

THESIS INFORMATION

INTRODUCTION

Thesis Title: Utilizing pitaya peel powder for partial replacement of wheat flour in the production of high-fiber cookies.

Field: Food Technology

Field Code: 9540101

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CONTENT

Cookies are a globally popular product due to their nutritional composition, convenient use, and diverse variety. However, traditional cookies are rich in sugar, starch and energy. Recently, high-fiber, low-sugar, and low-energy cookies have attracted great attention. Finding a potential source of fiber material for supplementation into cookie formula is highly essential. Pitaya is a well-known fruit in our country. Pitaya fruit peel constitutes 20-30% of the total fruit weight and is a by-product of the pitaya fruit processing procedure. In Vietnam, a portion of pitaya fruit peel is used as animal feed or fertilizer, while a substantial amount remains under-utilized or improperly treated, leading to environmental pollution. However, pitaya fruit peel is rich in dietary fiber and antioxidative compounds like betacyanin and phenolic compounds. Therefore, pitaya peel needs to be used not only for the production of value-added products but also for the reduction of waste generated from the pitaya fruit processing. In this dissertation, pitaya peel powder (PPP) was used for partial replacement of wheat flour in the production of high-fiber cookies, the research contents were as follows:

- (i) Impacts of blanching conditions on the quality of pitaya peel,
- (ii) Impacts of drying conditions on the PPP quality,
- (iii) Impacts of sieve aperture size on the PPP quality,
- (iv) Impacts of PPP particle size on the cookie quality,
- (v) Impacts of PPP ratios in the cookie recipe on the product quality.

Scientific and practical significance of the research

Scientific significance: The dissertation has identified:

The impacts of blanching temperature on the extent of enzyme inactivation and kinetic parameters of polyphenoloxidase and peroxidase inactivation, extent of loss, and kinetic parameters of the antioxidant degradation in pitaya fruit peel, including betacyanins and total phenolic compounds.

The impacts of drying temperature and air velocity on the quality of PPP.

The impacts of sieve mesh size on the quality of pitaya fruit peel powder and the quality of cookies enriched with PPP.

The impacts of the addition level of PPP to cookie formulation on the product quality.

Practical significance: The dissertation has determined:

The appropriate blanching and drying conditions in the treatment procedure to yield PPP with high dietary fiber and antioxidant contents.

The appropriate sieve mesh size of PPP and the suitable addition level of PPP to cookie formulation to produce high-fiber and antioxidant cookies with acceptable sensory quality.

The glycemic index and antioxidant release of high-fiber cookie samples obtained through in-vitro digestion.

The technical solution for enhancing the physical characteristics of high-fiber cookies when the addition level of PPP in the cookie recipe was increased to 25% of the blend weight.