# DEVELOPMENT OF AN INNOVATIVE PRODUCT OF PALM MALTO: A Spray Dried Powder of Palmyrah Fruit Pulp

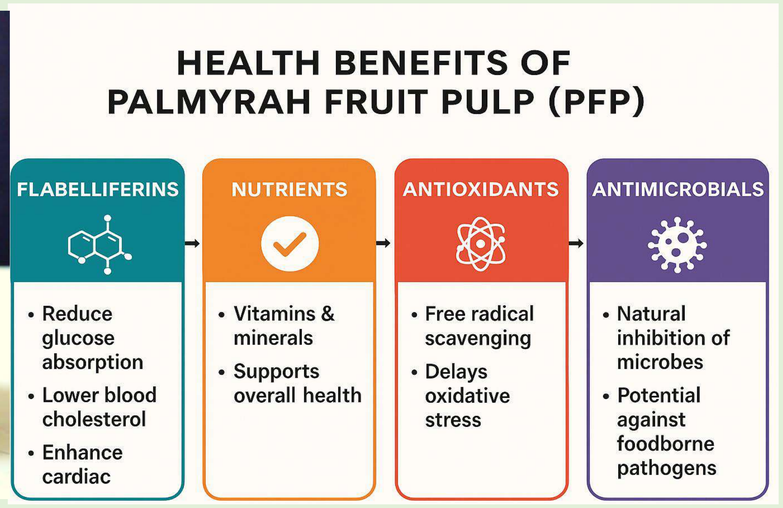
S. Thuraisingam[1], V. Samsan Kapil[1] & T. Kirushanthi[1,*]

[1]Palmyrah Research Institute, Kandy Road, Kaithady, Jaffna, 40000, Sri Lanka.

*Corresponding author: kirushvel23@gmail.com

## INTRODUCTION

Ripe palmyrah fruit (*Borassus flabellifer* L.) contains about 40% pulp, known for its deep yellow color, distinct flavor, and bitterness due to flabelliferins—bioactives with potential health benefits.




**Problem Statement and Justification:** PFP has a short shelf life and is often preserved using chemicals. Large volumes go to waste during peak harvest (Aug–Oct). Transforming pulp into powder via spray drying can improve shelf life, ease of packaging, ease of handling during storage, and diversify applications.



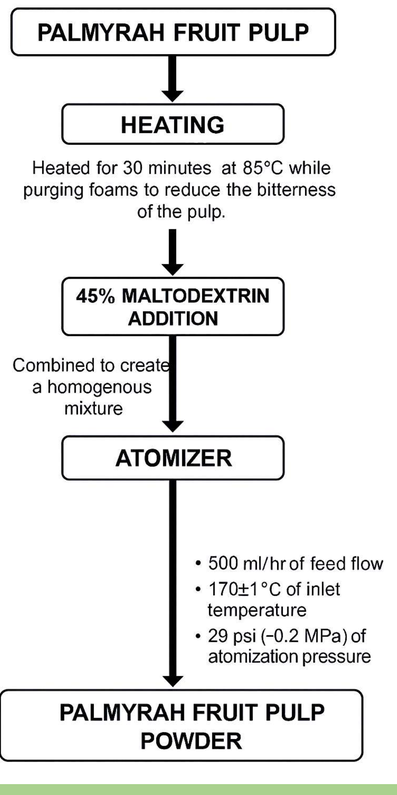

Spray drying provides a method to extend shelf life and enhance storage and usability. Yet, high fiber and pectin content in the pulp cause stickiness, making spray drying challenging.




Adding emulsifying agents like maltodextrin and gelatin into PFP will reduce the stickiness and coat the pulp, making it into powder.

This study aims to explore the alternative use of palmyrah fruit by converting its pulp into powder using the spray drying technique. Also, this study focuses on evaluating the antimicrobial potential of Palmyrah Fruit Pulp Powder (PFPP), highlighting its promise as a **natural functional ingredient in food and pharmaceutical products**.

## MATERIALS & METHODOLOGY


- Properties of Palm Malto were evaluated.
- Potential value-added products (supplementary disc and milk powder) were studied and their Properties were evaluated.

## RESULTS & DISCUSSION

- Antimicrobial activity of palm Malto showed inhibition zones against selected microbial strains (See Fig.1), suggesting promising applications in food preservation and nutraceutical development.

**Table 1: Zone of Inhibition (ZOI) in mm of Palm Malto**

| Sample ID | Sample Name | Zone of Inhibition (ZOI) in mm | | |
|---|---|---|---|---|
| | | *E.coli* | *Staphylococcus aureus* | *Enterococcus sp.* |
| (+) | Chloramphenicol | 3.50 | 3.93 | 3.73 |
| AS | Ascorbic acid | 1.73 | 1.97 | 1.83 |
| p50 | Ethanol +50% water | 1.73 | 1.53 | 1.70 |
| P100 | Palm Malto | 1.63 | 1.50 | 1.67 |
| E100 | 100% Ethanol | 0.00 | 0.00 | 0.00 |
| E50 | 50% Ethanol | 0.00 | 0.00 | 0.00 |

*E.coli* *Staphylococcus aureus* *Enterococcus sp.*

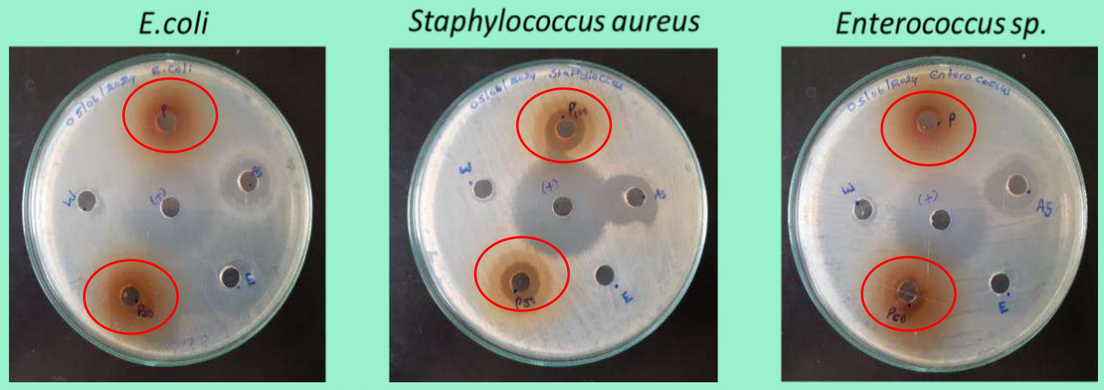
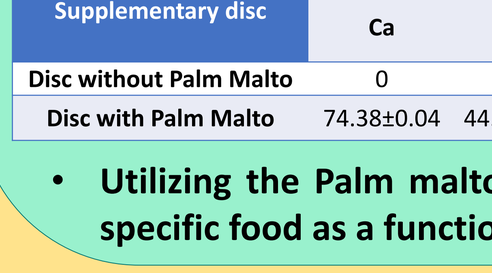


**Figure 1: Zone of Inhibition Palm Malto against selected microbial strains**




- Results of High-Performance Liquid Chromatography revealed that 8.54 mg/g of vitamin C was present in Palm-malto

**Table 2: Nutrients in Palm Malto**

| Nutrients | Mean Value |
|---|---|
| Ash (g/100g) | 2.099 |
| Moisture (g/100g) | 7.241[a] |
| Fat (g/100g) | 0.654[a] |
| Non reducing sugar(g/100g) | 38.240[b] |
| Total sugar (g/100g) | 44.870[b] |
| Vitamin C (g/100g) | 0.049[a] |
| Calcium (g/100g) | 0.202[a] |
| Phosphate (g/100g) | 0.087[a] |
| Salt (g/100g) | 1.320[b] |
| Energy (kcal/100g) | 359.321 |

**Table 3: Functional properties of in milk + Palm Malto**

| Functional properties | g/100g |
|---|---|
| Yield % | 46.47 |
| Solubility % | 70.42 |
| Bulk density (g/ml) | 0.45 |
| Water activity | 0.24 |
| Moisture content % | 4.53 |
| Total Ash (g/100g) | 5.73 |

**Table 4: Nutrients in milk + Palm Malto**

| Nutritional composition | g/100g |
|---|---|
| Total sugar (g/100g) | 31.26 |
| Protein (g/100g) | 21.76 |
| Fat (g/100g) | 1.02 |
| Energy (Kcal/ 100g) | 368.2 |
| Calcium (mg/100g) | 602.96 |
| Vitamin C (mg/100g) | 8.05 |
| Total Phenolic content (mg GAE/100g) | 78.30 |

**Table 5: Minerals and Energy in Supplementary discs**

| Supplementary disc | Amount (mg/ 100 g) | | | | |
|---|---|---|---|---|---|
| | Ca | Mg | K | Na | Energy (kcal/100g) |
| Disc without Palm Malto | 0 | 0 | 992.38±2.14 | 385.79±1.16 | 280.56±0.03 |
| Disc with Palm Malto | 74.38±0.04 | 44.26±0.03 | 2690.17±1.77 | 4403.45±3.03 | 284.17±0.30 |

- **Utilizing the Palm malto as a food additive, which promote the specific food as a functional food**

## CONCLUSION

Palm Malto from Palmyrah fruit pulp demonstrates excellent stability, nutritional richness, and antimicrobial potential, indicating a promising role in value-added food products and health-oriented formulations.

**Flavoring agents for drugs like Vitamin C**

**Topping for icing cakes & Ice cream**

**Ready-To-Serve drinks**

**Milk shakes**

## REFERENCES


- V. Samsan kapil, T. Kirushanthi, S. Thuraisingam, H.U.K.D.Z. Rajapakse, I. Lindamulla (2024) Evaluation of anti-microbial activity of palmyrah fruit pulp powder and its potential application. In: Proceedings, 2nd Annual Symposium on Industrial assignments, Faculty of Livestock, Fisheries & Nutrition, Wayamba University of Sri Lanka, p 61.
- Sangeetha, S., Thuraisingam, S., Jayawardane, J. A. E. C., & Srivijeindran, S. (2023). A novel approach to the formulation of an encapsulated bioactive powder from palmyrah (Borassus flabellifer L) fruit pulp for nutraceutical applications. *Food Chemistry Advances*, *3*, 100405.
- K.M.A. Madushanka, S. Vasantharuba, B. Anuluxshy, T.Suganja, T.Kirushanthi and S. Srivijeindran.Development of Palmyrah (Borassus flabellifer L.)Fruit Pulp Powder Using Spray Drying Technique. [Abstract]. In: 6th International Conference of Dry Zone Agriculture; ICDA; 2020.