The Investigation of the Antimicrobial Potential of P. guajava leaves against Alcaligenes faecalis

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Project ID#

Q1: Research Question/Engineering Goal

Which extraction method of guava leaves can yield more antimicrobial agents?

It is to identify which extraction method is best in yielding the antimicrobial agents from *Psidium guajava* (guava) leaves and if it can be a sustainable and natural source of antimicrobial agents.

Q2: Methodology/Project Design

1st Extract: Place the washed guava leaves in a 1000 mL Beaker to boil in 500 mL of distilled water and transfer into another clean 500 mL Erlenmeyer Flask and place 4 sterile paper disks to soak for 30 minutes.
2nd Extract: Using a sterilized hole paper puncher, punch four holes on a fresh guava leaf and set aside.
3rd Extract: Place fresh guava leaves in a food processor and grind it until it crushed to tiny pieces; make the crushed leaves into more powdery form using the sterilized mortar and pestle. Place 4 sterile paper disk in the powdered guava leaves and add pressure so that the power would stick to the paper disk; set aside.
Water (negative control): Place 4 sterile paper disks in the petri dish with water and let it soak for 30 minutes. Place the soaked paper disks on the media in four regular intervals. Flip the plates and label each.
Anti-biotic Bacitracin™ (positive control): Place 4 sterile bacitracin disks on the media in four regular intervals. Flip the plates and label each.

Q3: Data Analysis & Results

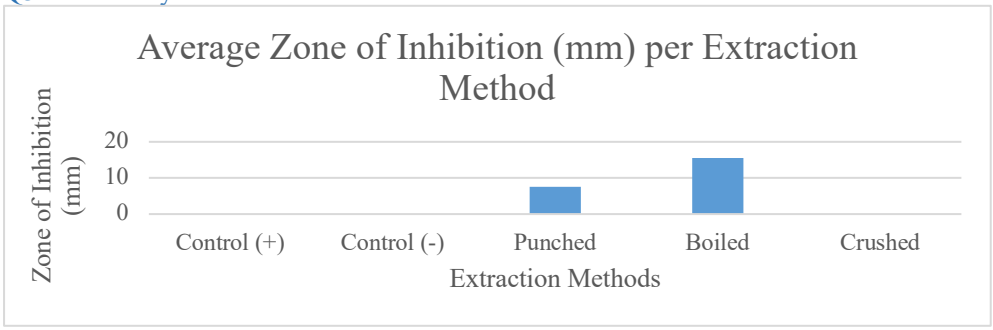

Figure 2: The graph shows the average zone of inhibitions per extraction method.

Five extraction methods are designated to test the antimicrobial susceptibility of Alcaligenes faecalis from Psidium guajava leaves. These methods involve four sterile disks exposed/soaked in boiled, crushed, and punched guava leaves and placing them on the surface of MacConkey Agar swabbed with A. faecalis at equal intervals. After 24 hours of incubation, the plates that showed the largest zone of inhibition were the disks soaked in boiled guava leaves with an average of 15 mm. Other extraction methods such as the crushed leaves, and control set up which are distilled water and Bacitracin disks did not show a measurable and significant zone of inhibitions.

Q4: Interpretation & Conclusions

After the analysis of the zone of inhibitions in each plate, it was generalized that the results supported the hypothesis that boiling *Psidium guajava* leaves would extract more antimicrobial agents against the gram-negative bacteria, *Alcaligenes faecalis*—which is known for being strongly drug-resistant (Huang, 2020). The plate where diffusion disks soaked in boiled guava leaves has shown an average of 15 mm in diameter zones of inhibition, indicating the no *A. faecalis* has grown during the incubation period of 24 hours. On the other hand, bacterial growth were observed in punched leaves method while the result in the crushed is invalid due to the scattered plant material.