G: Good morning everyone, I hope y'all are having a wonderful day. My name is Gianne Paulo Cabrera
J: I am Jene Raphael Dimal
P: and I am Paul Gerald Pare, and we are going to present a study entitled… PHYSICOCHEMICAL MODIFICATION AND SURFACE CHARACTERIZATION OF *Citrus microcarpa* PEEL WASTES NANOPARTICLE FOR THE BIOSORPTION OF COPPER

Introduction:

G: Mining for minerals and resources is a necessity to our industry. However, this leaves a negative environmental effects that could cause harm to the animals living in bodies of water and may cause permanent damage to its surroundings.

J: This was caused by the waste and byproducts of mining that contain a high concentration of heavy metals.

P: Conventional technologies that are used to remove heavy metals have major drawbacks but there's an alternative method to this which is "biosorption". Citrus peels and pectin were found to be containing carboxylic functional groups that enable their biosorption capabilities in the removal of metal ions.

G: This study's main objective is to create or develop a biosorbent from *Citrus microcarpa or* calamansi peels for the removal of copper ions found in water.

J: Next, for the hypothesis of our study. For the alternative hypothesis, If *Citrus microcarpa* is an effective biosorption to remove metal ions found in water, then it's a cost-effective, abundant, and simpler form of biosorption alternative to conventional technologies and it's a viable foundation to water treatment.

G: This study is made to determine the effectiveness of calamansi peels as a biosorption to remove metal ions in bodies of water. It could significantly mitigate the impending environmental and health hazards of heavy metal exposures, particularly copper.

Methodology:

P: For the methodology of this study, the first step is to prepare the biosorbents, which has three *Citrus microcarpa* peels biosorbents setups including pristine biosorbent labeled as (PB), alkali-modified biosorbent labeled as (AB), and carbonized biosorbent labeled as (CB).

G: Next is the Spectroscopic and Microscopic Surface Characterization of Biosorbents. The different pristine and modified biosorbents were analyzed via Attenuated Total Reflectance – Fourier Transform Infrared Spectroscopy and Field Emission - Scanning Electron Microscope.

J: The third one is the Biosorption Of Copper Using *Citrus microcarpa* Peel Biosorbents. Biosorption of copper were assessed using a batch experiment where the biosorbents were suspended in the copper contaminated wastewater.

P: Next, is the Pretest and Posttest Analysis of Water Samples, where the water samples were tested for the determination of pH and copper concentration. One-way analysis of variance or ANOVA was utilized at alpha level equal to 0.05.

Result and Discussion:

G: Now, let's proceed to the Result and discussion of our study. As seen on table 1, Hydroxyl functional group and carbonyl functional groups of carboxylic acid, carboxylates, and esters were found on the biosorbents that could have contributed in the binding of copper ions from water

J: Next in Figure 1, we can see Greyish clustered globules as seen in the FE-SEM Micrographs of the different *Citrus microcarpa* peels particles revealed that the biosorbent nanoparticles have heterogeneous, irregular and quasi-spherical morphology, and are also aggregated.

P: Furthermore, particle-size measurements determined sizes of the PB, AB and CB nanoparticles as observed at 100 000x magnification, with means of 65.30, 52.09, and 63.46 nm respectively.

G: As seen in Figure 2, after the batch experiment the biosorbent materials were able to reduce the concentrations of copper as compared to the mean pretest (control) value of 30.9 ppm (Cu) which did not undergo any treatment.

J: As shown in Figure 3, it showed that AB exhibited the highest percentage biosorption with 95.70 %, followed by PB with 78.57 % and CB with 76.42 %. It was revealed that modification of the biosorbent using an alkali solution enhanced its copper biosorption which indicates that it is a better biosorbent compared to the raw form. But CB showed a negative effect on its ability to remove copper from water.

P: In Figure 4, it shows that there is a change in the pH values of the water samples after the biosorption of copper, it showed that AB displayed the highest pH value of 6.51, followed by CB with 5.77, Pretest with 4.92, and PB with 4.41.

Conclusion and recommendations

G: Next, is the conclusion of our study. According to the results, *Citrus microcarpa* peels in their PB, AB, and CB form had exhibited high biosorption percentages and are all promising biosorbents for removing copper from water, however the Alkali (NaOH) modified biosorbent topped the other two.

J: Thus, the predominant biosorption mechanisms identified in this study are ion exchange and chelation/complexation, which are potentially reinforced by the biosorbents' physical properties.

P: As a result, AB can be used in water treatment systems, particularly in the mining industry, to treat copper-bearing wastewaters and make calamansi peel wastes more beneficial.

G: Lastly, In accordance with this study the researcher would highly recommend: the application of the biosorbents in the removal of other heavy metals and organic pollutants.

J: That's all for our presentation, Thank you for Listening!

30 secs - start
2 mins - intro
1 min - method
2 mins - result
1 min - conclusion
30 secs -

0:19 - title
1:37 - intro
1:08 - method
2:10 - r n d
1 min conclusion

Recommendations:

- Images related to study
- Replace halaman to images related sa study
- Increase font size intro (title & text), gawing bullet
- Remove statistical analysis (whole slide)
- C. microcarpa gawin italics (title) - pa double check
- Bullet conclusion and recommendations
- Add recommendation
- Pre-recorded video - Bawal cut, bawal edit

Yellow = na resolve na 👍
Q: Need din po bang imention or iinclude sa script at idictate yung lahat ng steps sa methodology? or kahit flash nalang po yung flowchart itself saying “Here’s the methodology of the study...” Then mag allot po ng konting time po, mga 5-10 seconds before proceeding to results & discussion po sana
A: mention the titles with emphasis on the main procedure where you will get the main result of the study.

1 min intro, 1 min method, 2-3 mins results, conclusion
Pwede ata sumobra sa 5 mins. pero bawal umabot 6 mins.
would lead in water pollution. These contain a high concentration of heavy metals which would exceed the standard level for copper in bodies of water and could also cause a change in pH level which is not suitable for living organisms in bodies of water

J: This was caused by the waste and byproducts of mining that would lead in water pollution. These contain a high concentration of heavy metals which would exceed the standard level for copper in bodies of water and could also cause a change in pH level which is not suitable for living organisms in bodies of water.

Paano prinepare biosorbents?

- For the first setup, the researchers will extract the contents of Citrus microcarpa, the collected peels were separated from other parts and were washed thoroughly using distilled water to remove unwanted materials in the experiment. It was then air dried for fifteen minutes. The peels were dried in a Laboratory drying oven in 100 degree celsius to remove moisture and water. Afterwards, it was grounded and stored in a clean and closed container named Pristine Biosorbent or PB.

- For setup two. Ten grams of PB was treated by immersion of aqueous solution of Sodium hydroxide at room temperature. Afterwards, it was washed thoroughly with distilled water via decantation and filtration, then dried and grinded just like in the first setup. This was labeled as Alkali Modified Biosorbent or AB.

- For the last setup, the PB was contained in a closed ceramic container with a small opening on the top. The vessel was then subjected to heat for 60 minutes and washed using distilled water. Then, it was sieved and stored in a clean and closed container ~~to avoid contamination with moisture, unnecessary moisture can cause the degradation of the material.~~ It was labeled as Carbonized Biosorbent or CB.

(kapag tinanong bakit 0.05)
this was chosen as an inferential tool to determine if there was a significant difference among the water samples before biosorption was applied or in Pretest and after biosorption using the biosorbents in terms of their copper concentration and pH level.

Results:

On Table 1, we can see the Summary of Important Functional groups of the C. microcarpa peel Biosorbent Nanoparticles. Hydroxyl stretching was observed in wavenumbers of 3286, 3333, and 3325 per centimeter for PB, AB, and CB respectively.

P: C-H stretching was detected at 2924 per centimeter for all of the biosorbents. Stretching of Carbonyl (C=O) functional group of ester was observed in PB at 1728 per centimeter but absent in AB and CB. For the carbonyl (C=O) functional group of carboxylate/carboxylic acid salts, peaks were found at 1612, 1612, and 1597 per centimeter for PB, AB, and CB, respectively. Carboxylate (COO-) of pectin were observed at 1412 and 1420 per centimeterfor PB and AB, respectively.

G: Again, Carbonyl (C=O) functional group of carboxylate were detected at 1366 and 1319 per centimeter for PB, 1373 and 1319 cm-1 for AB, and 1373 and 1311 cm-1 for CB. C-O-C functional group was found at 1234, 1242, and 1234 cm-1 for PB, AB, and CB, respectively. C-O of pectin was observed at 1018 cm-1 for all of the biosorbents.

Pag tinanong bat nagiba ang pH value.
The alteration or/and elimination of some of the functional groups, hydroxyl groups, in particular, may have caused the variation in the water samples' pH values, where the modified biosorbents showed lower acidity compared to the output of the raw form.