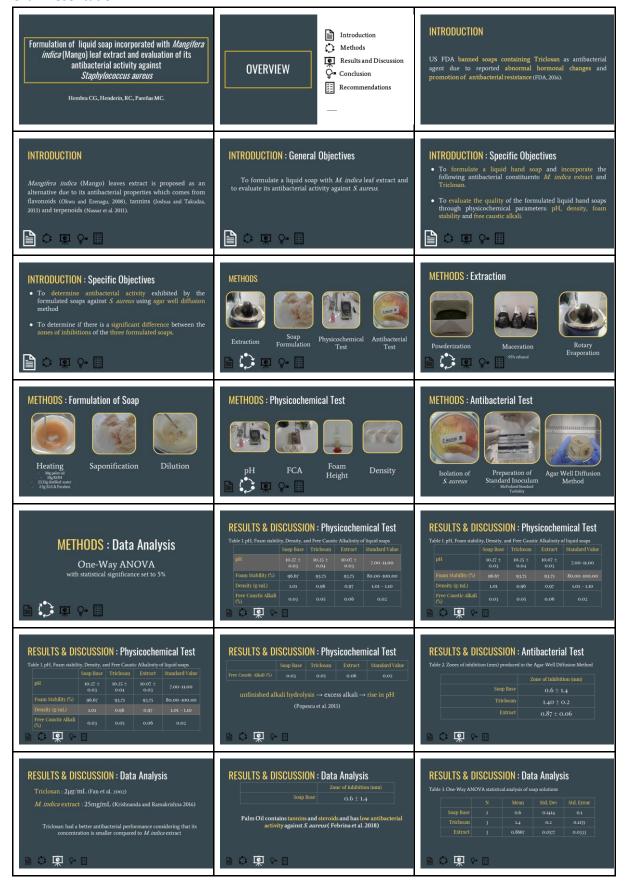
	Initial reading (mL)	Final reading (mL)	Free caustic alkali (%)	
Negative	20.00	19.50	0.03	
Positive	20.00	19.20	0.05	
Extract	20.00	19.10	0.06	

Conclusion

The formulated soap with M. indica extract has antibacterial activity against *S. aureus* however it cannot be used as an alternative for Triclosan.

Recommendation

Different oils should be used for future research and formulation of the soaps. Varieties of oil with found antibacterial properties could be used as a substitute for palm oil.





Chloe Elesse S. Faciolan, Francis Harry Shone V. Leonora, and Leonard Vincent A. Majaducon

Organo-mineral composites from the shells of *Crassostrea iredalei* (slipper cupped oyster), *Perna viridis* (green shell), and *Telescopium telescopium* (horned snail) in the removal of chromium (VI) from water

Gimmick Title: Labugay

DepEd Learning Competencies: Distinguish different contents of mixtures and separation techniques (S6MT-Id-f-2, S6MT-Ig-j-3) and; understand properties of matter and materials (S5MT-Ia-b-1)

Workshop Title: Labugay

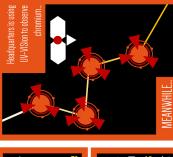
Target Skill: Use of pH paper and properties of acids and bases





What will our heroes do to prepare for their mission?

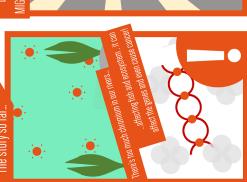




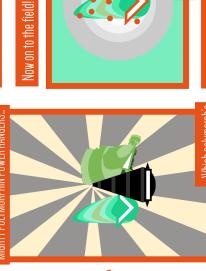
















WHAT ELSE IS IN STORE FOR OUR POLYMORPHIN RANGERS?



Organo-mineral composites from the shells of *Orassostrea iredalei* (Slipper-Oupped Oyster), Perna viridis (Green Shell), and Telecospium Telescopium (Horned Snail) in the remediation of Or (M) in water









Initial and final absorbance of the untreated and treated chromium solution measured using the UV-Vis at 350nm, the calibration curve was then used to convert the absorbance to concentration which were then used to obtain the chromium removed (in ppm) and each treatment's adsorption efficiency



Absorbance reading using UV-Vis



Crushing of Shells

Treatment

Data Analysis



All of the treatments were able to remove All of the treatments were able to remove chromium from the water. Bagongon removed the most at 0.784 ± 0.067 ppm, whereas talaba remediated the least at 0.279 ± 0.183 ppm. The trend in the increase of pH follows the trend of increasing adsorption efficiency. (Table 1)

Upon One-way ANOVA, the results show a significant difference between treatments at the 95% confidence interval with p=0.0483. The LSD post-hoc reveals that a significant differences exist between bagongon and talaba, and talaba ang bagongon.

Table 1. Summary of adsorption efficiencies and chromium removed, and comparison of initial and final pHat the end of batch runsis reported.

Treatment	Chromiumremoved (ppm)	Adsorption Efficiency (%)	pHinitial	pHFinal
Bagongon	0.784 ± 0.067	9.632		217
Tahong	0.687 ± 0.292	8.444	211	216
Talaba	0.279± 0.183	3.431		214

The shells of Bagongon, Tahong, and Talaba vary in adsorption efficiencies due to their respective organomineral composites. The trend in the change in pH closely follows the trend in adsorption efficiency.

The results are so because:



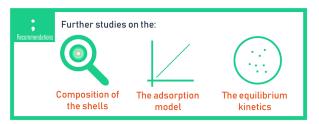
Surface adsorption allows chromium to bind at the surface of the calcium carbonate. The identity of the adsorbent affects the extent of adsorption.



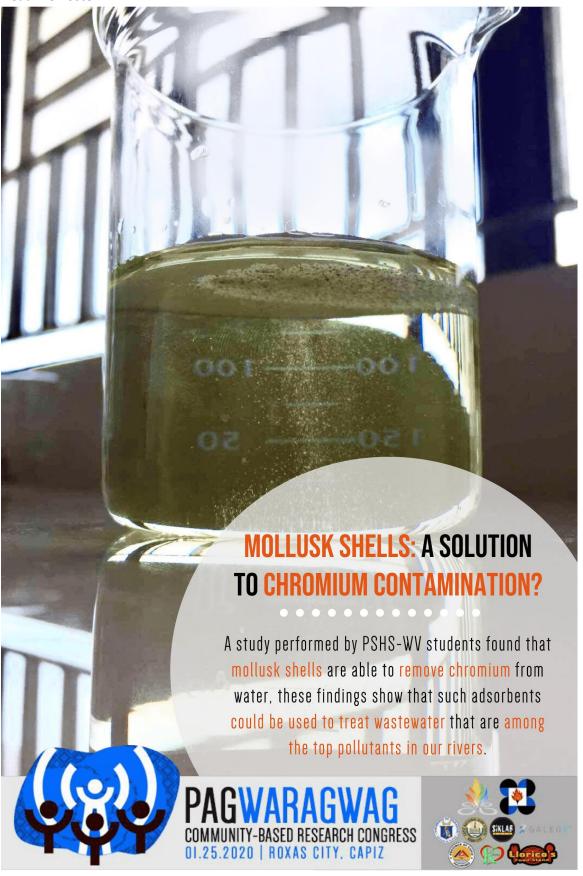
Calcite and aragonite polymorphs of calcium carbonate are present in mollusk shells. These vary between species.



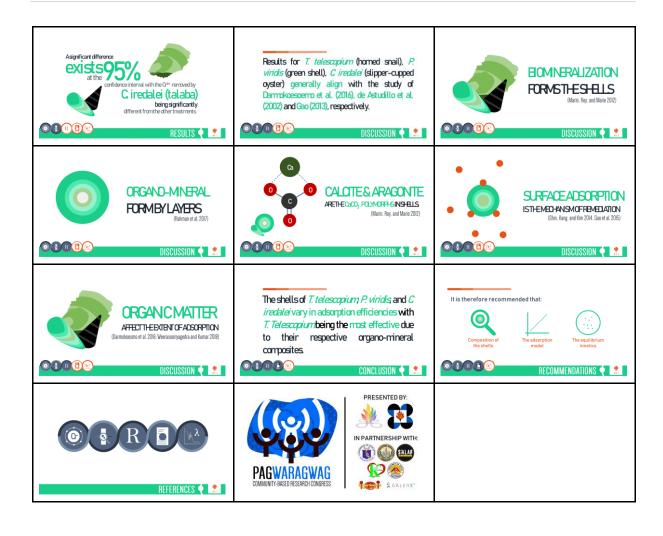
Variations in organic matter present affected surface adsorption, bagongon shells have the greatest organic content among the three shells



References: Bobade V. Eshinagi N. 201
Cabuga CC et al. 2017. Ga







Gideon Benedict F. Bendicion, Aaron Philip C. Dael, and Sophia Karina S. Genterola

Potential antifeedant bioactivity of *Anethum graveolens* (dill) essential oil against *Cochlochila bullita* (lace bugs) on *Ocimum kilimandscharicum* (sweet basil)

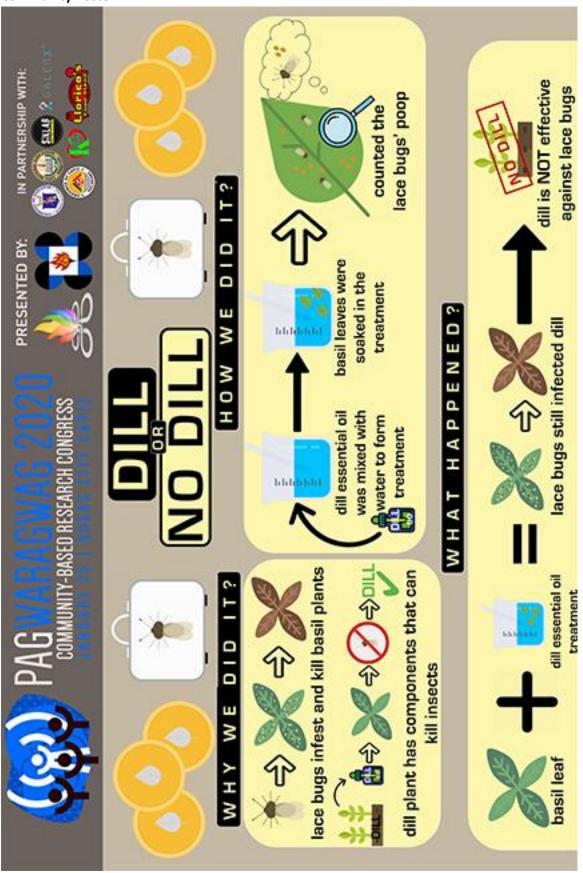
Gimmick Title: The Battle for Basil

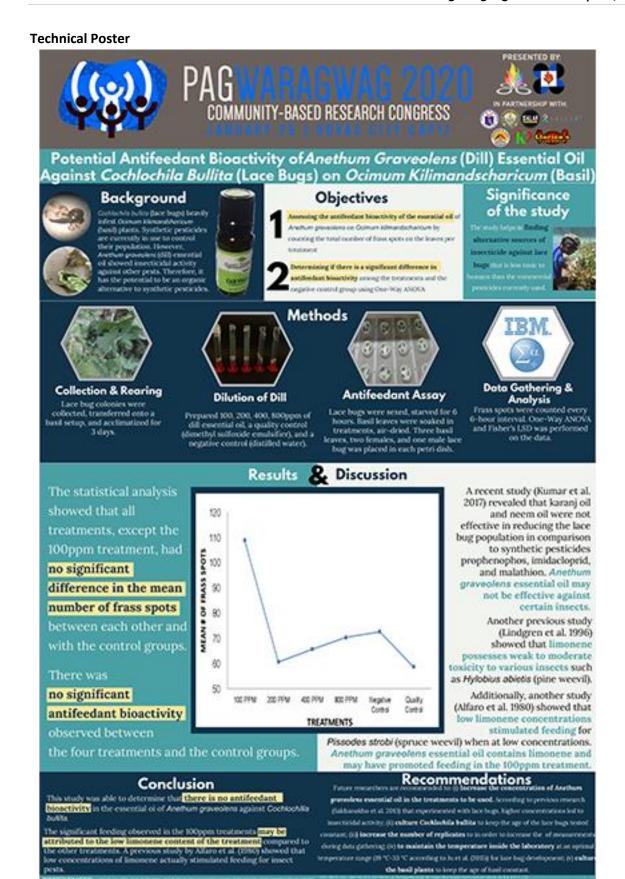
DepEd Learning Competencies: State the importance of plants to humans (S3LT-IIe-f-9); recognize that there is a need to protect and conserve the environment (S3LT-IIi-j16) and; describe certain types of harmful interactions among living things (S4LTIIi-j-16)

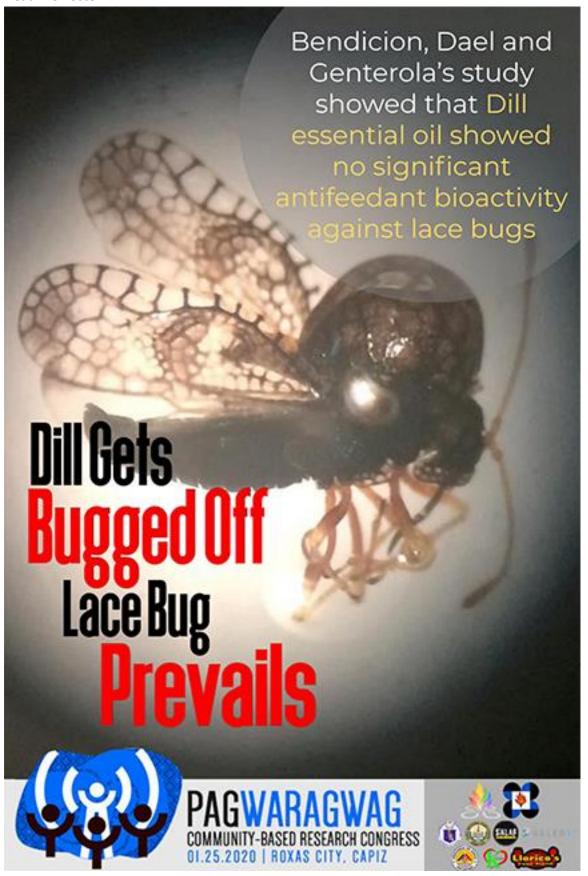
Workshop Title: The Art of the Lace Bug Target Skill: Proper handling of lace bugs



Community Poster











Sam Daniel T. Venturina, Josh Zavion A. Comuelo, and Wayne Rocq A. Samaniego

The utilization of methanolic *Bixa orellana* (Annatto) seed extract as substitute for safranin in Gram staining

Gimmick Title: Will It Color?

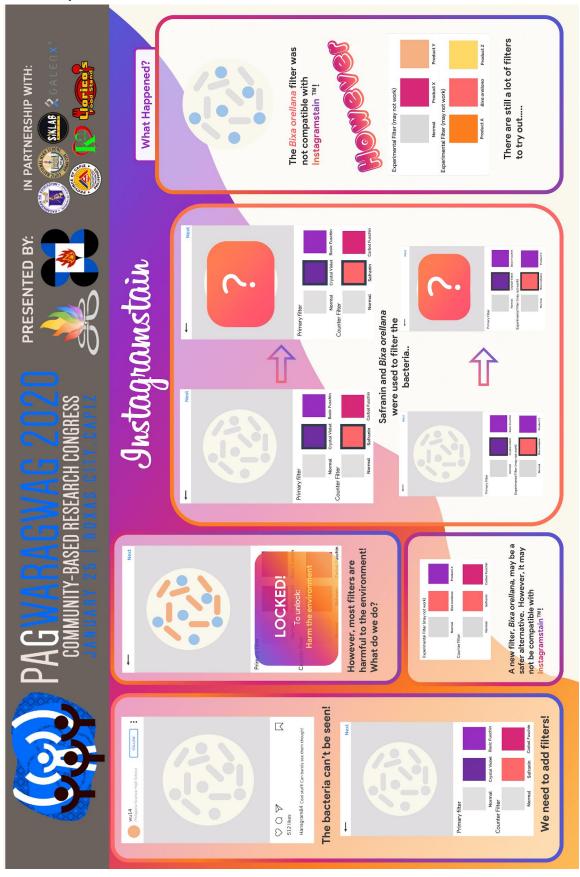
DepEd Learning Competency: Identify beneficial and harmful microorganisms (S7LT-IIf-6)

Workshop Title: Instagramsmear

Target Skill: Proper procedure in smearing



Community Poster



Technical Poster



PAGWARAGWAG 2020

COMMUNITY-BASED RESEARCH CONGRESS



The use of *Bixa orellana* (Annatto) extracts as a substitute for safranin in Gram Staining

Background

Gram staining is a technique used to differentiate two groups of **bacteria** based on their cell walls. Currently, stains that are made from synthetic components are used.

However, current studies gravitate towards the use of natural dyes instead of their synthetic counterparts





Bixa orellana

Bixa orellana, commonly known as Annatto, is a dye yielding plant could be used as a natural alternative for synthetic stains like Safranin.

Significance

This study can help provide information on the possibility of plant dyes as alternative to the commercially used synthetic dyes in Gram Staining.

Objectives

This study aims to investigate the use of *Bixa orellana* extracts as a substitute for safranin in Gram staining.

Specifically, this study aims:

To measure and compare the pH of the stock solutions of both *Bixa* orellana and safranin

To compare the UV-Spectra of pure bixin and the bixin extract.

To compare the (a) solubility, (b) pH and (c) color spectra of the reconstituted *Bixa* orellana solutions.

To compare the staining capabilities of both Bixa orellana and safranin.

Methods











Extraction

Evaporation

Reconstitution

Smearing

Staining

Results and Discussion

The Bixa orellana extract was found to be acidic at pH **5.92**



The *Bixa* orellana extract was also unable to stain the bacteria.

This may be due to the fact that pH plays a role in the binding of the stain to the bacteria.





As bacterial cells are acidic, basic stains can bind with them easier.

Conclusion and Recommendations

The *Bixa orellana* extract **cannot** be a substitute for safranin in Gram Staining.

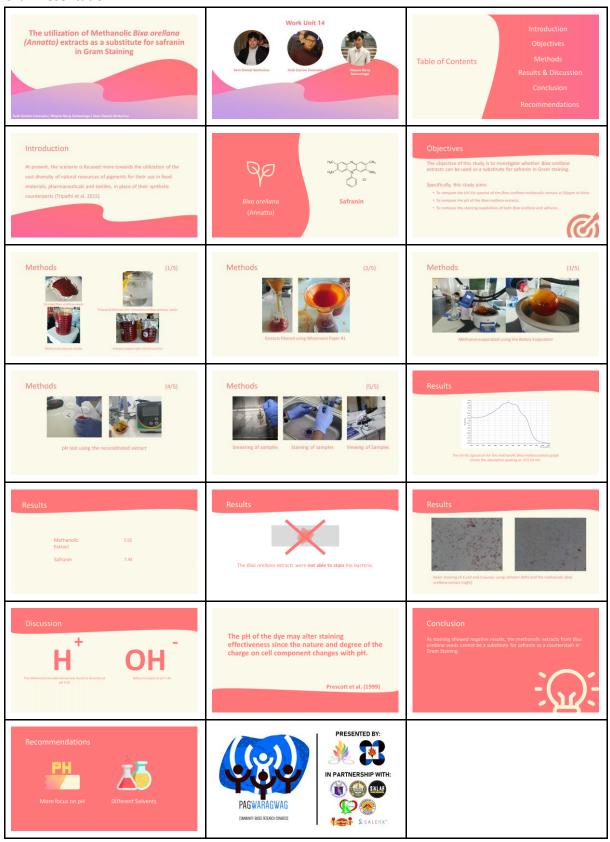
The replication of this research with more focus on the pH of stains is recommended. More configurations is also recommended to better understand the relationship between pH and staining ability.

References

Giridhar P, Akshatha V. and Parimalan R. 2014. Review on Annatto Dye Extraction, Analysis and Processing – A Food Technology Perspective. Journal Science Research and Reports 3(2): 327-

Ochei, J. and Kolhatkar, J. (2005). Medical Laboratory Science Theory and Practice 3rd reprint Pp 441.





Luke Daniel G. Socrates, Mary Jane O. Tang, and Seth William C. Tionko

Optimization of reaction parameters for the synthesis of silver nanoparticles using ascorbic acid and trisodium citrate

Gimmick Title: Perfect Combination

DepEd Learning Competency: Describe the components of a scientific investigation (S7MT-la-1)

Workshop Title: Perfect Combination Target Skill: Calculating molarity



Community Poster



Technical Poster



PAGWARAGWAG 2020



COMMUNITY-BASED RESEARCH CONGRESS

Optimization of reaction parameters for the synthesis of silver nanoparticles using ascorbic acid and trisodium citrate

BACKGROUND



Silver nanoparticles (AgNPs) are structures with dimensions under 100 nm. These are used in the fields of medicine, electronics, and others. [1]



AgNPs can be synthesized using the combination of reducing and capping agent, namely ascorbic acid and trisodium citrate respectively [2].



Optimization of reaction parameters was done through Response Surface Methodology which measures the synergistic and antagonistic effect of each variable to the overall response [3].

SIGNIFICANCE

Optimal conditions may be used to efficiently synthesize AgNPs for bulk production in the future.

OBJECTIVES

To optimize the reaction parameters in the synthesis of AgNPs through RSM Specifically:

- 1) To determine the optimal conditions
- To compare the theoretical yield to the actual yield of AgNPs

METHODS











Synthesis of AgNPs

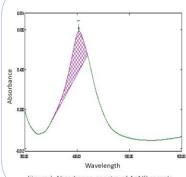
Altering of Parameters

UV- vis Analysis S

Statistical Analysis

Optimized Synthesis

RESULTS AND DISCUSSION



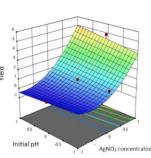


Figure 1. Absorbance spectra of AgNP sample Figure 2. 3D interaction plot of AgNPs yield, initial pH, and AgNO3 concentration.

UV-vis spectra of the sample showed that the peak wavelength is 404 nm confirming the formation of silver nanoparticles. (Figure 1)

Yield = 0.541143 + 0.1853A + 0.2117B + 2.2756C + 0.44475AC + 1.57966C²

The equation representing the system was established. 'A' stands for initial pH, 'B' for digestion time, and 'C' for AgNO₃ concentration. It can be observed that AgNO₃ had the most effect on the yield of AgNPs and had a synergistic effect with initial pH. The theoretical yield obtained from Figure 2 is 5.238 while the actual yield from the experiment was 4.298. AgNPs yield had a 17.95% error.

CONCLUSION

Optimal conditions were found out to be at pH = 8, digestion time = 4.5 minutes, AgNO₃ concentration = 0.015 M. AgNO₃ had the most effect on yield of AgNPs and had a synergistic effect with pH. Actual yield was determined to be 4.298 area units.

RECOMMENDATIONS

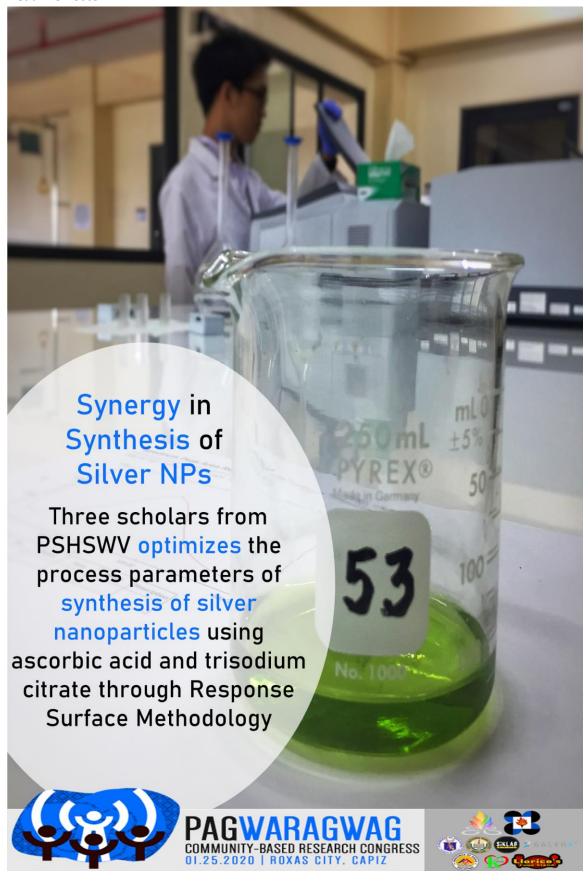
Further investigation of effects of other parameters such as stirring speed, heating temperature, and reductant and stabilizer concentration, thus a six-level factorial design.

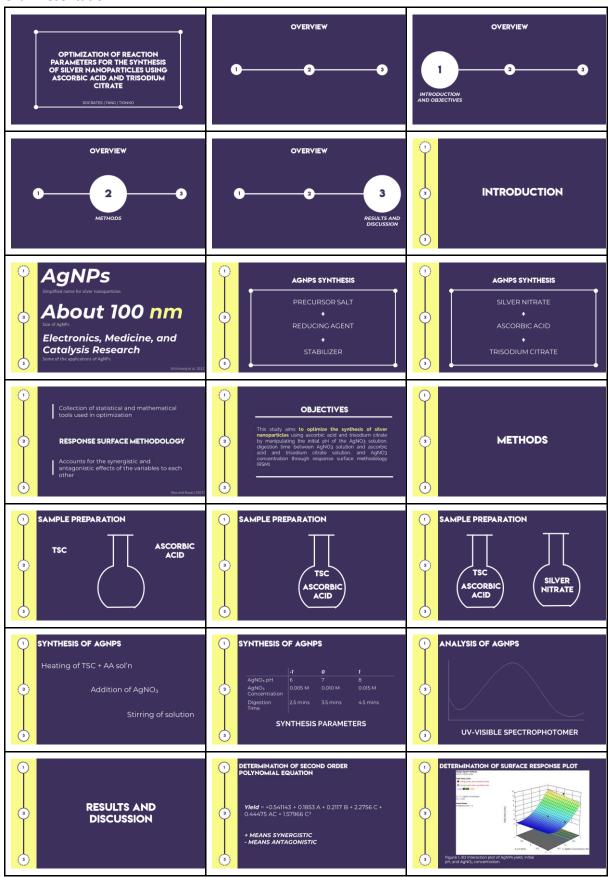
The use of two-neck round-bottom flask as a reaction vessel for the synthesis of AgNPs.

Acta Part A: Mol & Biomol Spectroscopy, 93(2012):95-99.

2[Qin Y, Ji X, Jing J, Liu H, Wu H, Yang W. 2010. Size control over spherical silver nanoparticles by ascorbic acid reduction. Colloids and Surfaces: A Physiochem and Engg Aspects 372(2010):172-176.

3] Bas D, Boyaci I. 2007. Modelling and optimization: Usability of Response Surface Methodology, J Food Engg. 78(3):836-845.







Christian Dale P. Celestial, Bassy Leiah V. Ibarreta, and Ruth SP G. Tiron

Determining the maximum number of transaction records that the Apriori algorithm can scan in 90 seconds

Gimmick Title: Feed Me: The EatVentures of Apriori Bot

DepEd Learning Competency: Employ the use of mobile devices to access information, communicate with others, and solve problems in daily life (LS6DL-DD-PSELE/AE/LS/AE-5)

Workshop Title: Prava: 101 in Slaying Computer Science

Target Skill: Basic Java programming



Community Poster



Technical Poster



Determining the maximum number of transaction records that the Apriori algorithm can process in a tolerable amount of time

BACKGROUND OF THE STUDY

The Apriori Algorithm



easy and simple to use



takes a long time in scanning large databases

There is **no definite value** as to the maximum number of transaction records that the algorithm can scan in a tolerable amount of time.



tolerable amount of time = 90 seconds (Antonides et al. 2015)

SIGNIFICANCE OF THE STUDY

This study could be used as a basis for comparison to researchers who aim to study and improve the Apriori algorithm in the future.

OBJECTIVES

To determine the size of the database which the classic Apriori algorithm can process accurately within 90 seconds, given that the complexity of the database and the hardware used are constant

Specific

- 1. To determine Apriori's scanning time and accuracy
- To determine the maximum number of transaction records that the algorithm can process with a percent error of 0%

METHODS



code

Acquisition of grocery database and modification of Java source

2

Initially scanned 500 records . Repeated thrice . Computed

average scanning time 3 Two hundred

(200) records repeatedly added until scanning time =

transaction

4

Percentage prediction error was computed using actual and outputted frequency

RESULTS & DISCUSSION

The results show that the classic Apriori algorithm can scan **1,310 transactions** in less than 90 seconds. The algorithm's scanning time in this period was **82.52 seconds**. Several factors could have affected the results of the study such as the hardware and minimum support used in the testing process.

The percentage prediction error throughout the whole process was **0**%. The accuracy was 100% throughout the whole process, meaning the modifications made were **effective**.

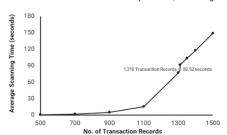


Figure 1. The average scanning time of the algorithm in each trial for each set of transaction records.

y = 0.0248e^{0.0061x} y = 0.0248e^{0.0061x} y = 0.0248e^{0.0061x} y = 0.0248e^{0.0061x} No. of Transaction Records

Figure 2. Trendline of the average scanning time of the algorithm and the corresponding number of transaction records.

CONCLUSION

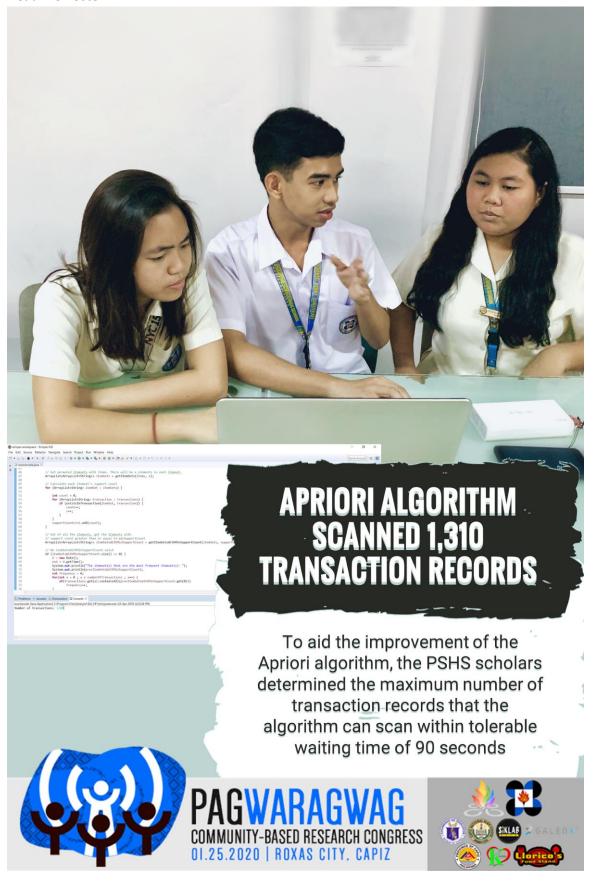
The Apriori algorithm can scan 1,310 transactions in under 90 seconds, with 100% accuracy.

RECOMMENDATIONS

The study may be performed with other hardware and with other programming languages

REFERENCES

- Antonides G, Verhoef PC, van Aalst M. 2002. Consumer perception and evaluation of waiting time: A field experiment. J Consum Psychol. 12(3): 193–202.
- Najadat HM, Al-Maolegi M, Arkok B. 2013. An improved Apriori algorithm for association rules. Int Res J Comput Sci Appl. 1(1): 1-8.
 Sahu A, Dhakar M, Rani P. 2015. Comparative analysis of Apriori algorithm based on association rule. Int J Comp Sci Comm. 6(2):18-21.







Katrina Bianca T. Bandiola, Joshua James Angelo Y. Galotera, and Jenn Christel C. Sampiano

Column adsorption of cadmium (II) and lead (II) using rice husks and mango peels

Gimmick Title: Catch MEtals If You Can

DepEd Learning Competencies: Identify things that can make objects move such as people, water, wind, magnets (adsorption) (S3FE-IIIc-d-2) and; describe the appearance and uses uniform and non-uniform mixtures (S6MT-lac-1)

Workshop Title: Power Column

Target Skill: Column packing and adsorption





Technical Poster



Column adsorption of cadmium and lead using rice husks and mango peels

BACKGROUND

Cadmium and lead are exceeding the standard levels in wastewaters due to industrialization.

These heavy metals are toxic contaminants that can cause diseases and environmental damage.

Rice husks and mango peels are adsorbents with the potential to remove cadmium and lead in water. However, they have only been tested individually.

Combining adsorbents in a column setup may increase the removal efficiency for multiple heavy metals in water.



SIGNIFICANCE

This study can determine whether a multi-adsorbent column has a higher removal efficiency than single-adsorbent columns.



To determine the adsorption efficiency of a multi-adsorbent column composed of rice husk and mango peel waste adsorbents and compare it to the efficiency of columns individually composed of rice husk and mango peel waste



METHODS



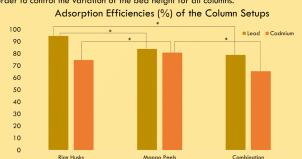






RESULTS & DISCUSSION

The setup with the highest percent adsorption for lead removal was the rice husk column at 94.66% while for cadmium removal it was the mango peel column at 80.66%. The combination setup had the lowest adsorption efficiency for both metals. The lower adsorption efficiency of the combination setup can be attributed to the reduction of adsorbent mass in order to control the variation of the bed height for all columns.



* denotes that the $p \ge 0.05$, thus there is a significant difference between

CONCLUSION

Single adsorbent columns achieved the higher adsorption efficiencies.

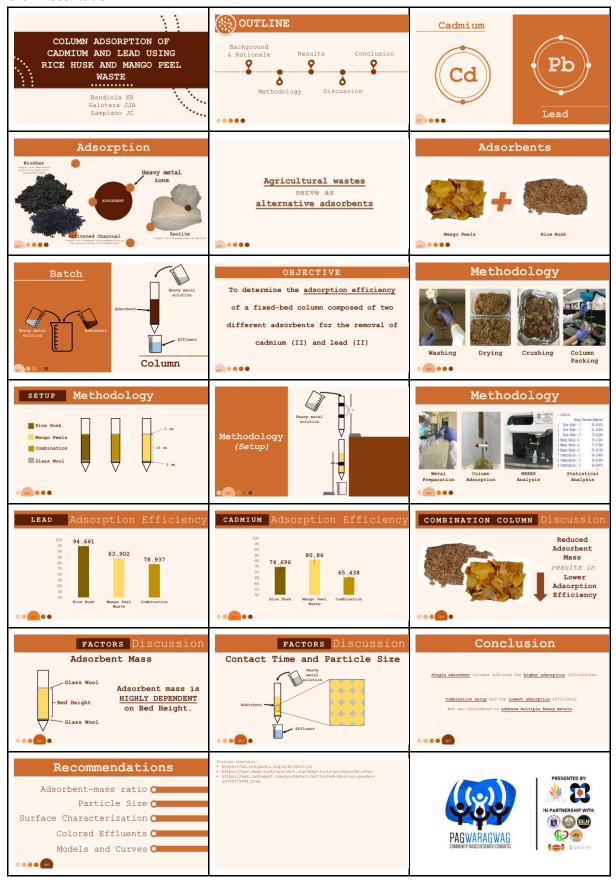
Combination setup had the lowest adsorption efficiency but was considered to address multiple heavy metals.

RECOMMENDATIONS

• Manipulate the adsorbent-mass ratio and particle size

- · Address the case of colored effluents
- Perform surface characterization on adsorbents
- Implement breakthrough curves to understand adsorption kinetics





Harvey C. Loquias and Reigen R. Placido

Antibacterial activity of copper-chitosan complexes against zoonotic *Vibrio* parahaemolyticus

Gimmick Title: Copper Hoppers

DepEd Learning Competencies: Describe different objects based on their characteristics (e.g. Shape, Weight, Volume, Ease of flow) (S4MTIg-h-6) and; infer how friction and gravity affect movements of different objects (S4ESIVc-3)

Workshop Title: Lab ka ba?: Aseptic Technique

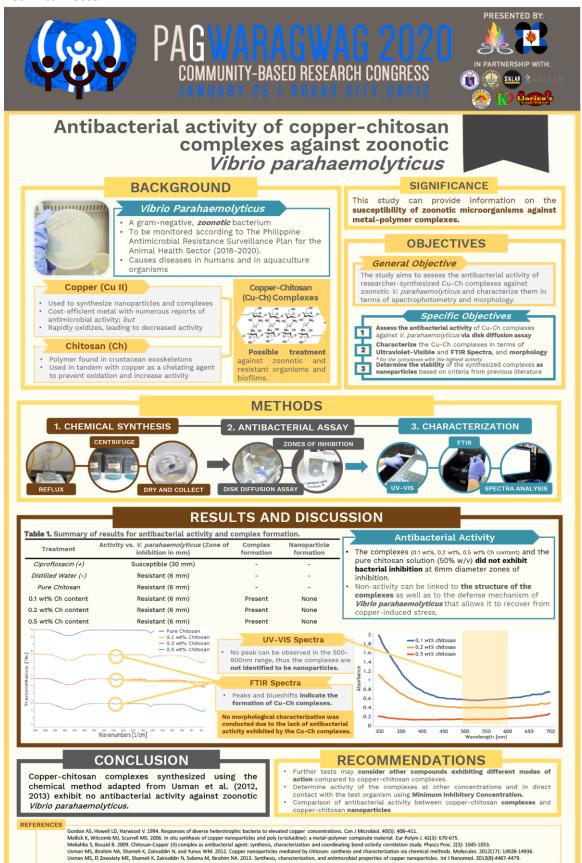
Target Skill: Aseptic technique

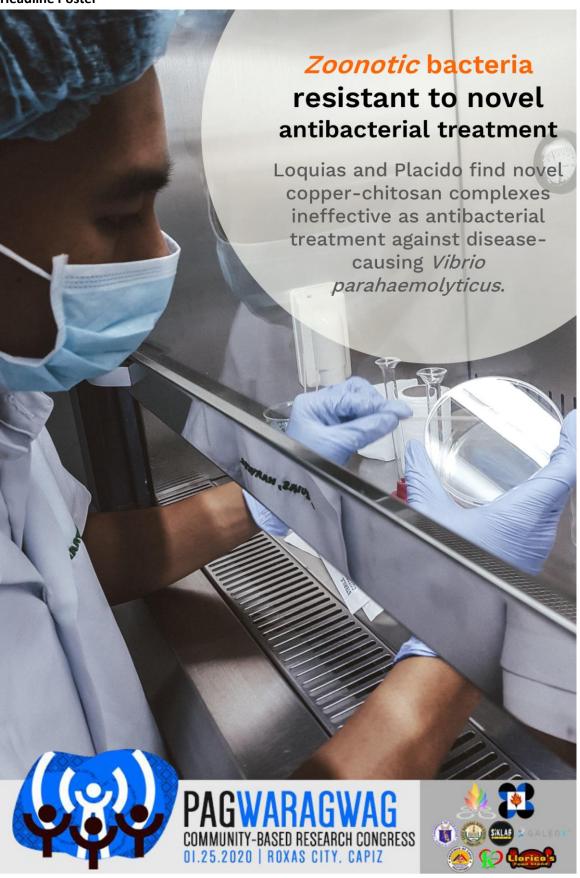


Community Poster

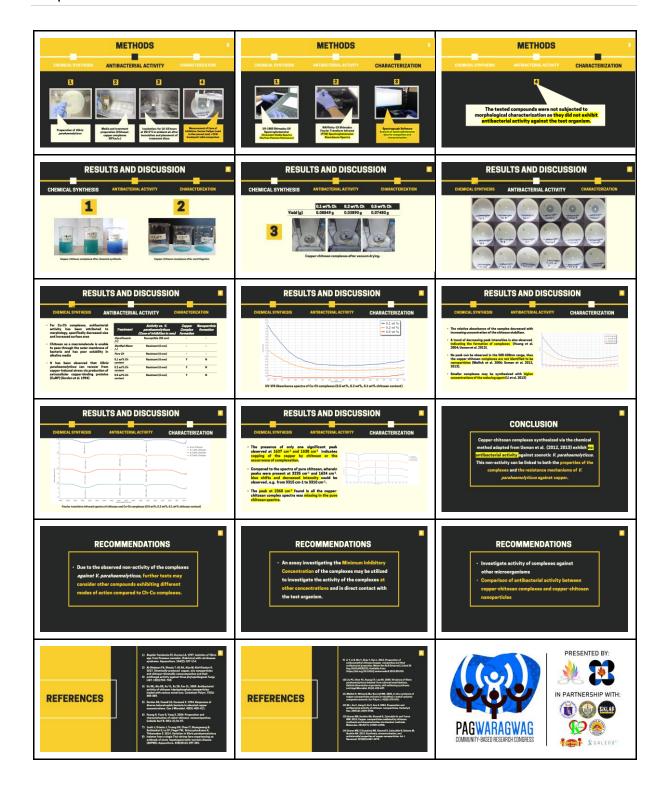


Technical Poster









Cyra Marie P. Agno, Pauline Ysabelle A. Gilongos, and Yani Angeline D. Jalandoni

Evaluation of the ultraviolet and visible light photocatalytic activity of undoped and nitrogen-doped titanium dioxide nanoparticles (N-TNPs) against low-density polyethylene (LDPE)

Gimmick Title: Shots Fired

DepEd Learning Competencies: Describe changes in properties of materials when exposed to certain conditions such as temperature or when mixed with other materials (S4MTIg-h-6) and; infer the importance of water in daily activities (S4ESIVc-3)

Workshop Title: Accuracy is Key

Target Skill: Measuring and transferring liquids



Community Poster





Evaluation of ultraviolet and visible light photocatalytic activity of undoped and nitrogen doped titanium dioxide (N-TNPs) nanoparticles against low density polyethylene (LDPE)

Background

Plastic pollution is becoming alarming because of the inability of plastic to degrade faster.



Heterogenous photocatalysts are effective in polymer degradation and uses semiconductors to generate reactive species like **superoxides** and **hydroxyl radicals** when exposed to light[1].

Titanium dioxide (TiO_2) is the most promising semiconductor due to its high efficiency, chemical inertness, stability, and nontoxicity [2]. Furthermore, doping nitrogen in its crystalline lattice can enhance its properties.



Objectives

This study aims to confirm if N-TNPs are more efficient photocatalyst than TNPs in degrading LDPE. Specifically, it aims to:



To compare microscope images of LDPE before and after the irradiation under visible and ultraviolet light



To compare the vinyl and carbonyl indices of LDPE before and after the irradiation under visible and ultraviolet light

Significance

This study finds a way to degrade plastics faster to fight plastic pollution.

Methods



Cutting of LDPE

Dispersion of TNPs

Microscope imaging and FTIR analysis

UV and visible light exposure

Microscope imaging and FTIR analysis

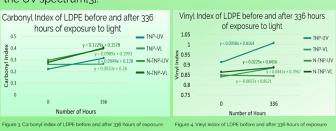
cope imaging Data analy

Results & Discussion

After 336 hours of exposure, it was observed that there were **cracks and scratches** found on the surface of the LDPE.



There was also an increase in the values of the carbonyl and vinyl indices after the treatment and exposure which indicates polymer degradation. It was proven that **nitrogen doping**, which showed greater increase in values, enhanced the properties of TNPs which made it a **more efficient photocatalyst** that can react to both UV and visible light compared to TNPs which can only react with light in the UV spectrum[3].



Conclusion

The doping of nitrogen in the crystalline lattice of titanium dioxide nanoparticles enhanced its properties making it a more efficient photocatalyst in degrading LDPE.

Recommendations

~ increase the length of exposure for more notable results ~ increase the volume of solution depending on the length of exposure

References

[1] Kamrannejad MM, Hasanzadeha A. Nosoudib N, Maic L, Babaluo AA. 2014. Photocatalytic Degradation of *Polypropylene*/TiO2 Nano-composites. Mat Res. 17(4): 1039-1046. doi: http://dx.doi.org/10.1590/1516-1439.267214

[2] Tofa TS, Kunjali KL., Paul S, Dutta J. 2019. Visible light photo catalytic degradation of microplastic residues with zinc oxide nanorods. Environ Chem Lett. doi: https://

3] Jwo CS, Tien DC, Teng TP, Chang H, Tsung TT, Liao CY, Lin CH, 2005 Preparation and UV characterization of TiO2 na noparticles synthesized by SANSS. Rev Adv Mater Sci. 10:283-288.

PLASTIC LESS

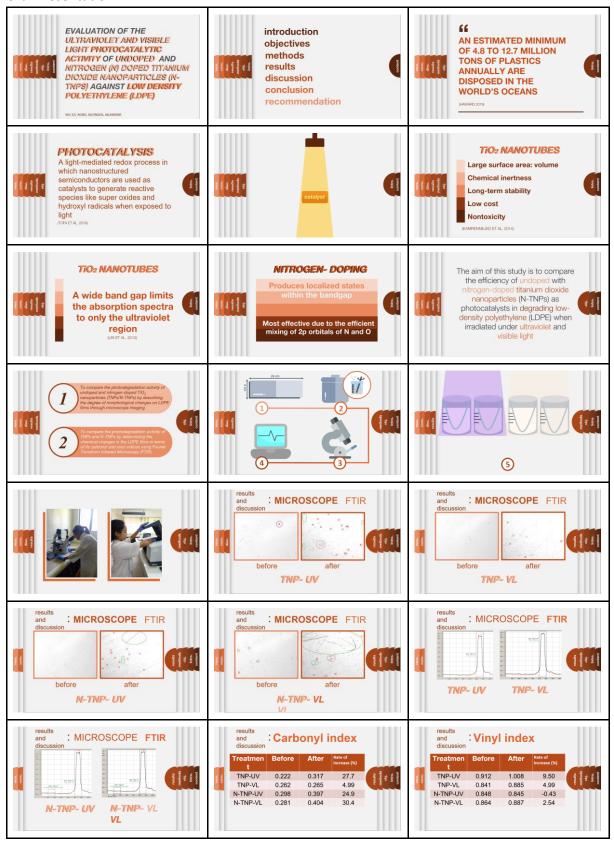


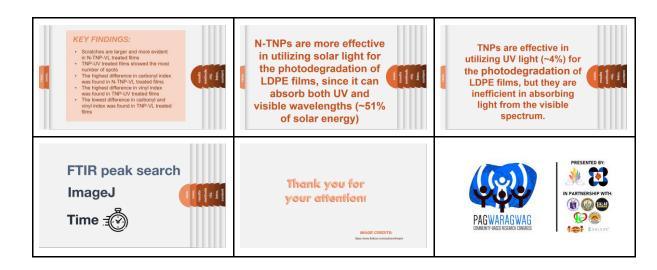


Using *nanoparticles* as catalysts, plastics can be degraded easily and efficiently by *photocatalysis* –

A process where organic pollutants are converted to harmless compounds.







Jeff Lawrence B. Derramas, Nina Beatris C. Gonzalez, and Tristan Timothy M. Villaflor

The quantification of the correlation between water nitrogen level and the phosphorus uptake of *Chlorella sorokiniana* (freshwater green alga) in simulated nutrient-contaminated freshwater

Gimmick Title: ALGAEve it a Shot!

DepEd Learning Competencies: Explain how living things depend on the environment to meet their basic needs (S3LT-IIi-j15); recognize that there is a need to protect and conserve the environment (S3LT-IIi-j16) and; relate the importance of surroundings to people and other living things (S3ES-IVc-d-2)

Workshop Title: Gotta Count 'Em All

Target Skill: Counting algal cells through a haemocytometer









Quantifying the correlation between water nitrogen content and phosphorus removal of Chlorella sorokiniana

Background

Eutrophication is a phenomenon wherein there is an oversaturation of nutrients in bodies of water that can cause:









Nitrogen and phosphorus are the principal causes of

It is therefore important for us to **understand the mechanisr** between them involved in their remediation to **better understand the efficiency of their removals** in each others'

Bioremediation

- A dominantly popular type of water remediation in recent research.

 Utilizes the natural mechanisms of plants and algae for remediating contaminants.

 Cheap and environmentally friendly compared to chemical methods.

Chlorella sorokiniana

- Locally available algae with commercial
- applications Has been proven to be able to remediate N & P

Significance

Establishing a quantified or numerical representation as a predictive guide of how the presence of nitrogen affects the removal of phosphorus.

Objectives

The objective of the study is to describe and evaluate the correlation between water nitrogen content and phosphorus uptake of Chlorella sorokiniana in nutrient-contaminated freshwater in different nitrogen levels.

Specific Objectives:

- 1. To determine the amount of phosphorus removed by Chlorella sorokiniana in different nitrogen levels.
- 2. To analyze the acquired data using:

 Pearson R Correlation and Linear Regression

Methods



Haemocytometer









UV-Vis analysis



Statistical Analysis

Results & Discussion

Removal rates observed ranged from 3.88% to 48.37%

It was observed that **as the nitrogen input increased**, the **amount of phosphorus removed** also generally **increased**, exhibiting a **positive relationship**.

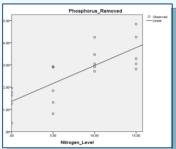


Figure 1. Linear model of phosphorus removed vs nitrogen level

Pearson's Coefficient: 0.694

*quantifies the **type** (+/-) and the **strength** of the correlation.

Linear Regression: y = 0.02196x + 9.067

quation represents the **linear model** of the relationship between the variables.

The relationship and effects of N levels on the uptake of P are dependent on the dominant mechanism of their uptakes relative to each others' presence, which may vary between

In the case of this study, an increase of water nitrogen content increases the amount of phosphorus removed. This can be attributed to the increased nitrogen increasing the growth rate of the microalgae and therefore increasing its demand for phosphorus to sustain its growth.

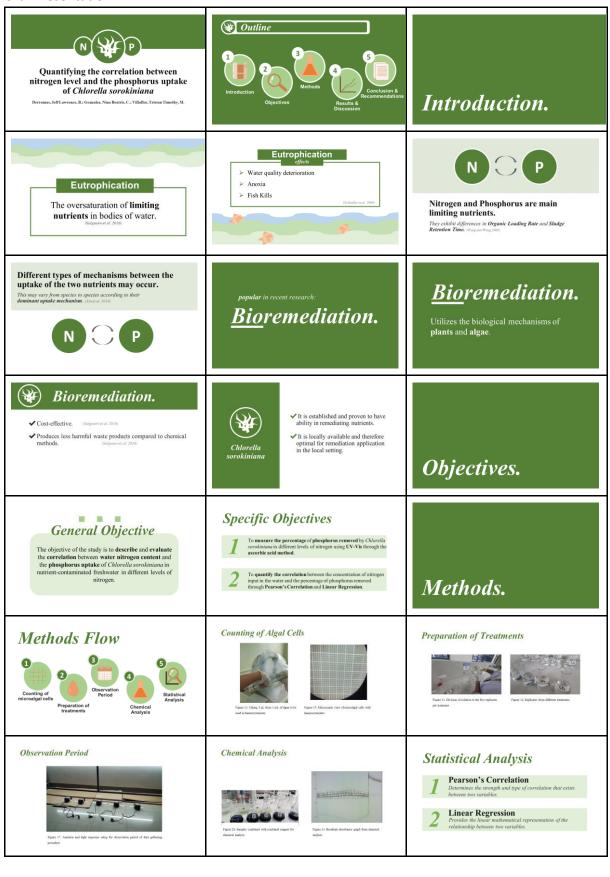
Conclusion

A statistically significant positive correlation exists between water nitrogen content and phosphorus removal by Chlorella sorokiniana.

Recommendations

- **Optimization of** procedures involving manual work by using technological means to reduce errors.
- Use of naturally sourced water to give a more accurate representation of a natural setting.
- Investigate more nitrogen levels to provide more data







Ma. Anna E. Carigaba, Mary Angeli J. Leonida, and Caryl Jane C. Masculino

Larvicidal activity of *Citrofortunella microcarpa* (calamansi) peel essential oil against third and early fourth instar *Aedes aegypti*

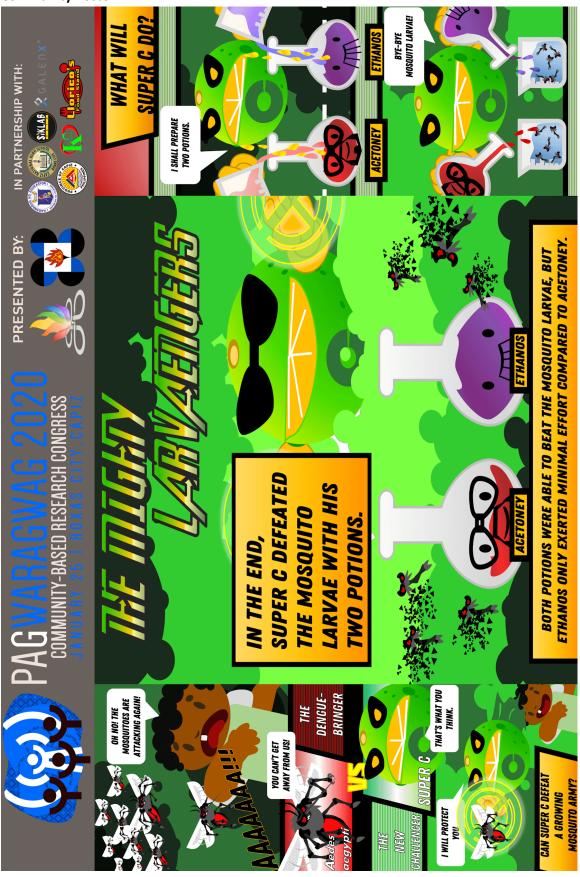
Gimmick Title: The Mighty Larvaengers

DepEd Learning Competencies: Express concentrations of solutions quantitatively by preparing different concentrations of mixtures according to the uses and availability of materials (S7MT-Id-3) and; investigate the relationship between the amount of force applied and the mass of the object to the amount of change in the object's motion (S8FE-Ia-15)

Workshop Title: Larvaengers Assemble!
Target Skill: Collection of mosquito larvae



Community Poster

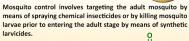




Larvicidal activity of *Citrofortunella microcarpa* (Calamansi) peel essential oil against *Aedes aegypti* mosquito larvae

Background

From January to August 2019, there were 45,345 reported dengue cases in Western Visayas. Dengue is transmitted by the *Aedes aegypti* mosquito.



These frequently used chemicalbased products however contain an active interedient called DEET and exposure to high DEET concentrations can cause

high DEET N,N-diethyl-meta-toluami

encephalopathy as well as other side effects.

Nowadays, natural-based products are preferred since they contain an abundant amount of bioactive compounds having potential against developmental stages of mosquitoes.

Objectives

This study aims to evaluate the larvicidal activity of the essential oil of Citrofortunella microcarpa peel against third and early fourth instar Aedes aegypti mosquito larvae.

Specifically, it aims to:

- Determine the limonene content present in the steam distilled *C. microcarpa* peel essential oil by subjecting it to Gas Chromatography—Mass Spectrometry
- Evaluate the larvicidal activity of the essential oil of C. microcarpa peel against third and early fourth instar Ae. aegypti mosquito larvae by computing the mortality rate.
- Compare the results of larval mortality rate using Probit Analysis.

Significance



References

Cheong MW, Chong ZS, Liu SQ, Zhou W, Curran P, Yu B. 2012. Characterisation of calamansi (Citrus microcarpo). Part I: Volatiles, aromatic profiles and phenolic acids in the peel. Food Chem. 134(2), 686-695. https://doi.org/10.1016/ j.foodchem.2012.02.162.

Karr LL and Coats JR. 1988. Insecticidal Properties of d-Limonene. J Pesticide Sci. 13(2), 287-290. https://doi.org/10.1584/ jpestics.13.287.

Pansit NR, Avila STR, Calumba JR. 2018. Larvicidal activity of *Citrofortunella microcarpa* (Lemonsito) and *Carica papaya* (Papaya) extracts against the dengue-vector mosquito, *Aedes* sp. Int J Mosquito Res. 5(4), 51-58.

Methods



Results & Discussion

Larvicidal activity of Calamansi peel EO against third and early fourth instar Ae. aegypti larvae after 24 hours.

Treatments	Dose (ppm)	Mean % Mortality ± SD	LC₅o (ppm)	LC ₉₀ (ppm)
	8.00	11.43 ± 4.76		
Calamansi Peel EO in	9.00	52.85 ± 7.56	9.08	10.58
Acetone	10.00	84.29 ± 9.76	9.08	
	11.00	92.14 ± 6.36		
	8.00	22.14 ± 13.18	8.89	10.57
Calamansi Peel EO in	9.00	50.88 ± 8.26		
95% Ethanol	10.00	82.14 ± 8.59		
	11.00	94.28 ± 5.34		
Negative Control (Dechlorinated Water)	0.00	0.00	0.00	0.00
Negative Control (Acetone)	11.00	0.00	0.00	0.00
Negative Control (95% ethanol)	11.00	0.00	0.00	0.00

C. microcarpa peel essential oil in 95% ethanol possessed great larvicidal potential against third and early fourth instar Ae. aegypti mosquito larvae and was found to be effective at low concentrations with an estimated LC₅₀ value of 8.89 ppm and LC₉₀ value of 10.57 ppm.

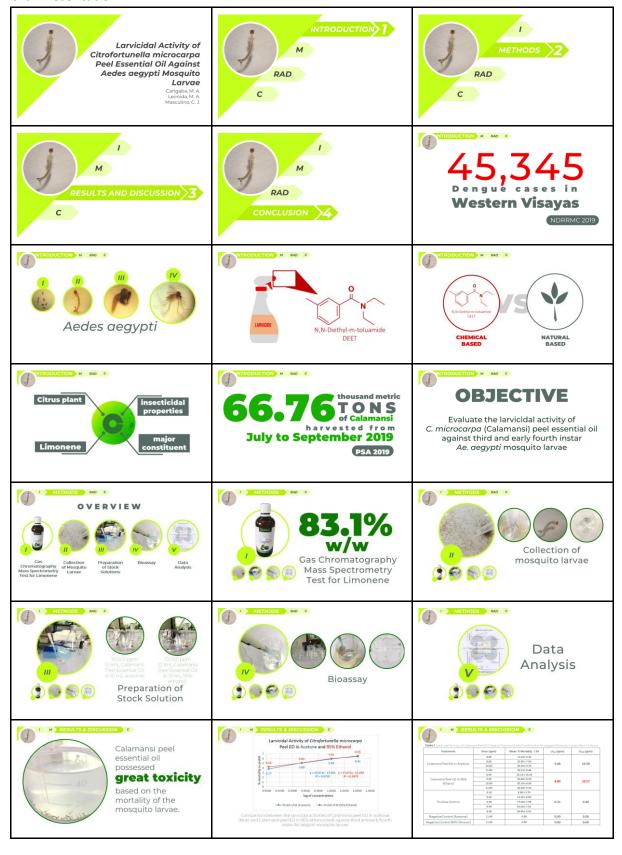
Conclusion

The larvicidal activity of *C. microcarpa* (Calamansi) peel essential oil is found to be effective at low concentrations against third and early fourth instar *Ae. aegypti* mosquito larvae. It can be used as an alternative biolarvicide.

Recommendations

It is recommended to increase the number of replicates for each concentration in order to eliminate the outliers. A smaller range of intervals between concentrations may also be tested for larvicidal activity observation for more accurate results since the values of the concentrations established were low that even a small amount of treatment could affect the results.







Cheril B. Triol, Athena Therese V. Dionela, and Angela Isabelle D. Ecube

The use of *Clitoria ternatea* (blue ternate) ethanolic extract as a potential stain for bacteria

Gimmick Title: Coloring Bacteria

DepEd Learning Competency: Identify beneficial and harmful microorganisms (S7LT-IIf-6)

Workshop Title: Be Careful with My Bacteria

Target Skill: Bacterial staining



Community Poster





The use of Clitoria ternatea ethanolic extract as an alternative bacterial stain

Background



Most microbial stains in use are chemically synthesized in the laboratory due to its convenience. However, they pose as threats to the environment and to human health as some synthetic dyes are known to be carcinogenic, mutagenic, and teratogenic. Hence, the use of alternative convenient, cheaper, safe, non-toxic, non-allergic, eco-friendly, renewable and biodegradable dyes such as natural dyes is on the rise.

Objectives

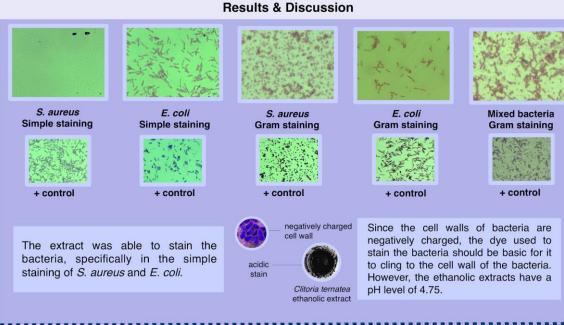
This study aims to investigate the ability of the ethanolic extract of Clitoria ternatea flowers as an alternative stain for Gram-Positive Staphylococcus aureus and Gram-Negative Escherichia coli.

Significance

This study seeks to impart knowledge to microbiologists and farmers on the capability of Clitoria ternatea ethanolic extract as bacterial stain.

Methods





References

Adeyemo S, Akinloye A, Adekammi G. 2017. The use of plant dyes for microbial staining and identification: an eco-friendly and non-toxic alternative method. J Adv Biol Biotechnol. 16(4):1-10.

Akinloye A, Illoh H, Olagoke A. 2010. Screening of some indigenous herbal dyes for use in plant histological staining. J For Res. 21(1):81-84.

Lijion MdB, Meghla NS, Jahedi E, Rahman MdA, Hossain I. 2017. Phytochemistry and pharmacological activities of Ciltoria ternatea. Int J Nat Soc Sci. 4(1):01-10.

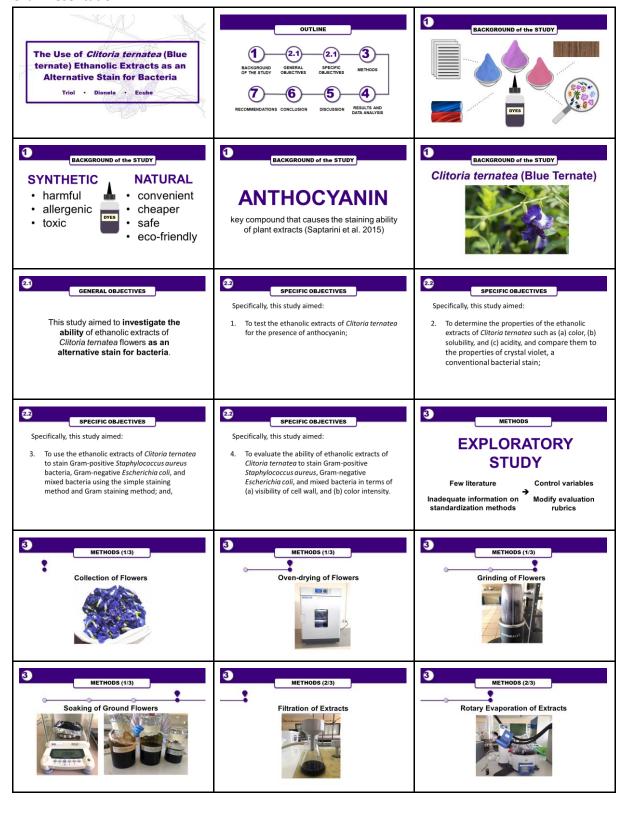
Suebkhamper A, Sotthbiandhu P. 2013. Effect of using aqueous extract from butterfly pea flowers (Ciltoria ternatea I.) as a dye on animal blood smear staining. Suranaree J Sci Technol. 19(1):15-19.

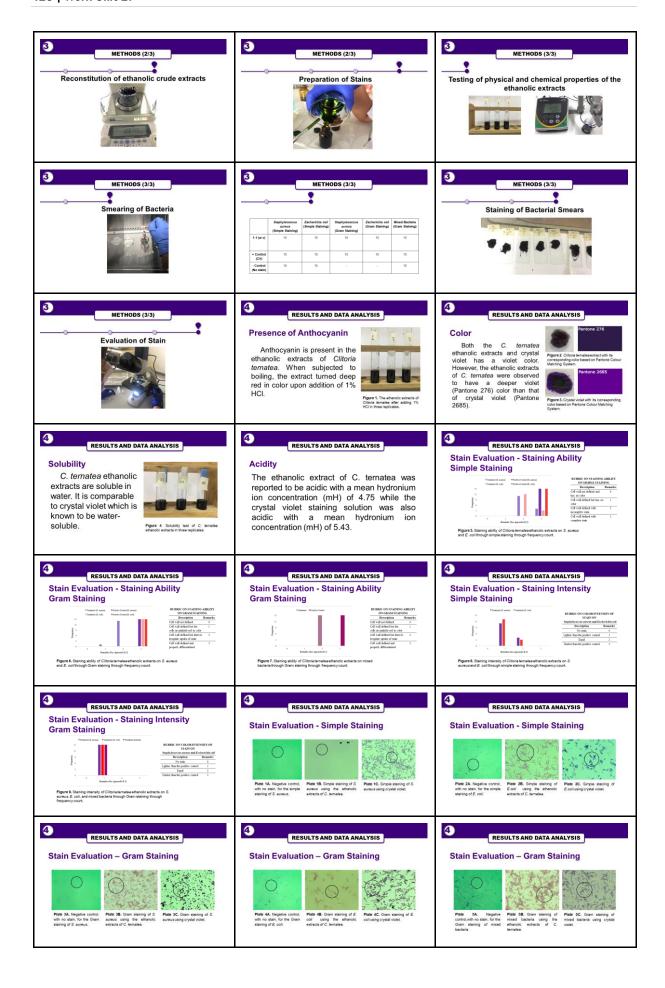
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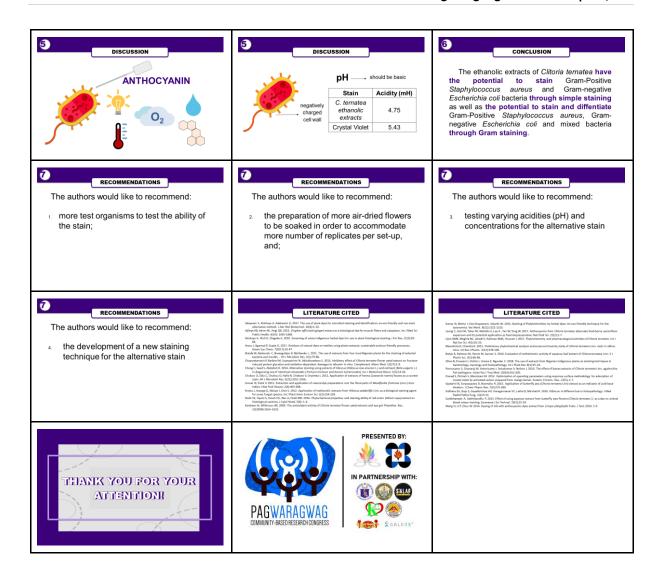
https://www.marketlab.com/mages/sot/GramStainKits.jpg?v=100735479217-2

https://www.barchitechnol.ncom/FFHhJh5oEF6XHApNyjd2-OxOXek=/800x600/filters:no_upscale()https://public-media.si-cdn.com/filer/6e/43/6e43d5d4-da0e-4/23-948b-175fcf3801e2/file-20171211-27714-gc0b2x.jpg









Beverly Mae L. Constantino, Lander R. Guillergan, and Carl William P. Yabut

Monogenean and cestode infestation in the gills and intestines of *Clarias gariepinus* (African catfish) in Zarraga, Iloilo and *Chanos chanos* (Milkfish) in Dumangas, Iloilo

Gimmick Title: Parasite Hunting

DepEd Learning Competency: Focus specimens using compound microscope (S7LT-IIb-2)

*handheld microscopes were used

Workshop Title: Inside a Fish Target Skill: Microscopy



Community Poster





PAGWARAGWAG 2020

COMMUNITY-BASED RESEARCH CONGRESS



Parasite fauna of *Clarias gariepinus* (African catfish) in Zarraga, Iloilo and *Chanos chanos* (milkfish) in Dumangas, Iloilo, Philippines

Background

Fishes are one of the most important food resources in the country.

Milkfish is considered to be the

Milkfish is considered to be the second most widely farmed fish species.



African catfish is also considered as a major component in the country's aquaculture industry.



However, diseases caused by parasites could lead to mortalities.

Significance

Due to the lack of recent studies, this study helps the fish farmers in effectively managing their fish farms.

Objectives

This study aimed to identify the types and determine the mean intensity and prevalence of parasites for each fish species and correlate them with the samples' weight and length

Methods



Collection of samples



3 Examination of samples



2 Preparation and



4 Data analysis

Results

Among the two fish species, African catfish was the most infected, harboring three types of parasites, and a total of **1250 parasites** in 30 fish samples. Meanwhile, milkfish samples, harboring only two types o parasites, exhibited lower prevalence and mean intensity.

Parasites present	C. gariepinus		C. chanos	
	%	MI	%	MI
Monogenean (Dactylogyrus spp.)	100	39	40	2
Monogenean (Gyrodactylus spp.)	50	4	3.33	1
Cestode	16.67	6		

A positive correlation was observed between the length and weight of African catfish and the number of parasites present was found to be significant at the 0.01 level. With this, the correlation of the weight and length of catfish to the number of parasites present can be described as moderately high. Meanwhile, no significant correlation observed between the number of parasites present and the length and weight of milkfish.

Discussion

The results of the study align with most previous studies regarding the parasitism of these fishes. However, it differ from the results of Enyidi and Eneje (2015) which states a negative correlation between fish size and number of parasites.

Conclusions

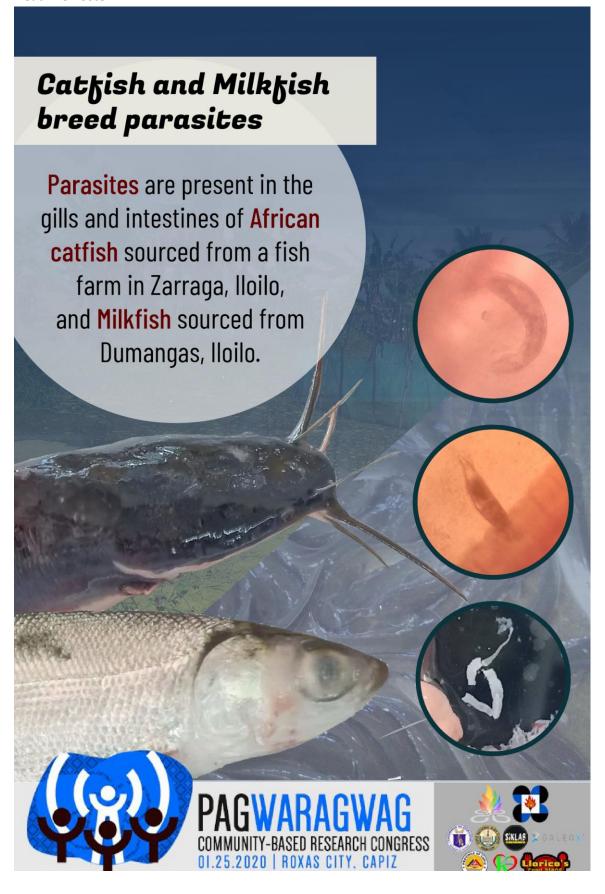
- African catfishes and milkfishes harbor parasites.
- The bigger the African catfish, the more parasites can be found while size does not affect the number of parasites in milkfish.

Recommendations

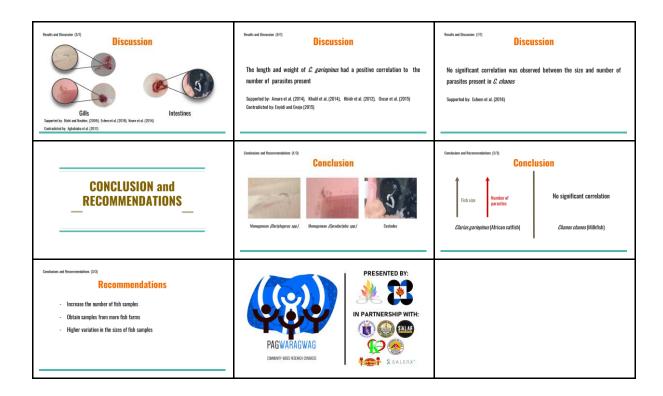
- increase the number of fish samples
- Obtain samples from more fish farms
- Higher variation in the sizes of fish samples

References

- Amare A, Alemayehu A, Aylate A. 2014. Prevalence of Internal Parasitic Helminthes Infected Oreochromis niloticus (Nile Tilapia), Clarias gariepinus (African Catfish) and Cyprinus carpio (Common Carp) in Lake Lugo (Havke), Northeast Etilopia. J Aquas Rea Development. 5(3): 1-5.
- Echem RT, Barba HM, Li G, Peng F, Buenaventura NJC. 2018. Endoparasites in Chanos chanos (Forskal, 1775) from the wetlands of Zamboanga City, Western Mindanao, Philippines. J Aquac Res Development. 9(5 Envid UD. Energia UL. 2015. Parasities Of African Carlish (Clarais a parasites) and Carlican Carlish (Clarais a parasites) advantage and a Carlish (Clarais a parasites) and Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a parasites of African Carlish (Clarais a parasites) and Clarais a







Danielle Anleigh B. Colacion, Eloisa Marie M. San Diego, Justin Rey P. Secondes

Microplastic occurrence in the coastal sediments of selected barangays of Anilao, Iloilo, Philippines

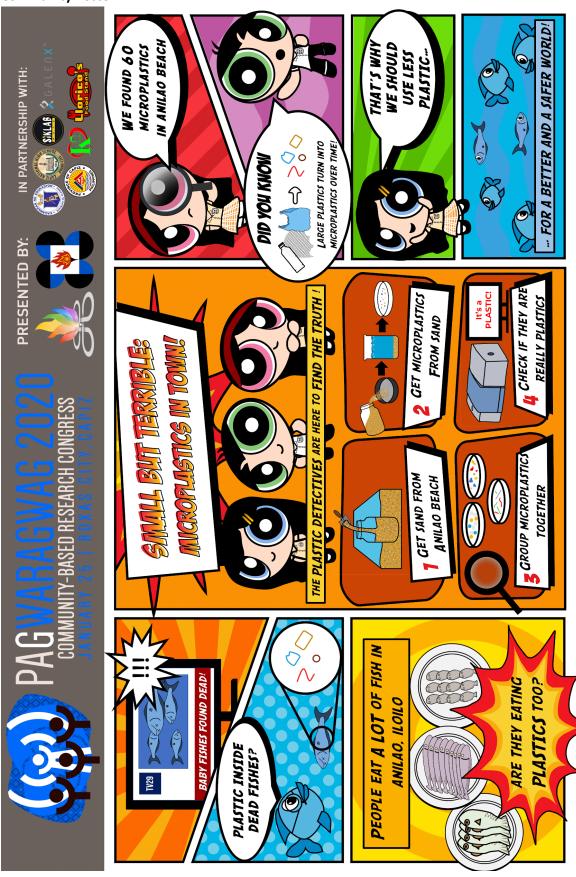
Gimmick Title: Pick Me Up!

DepEd Learning Competencies: Recognize the importance of recycle, reduce, reuse, recover, and repair in waste management (S5MT-le-g-3); discuss the interactions among living and nonliving things in estuaries and intertidal zones; (S5LT-IIh-8); and explain the need to protect and conserve estuaries and intertidal zones (S5LT-Ii-j-10)

Workshop Title: Micromeet!
Target Skill: Density separation



Community Poster





Microplastic occurrence in the coastal sediments of selected barangays of Anilao, Iloilo, Philippines

Background of the Study



Approximately 8% of plastics end up in marine systems every year.

fragment into smaller called microplastics, defined as plastics of length





Microplastics can ingested by a wider array of organisms, obstructing digestive pathways and releasing toxic chemicals into their bodies.

This phenomenon may also pose risks to human seafood consumption.



limited knowledge on the presence distribution microplastics in the Philippines.

Coastal communities such as Anilao, Iloilo are highly susceptible to the posed threats by microplastics due to their regular seafood



Objectives

- To count the microplastics present in the collected sediment samples through visual inspection using a compound inverted microscope
- To determine relative abundance in percent of microplastics of each 2 type – fiber, film, pellet, and fragment
- To determine the total abundance in particles/cm3 of microplastics contained in the collected sediment samples
- 4 To identify the chemical composition of the extracted microplastics through the Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) spectrophotometry

Significance of the Study

This study may serve as a basis for policies and actions directed towards the protection of seafood consumers from the health hazards posed by microplastics, as well as a baseline for future in-depth research on microplastic mitigation.

Methods









Density Separation



Wet Perovide Ovidation





FT-IR Analysis

Results & Discussion

Relative Abundance

Fiber was found to be the most abundant type of microplastic in Barangays Dangula-an and San Carlos, while fragments primarily constitute the microplastics obtained from Barangay Pantalan

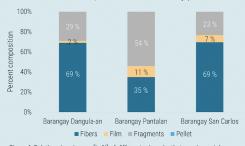


Figure 1. Relative abundances (in %) of different microplastic types in each barangay

Fibers: attributed to the fragmentation of fishing ropes and nets Fragments: attributed to the degradation of hard plastics

Total Abundance

Barangay Pantalan has the most number of microplastics



Figure 2. Total abundance (in particles/cm³) of microplastics each barangay

Possible sources of high 2 Water circulation and monsoons 1 Large amount of nearby households microplastic abundance

Chemical Composition

Two microplastic particles were identified to be polyethylene through FT-IR spectrophotometry

of polyethylene, polypropylene, and nylon.

Fishing ropes and nets are commonly composed

The collected microplastics may have sourced from the fishing ropes and nets in the Barangays.

Conclusion

Microplastics are present within the coastal areas in various morphological types with the chemical composition of two (2) microplastic pieces identified as polyethylene.

Accretions

Cazar A, Echewarria F, Gonzalez-Gordillo J, Irigolein X, Ubeda B, Hernandez-Leon S, Palma A, Navarro S, Garcia-de-Lomas J, et al. 2013. Plastic debris in the open cosen. PMAS. 111/281. 10238-10244.

Eries-Merlann Dhmopson R, Aldrige D. 075. Microplastics in freshwater systems. A review of the emerging threats, identification of knowledge gaps and prioritisation of research needs. Water Res. 75(2015): 63-92.

Wileczorak A, Morston L, Crotz P, Allcunk A, MacLuquilin A, Savart D, Brownow H, Doyle T. 2018. Frequency of microplastics in mesopelegic fishes from the Northwest Atlantic. Front in Mar Sci. 5(38): 1-9.

Recommendations

- A more appropriate tool, specifically **corers**. shall be utilized in the collection of coastal
- A greater amount of <2 mm sediments shall be processed for extraction to better represent the target population.
- It shall be determined whether the density of the actual solution used matches that of the theoretical one
- Wet peroxide oxidation shall be conducted more than once to further remove biological matter.
- A more appropriate equipment for visual inspection and chemical composition analysis, specifically a micro-FTIR, shall be utilized to improve the results of the study.

PRESENCE OF MICROPLASTICS



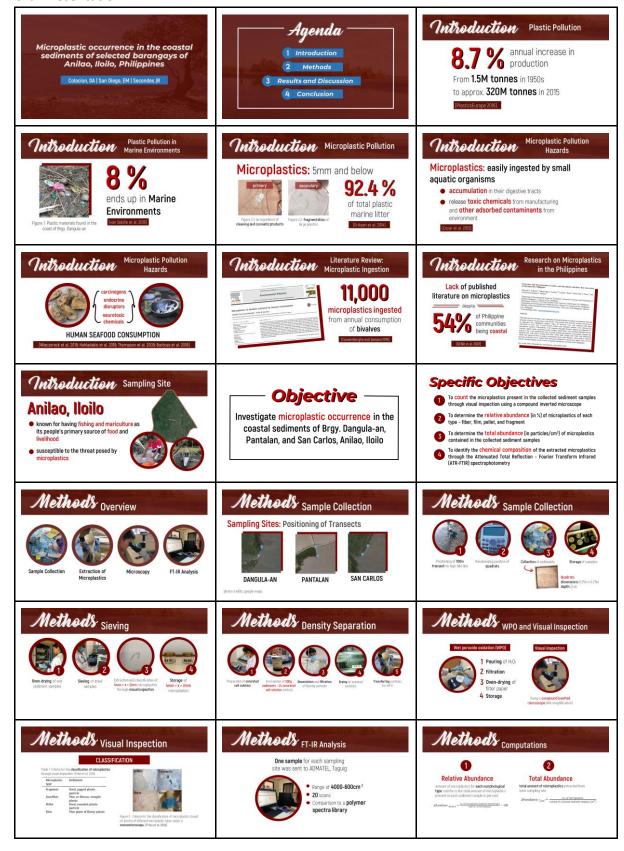
IN THE BEACHES OF ANILAO, ILOILO, CONFIRMED!

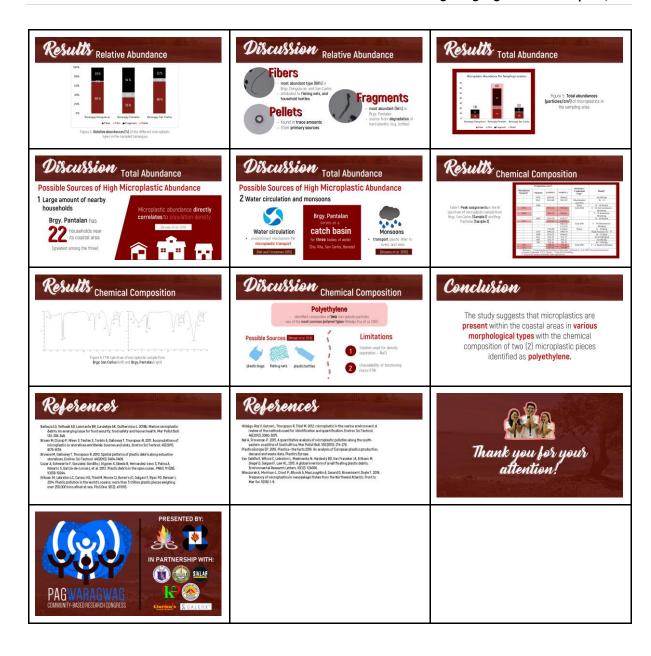
Colacion, San Diego, and Secondes discovered the presence of microplastics in the coastal sediments of Barangays Dangula-an, Pantalan, and San Carlos, Anilao, Iloilo











Work Unit 30

Rajo Christian G. Cadorna, Maxine P. Chan, and Juan Paulo Miguel I. Salmon

Measurement of eye turbidity of formalin-treated *Chanos chanos* (milkfish) using image analysis

Gimmick Title: Computer Cops: Finding the Fake Formalin Fish

DepEd Learning Competencies: Investigate properties and characteristics of light (S4FE-IIIh-5);

relate characteristics of light such as color and intensity to frequency and wavelength (S7LT-IIIf10);

demonstrate the existence of the color components of visible light using a prism or diffraction

grating (S8FE-If-26) and; explain the hierarchy of colors in relation to energy (S8FE-If-27)

Workshop Title: Software, Softwhat, Softwhy, Softhow Target Skill: Data encoding and descriptive statistics



Community Poster



Technical Poster





Measurement of eye turbidity of formalin-treated Chanos chanos (milkfish) using image analysis

Background



Fish freshness can be determined by evaluating the color of the eye.

Formalin, which may lead to cancer or even death[1], is illegally used as preservative for fish in markets[2].

Manual

Automated



- · Labor intensive · More efficient
- Time-consuming More consistent
- · Human error
- · More accurate

Objectives

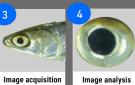
The aim of this study is to determine the effect of formalin treatment on Chanos chanos (milkfish) through the mean saturation and value of eye and pupil of eye using image analysis.

Significance

The results of this study will be useful to fish quality assessment agencies and fish consumers, contributing to the advancement quality assessment automation.

Methods







Results & Discussion

Formalin-treated



Parameter





Significance

Untreated

There is a significant difference in the mean values of the eye and pupil between treated and untreated setups.

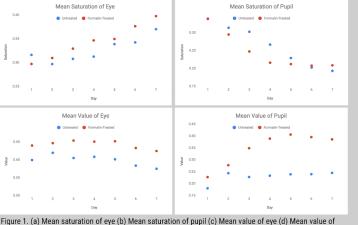
Table 1. Statistical analysis of the significant difference in regions of interest parameters between treated and untreated fish.

	(2-tailed, α = 0.05)
Saturation of eye	0.313
Saturation of pupil	0.562
Value of eye	0.000
Value of pupil	0.003

Saturation describes the intensity of a color, with 1 denoting a color in the purest form of its hue. Value refers to the lightness or darkness of a color.



The increase in saturation of the eye for both setups could be attributed to lipid oxidation[3]. The decrease in saturation of the pupil, decrease in value of the eye, and increase in value of the pupil is an indicator of turbidity[4].



pupil for formalin-treated and untreated samples

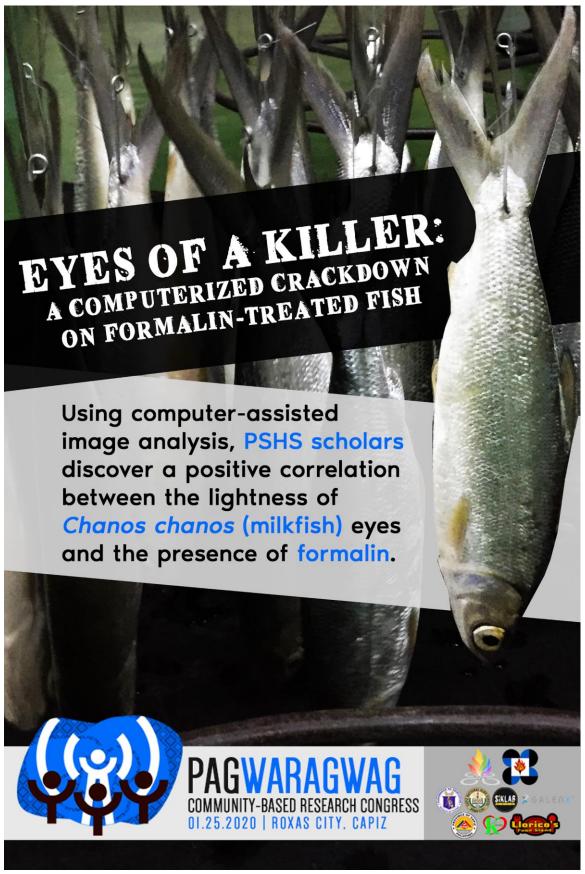
Conclusion

In both setups, the mean saturation of the eye and the value of the pupil increased with storage time while the mean value of the eye and the saturation of the pupil decreased. Formalin treatment led to a significant increase in the value of the eye and the pupil.

Recommendation

Automation of image acquisition and segmentation is recommended to remove human bias.

Headline Poster



Oral Presentation

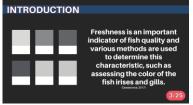


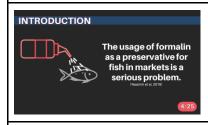


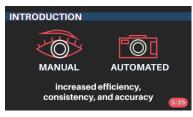


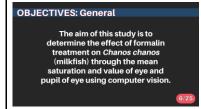


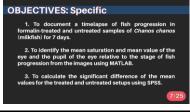


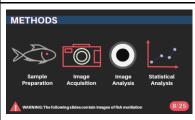


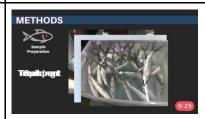




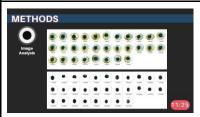




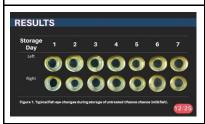


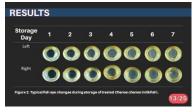


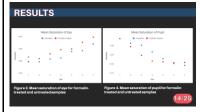




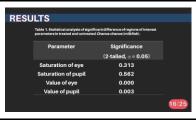
















Work Unit 32

Samantha E. Alvarez

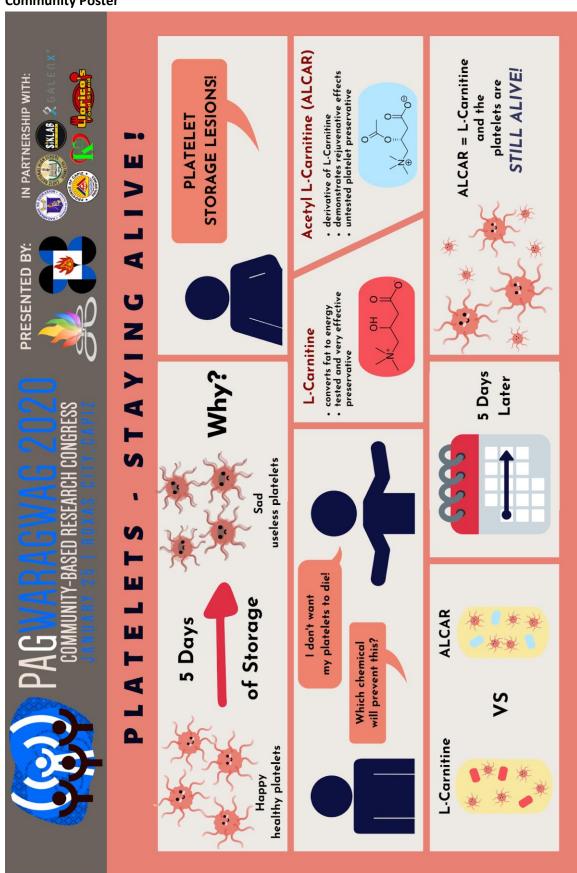
The effects of acetyl I-carnitine on the prevention of platelet storage lesions

Gimmick Title: Make Hanap-Hanap the Platelets

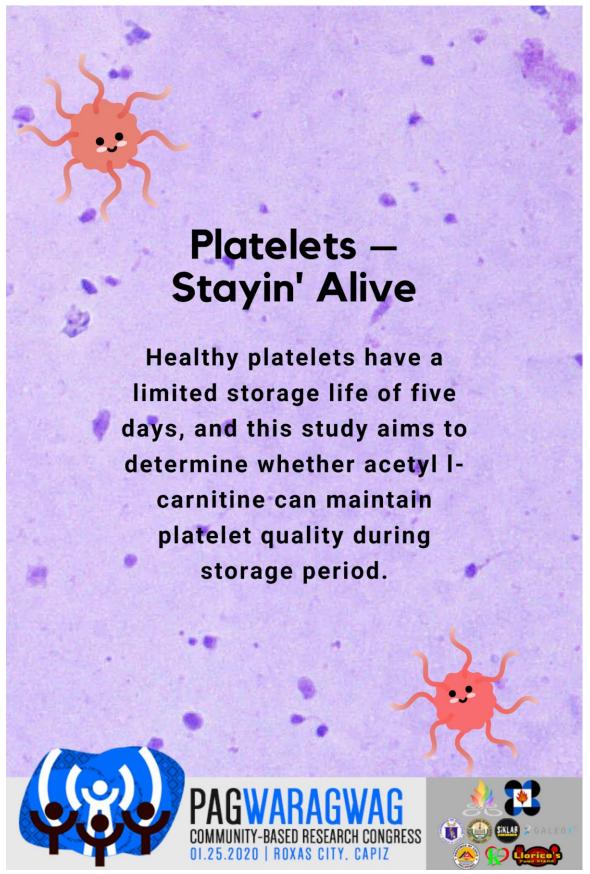
DepEd Learning Competencies: Compare the stages in the life cycle of organisms (S4LTIIg-h13) and; tell the benefits of separating mixtures from products in community (S6MTIg-j-3)



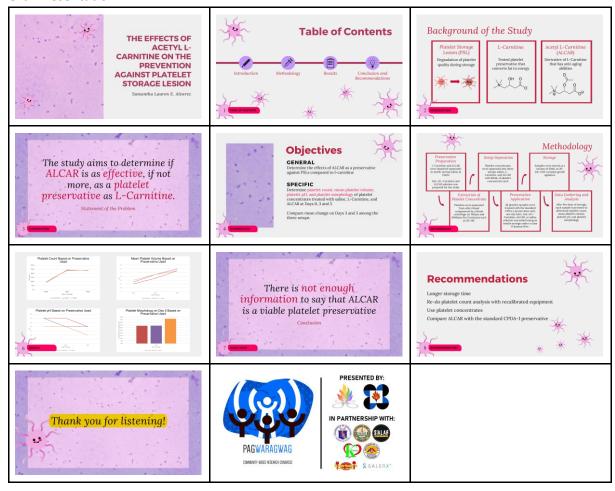
Community Poster



Headline Poster



Oral Presentation



ACKNOWLEDGEMENTS

Pagwaragwag has evolved to be an annual tradition for the graduating batch under the Research curriculum. This year, it has yet again expanded its reach to another province in Western Visayas - the province of Capiz. It was indeed fulfilling for the Grade 12 scholars of Batch 2020 to see their hard work and dedication be rewarded with the alacrity for learning that emanated from the participants. We hope that through this event, we were able to introduce to younger generations the fascinating science that comes with doing research and hopefully inspire them to be future problem-solvers and discovery-seekers themselves.

Putting together an event of this magnitude is never easy but it was made possible through the efforts of every single person that was part of it. With that, we would like to express our utmost gratitude to all of you.

To our director, Dr. Shena Faith M. Ganela and the faculty and staff of PSHS-WVC, thank you for your unwavering support and guidance.

To the officials from the Department of Education, thank you for your invaluable assistance.

To the coordinators of Capiz National High School led by Mrs. Judy B. Dunton, thank you for facilitating this event with us and ensuring its successful execution.

To the event sponsors and benefactors, thank you for your generosity and willingness to lend a helping hand.

To all the volunteers from the Grade 11 Batch, thank you for the time and effort you have put into this event.

To the research teachers, Dr. Aris Larroder, Ma'am Catherine Joy Mediodia, and Sir Ramon Angelo Sinco, as well as the research unit head Sir Harold Mediodia, thank you for guiding us every step of the way and for empowering us to believe in our capabilities.

And to everyone who has played a part in making Pagwaragwag 2020 possible, THANK YOU.



PAGWARAGWAG 2020 TEAM

Overall Heads

Jenn Christel C. Sampiano Rajo Christian G. Cadorna Luke Daniel G. Socrates

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Ramon Angelo Sinco
Catherine Joy Mediodia
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Joecile Faith Monana
Jay Vaneri T. Porras
Althea Venice Rello

APPENDIX A: DEPED ADVISORY



Republic of the Philippines
Department of Education
Region VI - Western Visayas
SCHOOLS DIVISION OF CAPIZ
Banica, Roxas City



Telefax No. (036) 6210-974 / Tel. No. (036) 6216-118

Division Advisory No. Old series of 2020 January 6, 2020

To: Public Schools District Supervisors
Heads of Secondary and Integrated Schools

Attached is the letter from Jenn Christel C. Sampiano, Event Coordinator, Department of Science and Technology - Philippine Science High School - Western Visayas Campus (DOST-PSHS-WVC), dated December 6, 2019, re: organizing PAGWARAWGAG this January 25, 2020.

The activity is to be conducted at Capiz National High School, Raxas City.

Participation to this activity is voluntary (personal time only) and subject to the no-disruption of classes policy per **DepEd Order No. 09, s. 2005** (*Instituting Measures to Increase Engaged Time-on-Task and Ensuring Compliance Therewith*).

For inquiries, schedule and reservation please contact,

MRS. JUDY B. DUNTON Head Teacher V Capiz National High School 09197321004 / 09166458910

Expenses to this activity are chargeable against local funds subject to the usual accounting and auditing rules and regulations.

Immediate dissemination on this matter is advice.

SALVADOR O. OCHAVO, JR., EdD, CESO V Schools Division Superintendent



Republic of the Philippines DEPARTMENT OF SCIENCE AND TECHNOLOGY PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS CAMPUS



06 December 2019

DR. SALVADOR O. OCHAVO JR., CESO V

Schools Division Superintendent Department of Education Region VI Division of Capiz, Banica, Roxas City



Attention: Andres D. Quiachon, EPS-Science

Sir

Greetings from Philippine Science High School - Western Visayas Campus!

PSHS-WVC will be organizing *Pagwaragwag* this January 25, 2020. *Pagwaragwag* is a community-based science research congress and will include the presentation of fun and interactive research gimmicks and research workshops for elementary school students and oral research presentations for high school students.

In this regard, we respectfully request from your office the endorsement of the aforementioned activity to the different elementary and secondary schools in your division. Such approval and wide dissemination of this request will allow us to serve more students to learn science. Participation in this activity would be **voluntary**.

Thank you in advance in anticipation for your support in youth-initiated projects to help produce competent, committed leaders, and nation-builders for the future!

Very truly yours,

JENN CHRISTEL C. SAMPIANO

Event Coordinator

+639295506464 | jsampiano@wvc.pshs.edu.ph

Noted by:

ARIS C. LARRODER, PhD.

Program Adviser

alarroder@wvc.pshs.edu.ph

SHENA FATH M. GANELA, PhD.

Campus Director III

APPFNDIX B: SEMINAR POSTERS





LABUGAY

Acids and bases dominate our daily lives. Learn measure them in this workshop.

09:00 - 09:30

LET'S TALK ABOUT ME: **MACERATION EXTRACTION**

09:00 - 09:30

more about them, their properties and even a way to

10:30 - 11:00

Good quality extracts makes for good results. Learn more about it in maceration extraction.

10:30 - 11:00

POWER COLUMN

Effective packing makes for an effective filter, but doing so isn't an easy job. Learn how in this workshop on column packing.

09:30 - 10:00

Microbiology studies are extremely susceptible to contaminations. For everyone's safety, learn about the aseptic technique in this workshop.

LAB KA BA?: ASEPTIC TECHNIQUE

09:30 - 10:00

GOTTA COUNT 'EM ALL

Research becomes more efficient with the aid of lab tools. This workshop teaches you how to use the haemocytometer to count algal cells.

10:00 - 10:30

11:00 - 11:30

11:00 - 11:30

STREAK OR TREAT Handling and studying bacteria follows a strict set of

11:00 - 11:30 10:00 - 10:30

rules. In this workshop, you will learn about proper streaking technique in order to obtain accurate data.

11:00 - 11:30

WIDESPREAD INDUSTRY PRODUCES UNWANTED BY-PRODUCTS THAT HARM HUMANS AND THE ECOSYSTEM. UNDETECTABLE TO THE HUMAN SENSES, THEY EXIST AND CONTINUE TO PERSIST. THIS CLUSTER THEREFORE FOCUSES ON REMOVING THESE PRODUCT FROM WATER.

BACTERIA ARE THE MOST ABUNDANT LIFE FORMS ON EARTH. QUITE LITERALLY, THEY PERMEATE EVERY ASPECT OF OUR EXISTENCE - FROM BIRTH, TO DISEASE, TO DEATH, AND EVEN IN INNOVATION. LEARN MORE ABOUT HEM IN THIS CLUSTER.





PERFECT COMBINATION

Preparing and mixing the right chemicals in the right amount is an essential lab skill. Learn about the math that goes with it in this workshop!

RICE AND SHINE 09:00 - 09:30

09:00 - 09:30 Accuracy doesn't necessarily mean digital. This

ACCURACY IS KEY

Researchers need to work cleanly and efficiently. Know how in this workshop, where you'll learn how to properly measure and transfer liquids.

09:30 - 10:00

10:30 - 11:00

workshop will teach you about the proper use and handling of the Vernier caliper for measurements.

THE ART OF THE LACE BUG

09:30 - 10:00

10:30 - 11:00

MICROMEET!

Physical processes exploit the many properties of matter. See that in action in this workshop, where matter is separated using density.

11:00 - 11:30

10:00 - 10:30

to appropriately handle lace bugs in your study.

RICEUP There are so many programs for analysis to choose

Live organisms must be treated properly, for ethical

and safety reasons. This workshop teaches you how

11:00 - 11:30

10:00 - 10:30

11:00 - 11:30

from. Know your priorities. This workshop teachers STAR, a statistical tool built for agriculture research.

11:00 - 11:30

EVERDAY, WE EXPLOIT MATTER AND ITS PROPERTIES TO SOLVE REAL-WORLD PROBLEMS. THE STUDY OF MATERIALS HAVE AFFORDED US NUMEROUS INNOVATIONS THAT ALLOW US TO LIVE CONVENIENTLY. THAT ASPIRATION HAS BEEN IMBIBED BY THE STUDIES IN THIS CLUSTER.

AGRICULTURE IS A NOBLE FIELD THAT PROVIDES HUMANS WITH THE ENERGY TO NOT JUST SURVIVE BUT LIVE AND INNOVATE. TO FEED THE WORLD, WE MUST FIRST UNDERSTAND THE FIELDS. THIS CLUSTER CATERS TO THAT NEED AND THE INNOVATIONS THAT COME WITH IT.





LARVAENGERS ASSEMBLE!

Collecting organic samples for analysis can be pretty difficult, especially when dealing with small insects. But don't worry this workshop's got you covered.

10:30 - 11:00

11:00 - 11:30

11:00 - 11:30

09:00 - 09:30

LIT-SPICE Investigating the theoretical can save you time and money. This workshop will teach you how to use LtSpice, a tool to analyze and simulate circuits.

09:00 - 09:30

10:30 - 11:00

BE CAREFUL WITH MY BACTERIA

A speck of color holds plenty of information in research. This workshop teaches bacterial staining, a method of identifying and classifying bacteria.

CHARLIE IN THE CACAO FACTORY 09:30 - 10:00

Complex studies often use complex equations. But with the aid of common software, one can automate the solving process. Learn about it in this workshop.

09:30 - 10:00

11:00 - 11:30

INSTAGRAMSMEAR

Depending on the study, you could culture bacteria in different ways. Learn about smearing - one of those techniques - in this workshop.

GO SOLAR 10:00 - 10:30

Everything can improved. Even the technology we have now. Join this workshop to experience hands on the assembly of a solar cell concentrator.

10:00 - 10:30

11:00 - 11:30

RESEARCH UTILIZES VARIOUS SUBSTANCES TO MEET THEIR OBJECTIVE. SOMETIMES THESE VERY SUBSTANCES ARE THE SUBJECT OF RESEARCH AS THEY HAVE HEALTH IMPLICATIONS, WHETHER DIRECT OR INDIRECT. STUDIES IN THIS CLUSTER REACT TO THAT CALLING, KNOW MORE INSIDE

LIFE IS MADE EASIER BY THE EMERGENCE OF NEW TECHNOLOGY, WHICH UPDATES THE OLD AND DISCOVERS THE NEW. WHETHER IT BE MATERIALS OR PROCESSES, THIS CLUSTER CONTINUES TO PUSH THE FRONTIERS OF TECHNOLOGY IN THEIR VARIOUS STUDIES.



PRAVA: 101 IN SLAYING COMPUTER SCIENCE

Computers have their own language. Learn about basic Java programming in this workshop.

09:00 - 09:30

10:30 - 11:00

SOFTWARE, SOFTWHAT, SOFTWHY, SOFTHOW

Large quantities of numbers can be difficult to analyze. Good thing there's this workshop!

09:30 - 10:00

11:00 - 11:30

INSIDE A FISH

Looks can be deceiving, especially when you can't even see it. This workshop teaches peering into the small and the unseeable using microscopy.

10:00 - 10:30

11:00 - 11:30

THE USE OF TECHNOLOGY HAS MADE LIVING, STUDYING, AND EVEN SURVIVING SO MUCH EASIER. IN THIS CLUSTER, SEE HOW MAN MEETS NATURE, LOOKING INTO THE BOUNTIES OF THE ENVIRONMENT THROUGH THE LENS OF TECHNOLOGY.

APPENDIX C STATION LABELS FOR GIMMICKS







WASTE REMEDIATION **LABUGAY**



PARASITE HUNTING















RICE BILIS



BLOW IT AWAY

















FINDING MACKY DAMAK



















COLORING BACTERIA

PERFECT COMBINATION

















INDUSTRY, ENERGY AND EMERGING TECHNOLOGY

EVERYCIRCUIT



















JANUARY 25, 2020 | ROXAS CITY, CAPIZ





AQUACULTURE AND NATURAL SCIENCES

COMPUTER COPS: FINDING THE FAKE FORMALIN FISH





INDUSTRY, ENERGY AND EMERGING TECHNOLOGY

WAY OF THE LIGHT













CATCH METALS IF YOU CAN

















BALL IN THE HOLE







SOLVE SALT CRIMES WITH RICE DETECTIVE











SHOTS FIRED













PRESENTED BY:













WILL IT COLOR?







MAKE HANAP-HANAP













THE BATTLE FOR BASIL



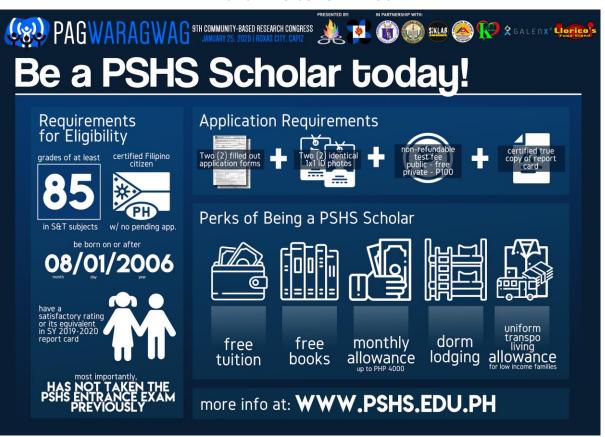


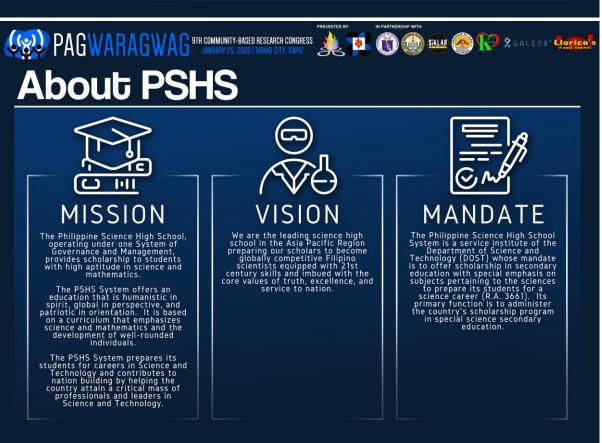






APPENDIX D BE A PSHS-WVC SCHOLAR POSTER





--- NOTHING FOLLOWS ---