

Exploring non-edible parts of pineapples as fat replacers in cake formulations

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Non-edible parts of many fruits, such as peel and seeds, are sources of compounds with important nutritional properties. They are also rich in fibres, which gives them the potential to be used as functional ingredients since fibres may be fat replacers in many food formulations. If these parts of fruits are properly transformed into edible forms, there will be potential reuse and recovery of food waste. In the case of pineapple, approximately 70% of the total weight of the fruit is not consumed, being rinds, core, and crown usually discarded.

This work aimed to transform pineapples' non-edible parts (rinds and crowns) into powders by freeze-drying with posterior micronization. The objective was to use the powders as fat replacers in a traditional cupcake recipe and assess the texture profile of the baked cakes.

Pineapples (*Ananas comosus* L.) rinds and crowns were removed, cut into small pieces, and freeze-dried. The dried samples were ground in a hammer mill to obtain powders/flours. They were characterized in terms of water activity, water and oil absorption capacity (WAC and OAC), proteins, and total dietary fibre content (on a dry basis, d.b.). These powders were used in a cupcake recipe (control), replacing the fat (butter) with the powders in different proportions: 25, 50, and 75%. Relevant textural parameters such as hardness, cohesiveness, chewiness, and springiness were assessed in the baked cupcakes.

Water activity values of rind and crown powders were 0.36 ± 0.02 and 0.49 ± 0.03 , respectively. Regarding functional properties, crown flours presented a considerably higher OAC (6.11 ± 0.39 g oil/g d.b.) than the rind (2.45 ± 0.47 g oil/g d.b.); WAC of both flours was similar, averaging 2.30 ± 0.34 g water/g d.b.

Protein content was significantly higher in the crown (8.14 ± 0.89 g/100 g d.b.) than in the rind flours (4.43 ± 0.38 g/100 g d.b.). Dietary fibres were mainly insoluble; the crown had 18% and the skin 37%.

The texture of cupcakes with 25% of both types of flour was similar to the control. However, as the proportions of the flours increased, texture differed mainly in crown-based recipes, becoming the cakes harder with springiness and adhesiveness decay.

These findings suggest that incorporating pineapple waste parts in a traditional cake recipe may serve as healthier ingredients with improved functional properties.

Keywords: Fruit wastes, proteins, fibres, texture

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