

ABSTRACT

The global food industry grapples with significant waste and loss, with more than one-third of total food production. This waste, extending from agricultural production to consumption, poses environmental and disposal challenges. Postharvest losses, particularly in fruits, contribute significantly, with over 60% of cultivated land crops going to waste. Addressing this issue is crucial for economic, social, and environmental reasons. This study focused on transforming substandard melons into Thai Melon Pies as a creative intervention to minimize postharvest losses. Evaluating various formulations involving thickeners (pectin and modified starch) and sweeteners (sucrose, xylitol, and sucralose), the research explored physicochemical attributes and consumer preferences. The sensory evaluation revealed indistinguishable preferences in pies with different thickeners with significant values above than 0.05, emphasizing the shared characteristics of color ($P = 0.724$), aroma ($P = 0.416$), texture ($P = 0.788$), taste ($P = 0.400$), overall liking ($P = 0.823$), and aftertaste ($P = 0.952$). However, variations arise in pies with different sweeteners, with xylitol emerging as the preferred option due to its quick sweetness perception and synergistic properties. This conclusion was indicated by the highest score found in aroma (7.00), taste (7.00), and aftertaste (7.00) of pies with 50% xylitol as the sweetener. Physicochemical analyses indicate that xylitol contributes to lighter color (L^* : 38.64; a^* : 6.81; b^* : 21.12), reduced water activity (a_w : 0.89), higher moisture content (75.26%), and superior texture (hardness: 1305.36 force). Meanwhile, apart from those attributes, no significant differences ($P > 0.05$) were found between different sweeteners in terms of ash ($P = 0.965$), protein ($P = 0.212$), crude fat ($P = 0.896$), dietary fiber ($P = 0.051$), and antioxidant property ($P = 0.996$). The study's multifaceted approach, combining technical analysis with sensory evaluation, provided comprehensive insights into the potential for minimizing postharvest losses through innovative food product development.

Keywords: postharvest losses, innovative food products, Thai Melon Pie, sensory evaluation, physicochemical analysis, pectin, modified starch, xylitol, sucralose, sustainability.