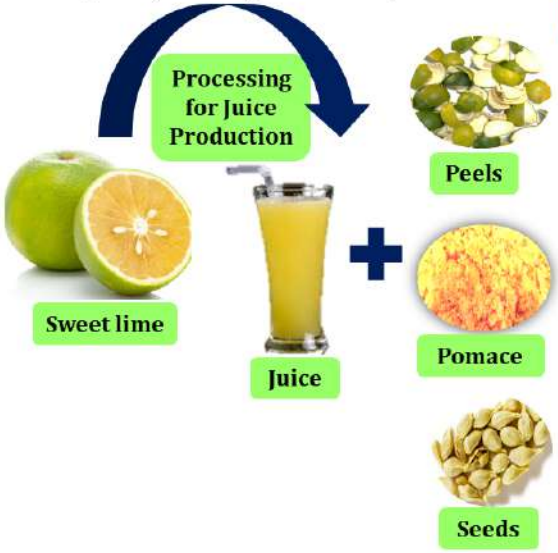
Comparison of Conventional and Advanced Drying method on the Sweet lime (*Citrus limetta*) peel waste: Nutritional, Functional & Color Profile

Shweta Suri, Anupama Singh and Prabhat K Nema
Department of Food Engineering
National Institute of Food Technology Entrepreneurship and Management (NIFTEM)
Sonipat, Haryana, India
Email: shwetasuri94@gmail.com

Introduction

- Sweet lime (*Citrus limetta*) also known as "*Mosambi*" is one of the popular citrus fruit. Owing to its unique appealing taste, flavor, and aroma, sweet lime is a highly valued fruit.
- It is often consumed fresh or processed in the form of juice. Processing lead to generation of large amount of waste in the form peels (50-55%), seeds and pomace.



- Sweet lime (*Citrus limetta*) peels are a rich and valuable bioactive residue.
- The high moisture content of peels is the only obstacle to its effective utilization.
- Drying is one of the traditional techniques of eliminating water from foodstuff thereby preserving them.

Aim

- To study the drying behavior of sweet lime (*Citrus limetta*) peel waste to improve its applicability.
- To check the effect of drying methods (solar drying and infrared drying) on the nutritional, functional, and color profile of the sweet lime peels.

Methods

Drying Process

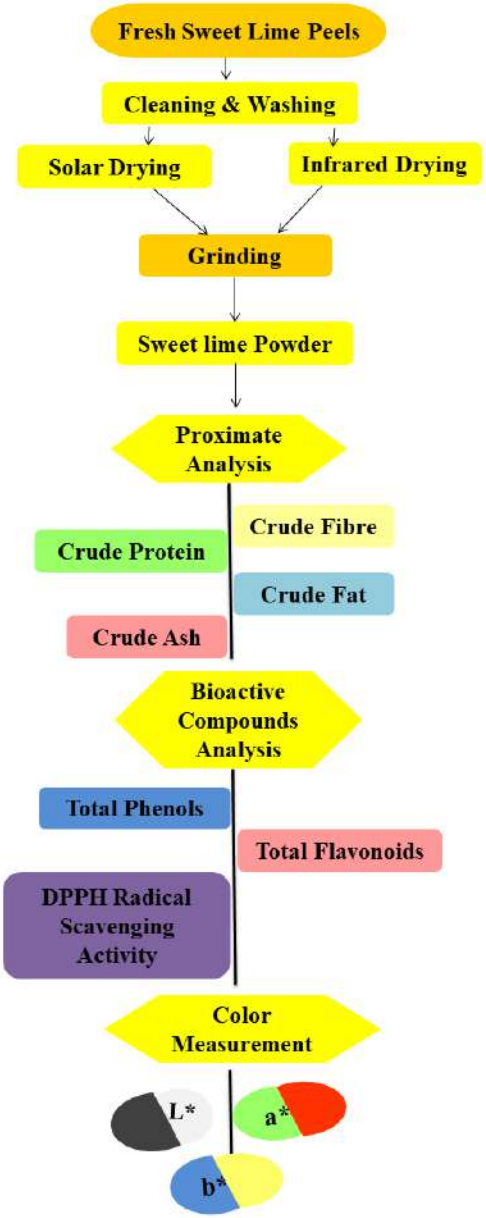
- Sweet lime peels were dried in two different drying units. 200g of peel sample was taken for the single-layer drying process.
- Initial moisture content of fresh peels was calculated using standard hot air oven dry method.

Solar Drying Process

- Conventional solar dyer having evacuated tube collector was used for drying of peels. The average temperature of the solar dryer in the peak hours (12:00 p.m.-2:00 p.m.) was 51°C (±2°C) with relative humidity (30-40%).
- Drying operations were conducted till a constant weight of peels was obtained.

Infra-Red Drying Process

- An infrared dryer developed at NIFTEM, India was used for conducting the experiments.
- The drying process was conducted at temperature (60°C) and constant air velocity (2.1m/s).



Results

Drying Behavior

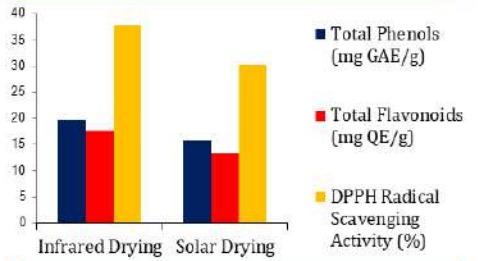
- The initial moisture content of fresh peels was observed to be 85.20% (db)
- In comparison to the conventional solar dryer, the advanced infrared dryer took the lesser time (4 hours) for dying.

Proximate Composition

- Infrared drying method was the best way to preserve the nutrients such as ash content, protein, and fiber content.

Parameters (%)	Infrared Drying	Solar Drying
Crude Fibre	15.67±0.84^{a}	14.47±0.55^{b}
Crude Fat	1.23±0.04^{b}	1.29±0.02^{b}
Crude Protein	8.09±0.30^{a}	7.87±0.61^{b}
Crude Ash	5.92±0.03^{a}	4.88± 0.03^{b}

Bioactive Composition



Color Parameters

- Infrared drying method showed high L* lightness and b* yellowness values.

Conclusion

- Sweet Lime peel waste contain good repository of nutrients and bioactive compounds.
- It could be implied from the study that advanced infrared drying is a suitable method in terms of preserving the quality attributes of the sweet lime peels.
- Infrared dried peel powder could be a good resource of significant valuable components, in this way encouraging the zero-waste theory.

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