

Effect of Different Thickening Agent on The Physicochemical Properties and Sensory Characteristics of Pasta Made from Sweet Potato Powder

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Structured Abstract

Background: The study demonstrates that sweet potato powder, combined with xanthan and guar gum, can produce gluten-free pasta with desirable physicochemical and sensory characteristics. This gluten-free pasta appeals to health-conscious consumers, supports sustainability and provides a viable alternative for those with dietary sensitivities. Its potential for vitamin fortification enhances its health profile, making it a versatile and innovative ingredient for culinary applications.

Methods: This research focuses on five formulations: one wheat-based control and four incorporating thickening agents such as xanthan gum (F1 and F2) and guar gum (F3 and F4). Key physicochemical parameters examined include moisture content, fat content, ash content, swelling index, colour metrics (L^* , a^* , b^*) and texture attributes like hardness, springiness, cohesiveness, chewiness, and resilience. A number of 36 panellists evaluated sensory qualities such as taste, colour, texture, elasticity, appearance and overall acceptability.

Results: The results demonstrated significant differences in physicochemical properties due to the type and concentration of thickening agents. The control formulation, due to its gluten content facilitating water absorption, had the highest moisture level (9.13%). In contrast, the moisture content of xanthan gum formulations (F1 and F2) was 7.97% and 7.82% respectively, and guar gum formulations (F3 and F4) had moisture levels of 8.27% and 8.68%. All formulations had low fat levels, except F2 and F4, which had slightly higher fat content (0.1%) due to the fat in the thickening agents. Sweet potato powder formulations exhibited higher ash contents, reflecting their rich mineral composition, with the control having the lowest ash content (0.57%). The swelling index was highest in the control (0.87), indicating greater water absorption during cooking, while F1 to F4 ranged from 0.43 to 0.55, indicating less starch swelling. Texture analysis showed that xanthan gum increased hardness and cohesiveness, whereas guar gum enhanced springiness and resilience. Sensory evaluation revealed no significant differences in taste, texture, elasticity or overall acceptability among formulations. However, colour and appearance differed, with the control appearing lighter while sweet potato-based formulations exhibiting reddish and bluish tints due to the natural pigments in purple sweet potatoes.

Conclusion: Conclusively, further investigation is necessary to elevate sweet potato pasta up to par with gluten pasta.

Keywords: Pasta, Sweet Potato, Thickening Agent, Xanthan Gum, Guar Gum

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