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Optimizing Antioxidant Extraction from Blackberries: A Key to Enhancing Chronic Disease Management

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INTRODUCTION & AIM

Introduction:

Oxidative stress, caused by an imbalance between free radicals and antioxidants, plays a crucial role in the development of chronic diseases, including cardiovascular diseases, cancers, and neurodegenerative disorders. Blackberries are a rich source of phenolic compounds with significant antioxidant potential, making them a promising candidate for dietary strategies aimed at reducing oxidative stress.

Objective:

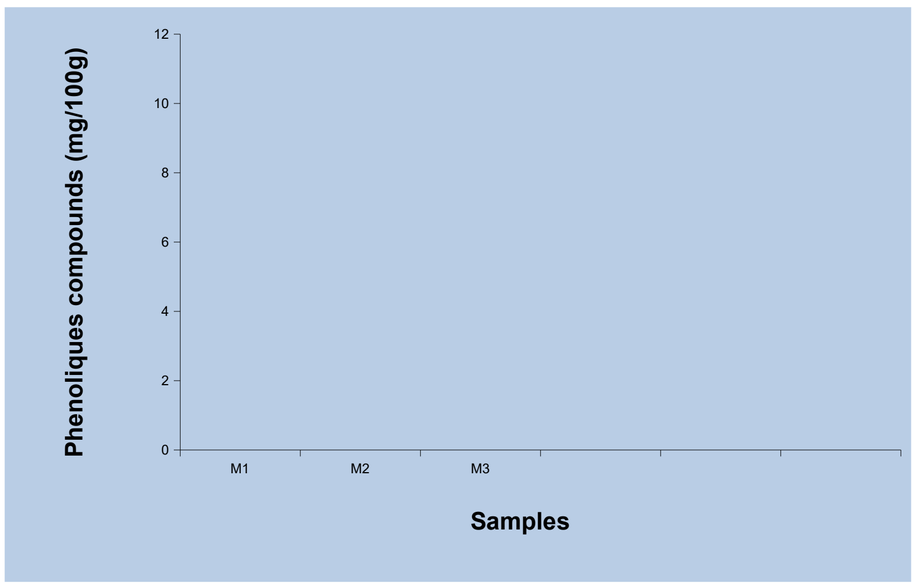
The main objective of this study is to optimize the extraction process of bioactive phenolic compounds from blackberries using various solvents, to enhance the antioxidant potential of the extracts and contribute to chronic disease management strategies.

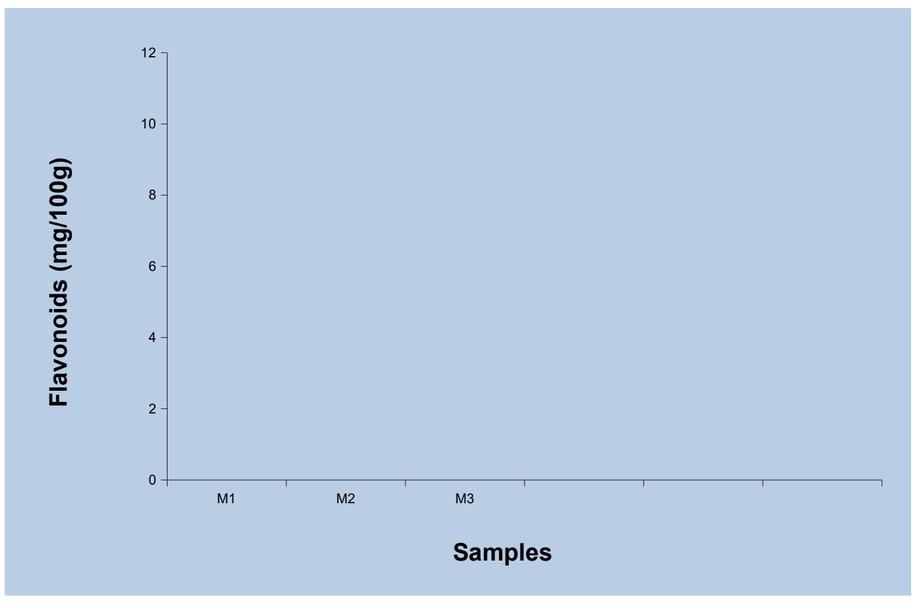
METHOD

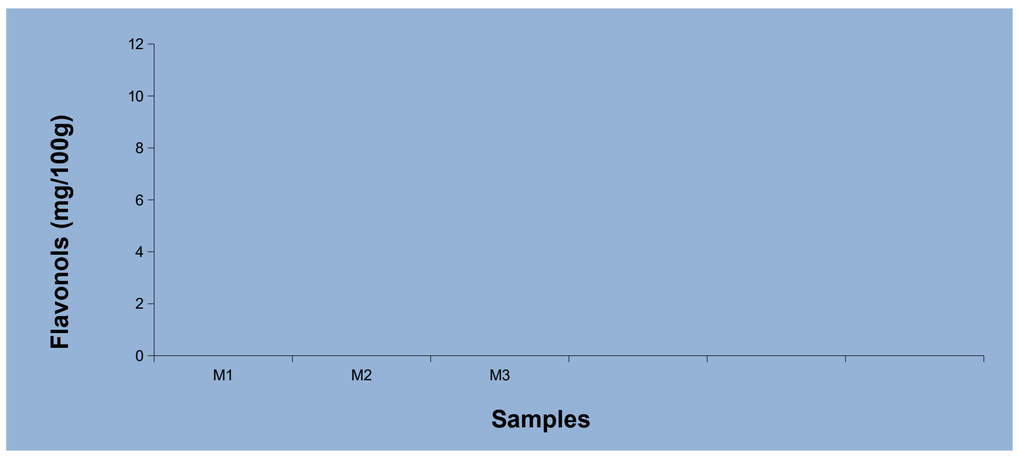
- **Sample Collection:** Fresh blackberries were collected from local sources, ensuring uniform ripeness.
- **Extraction Method:** A comparison of different solvents (ethanol 30%, acidified water, methanol) was carried out using microwave-assisted extraction (MAE) to optimize the yield of polyphenols.
- **Analysis of Phenolic Compounds:** Total phenolic content was determined using the Folin-Ciocalteu method, while flavonoids and flavonols were quantified using spectrophotometric techniques. High-performance liquid chromatography (HPLC) was used for the identification of specific phenolic compounds.
- **Antioxidant Activity:** The antioxidant activity was measured by DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging assay and ferric reducing antioxidant power (FRAP).

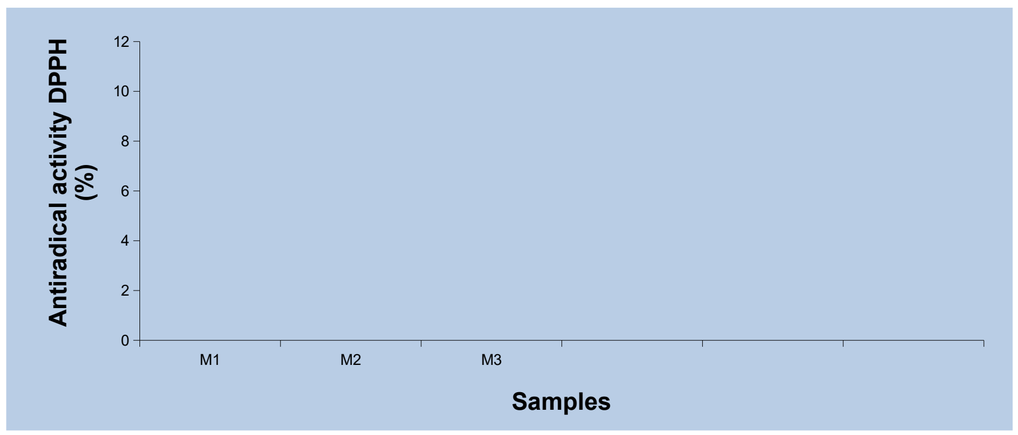
RESULTS & DISCUSSION

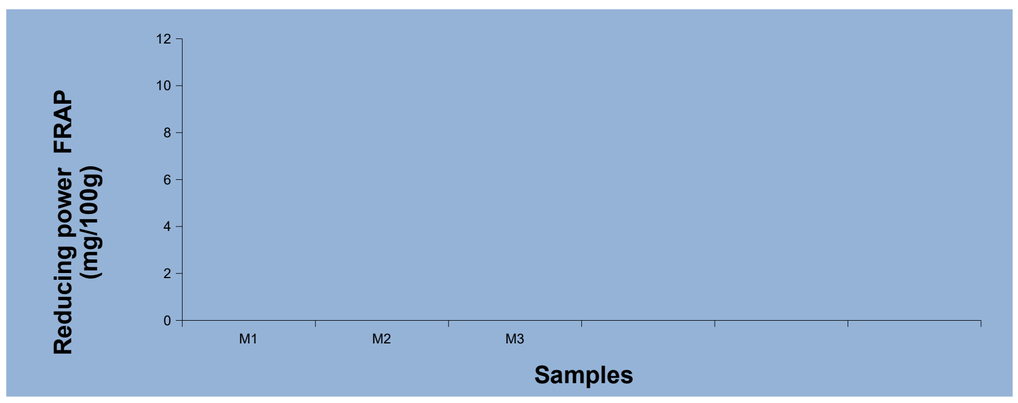
RESULTS











DISCUSSION

- **Phenolic Content:** The highest phenolic content was obtained using 30% ethanol as the extraction solvent, yielding 250 mg gallic acid equivalents (GAE)/100 g dry weight. Acidified water showed similar results, making it a viable solvent for extraction (Figure1).
- **Flavonoid and Flavonol Content:** Flavonoids and flavonols also showed higher concentrations with ethanol and acidified water extraction, indicating the efficacy of these solvents in extracting antioxidant compounds from blackberries (Figure 2 and 3).
- **Antioxidant Activity:** The DPPH and FRAP assays revealed that extracts with higher phenolic content exhibited significantly better antioxidant activities. Ethanol and acidified water extracts showed the most potent radical scavenging capacity, reducing DPPH radicals by over 80% (Figure 4 and 5).

CONCLUSION

Blackberries are a rich source of bioactive compounds with potent antioxidant properties. Ethanol (30%) and acidified water proved to be the most effective solvents for extracting phenolic compounds with high antioxidant activity. These results highlight the importance of solvent choice in optimizing antioxidant extraction, which has direct implications for developing blackberry-based functional foods to combat chronic diseases.

FUTURE WORK / REFERENCES

Future Work

Future studies should focus on:
The scalability of the optimized extraction process for industrial applications.
Testing the bioavailability of the extracted compounds in human clinical trials.
Evaluating the potential synergistic effects of blackberry extracts with other dietary antioxidants.

References

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2. Pincemail, J., et al. (2002). "Oxidative stress and chronic disease."
3. Manach, C., et al. (2004). "Phenolic compounds in plants and their health benefits."