Qualitative Analysis of Bioactive Compounds (Saponins) in Mauby Tree Bark (Colubrina arborescens)

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Introduction

What is Mauby Tree Bark?

- Bark from the Colubrina arborescens tree species
- Native to the Caribbean Islands and Florida
- Mauby — a bitter, dark liquid extracted from the bark
  - A folk remedy used for diabetes, hypertension, and high cholesterol
  - Prepared as a refreshing carbonated beverage

Mauby & Its Bioactive Compounds

- Bioactive compounds — extra-nutritional constituents that typically exist in small quantities in plants and foods
- Potentially decrease in the risk of chronic disease development in humans
- Mauby — novel source of bioactive compounds
- Saponins — found in plant species
  - Classified by carbon skeleton during biosynthesis and physio-chemical properties
  - Distinctive medicinal properties
    - Cardiovascular, anti-diabetic, anti-cancer, and immunological
  - Unique foaming and emulsifying properties

What is Power Ultrasound (PU)?

- Type of ultrasound-assisted extraction technology
  - Commonly used in food and pharmaceutical industries
  - Processes plant materials — denaturing plant cell walls
  - May result in greater extraction yields of bioactive compounds, such as saponins
  - A “green” and eco-friendly technology
  - Less hazardous chemical solvents
  - Energy efficient

Methods

The purpose of this study is to detect saponins by evaluating the qualitative characteristics (i.e., presence of foam) of Mauby bark powder solution prepared using (1) traditional boiling method and (2) power ultrasound method for 30 minutes each.

Results

- The foam was evaluated using a qualitative grading scale with the following descriptors: 0 - Absent; 1 - Present; 2 - Slightly Present; and 3 - Heavily Present

The traditional boiling method yielded more foam than the PU method

Discussion

- Looks can be deceiving! Though, the PU had less foam present, it does not mean there are less saponins in the Mauby solution.
- PU uses a process called cavitation to burst the plant cell to release the internal saponins. Such as saponins
- Hence, less foam is present in the PU samples, however, the extracted saponins are potentially greater in number than the boiled samples.

The Mechanisms of Saponins

- Cholesterol-binding Activity
  - Beneficial for cardiovascular disease and type 2 diabetes
- Cytotoxic/Anti-Tumor Activity
  - Potential chemotherapeutic agents
- Anti-Inflammation Activity
  - Positively regulate the immune system by suppressing inflammatory mediators
- Adjuvant Activity
  - Used in vaccine production due to their immune-enhancing properties
- Hemolytic Activity
  - Drug/herb interactions, such as warfarin, must be monitored to avoid dangerous blood thinning

Conclusion

Further analyses must be performed using High-Performance Liquid Chromatography (HPLC) to acquire quantitative results as well as identify specific types of saponins found in Mauby bark powder.

References