EFFECT OF SUBSTITUTION WITH NATIVE AND PHOSPHORYLATED TAPIOCA OR SAGO STARCH ON THE QUALITY OF GLASS NOODLE

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Keywords: strength, elasticity, transparency, stickiness, cooking loss.

Introduction

Glass noodle is a popular noodle in Asian countries, including Malaysia. In China and Thailand, the noodle is usually made from 100% mungbean starch but in Malaysia it is made from a mixture of 95% potato starch and 5% mungbean starch as mungbean starch is more expensive than potato starch. Although uncooked potato starch glass noodle has characteristics similar to uncooked mungbean starch glass noodle, it becomes sticky, experiences high cooking loss and does not retain its shape well when cooked in water. In this project, methods for improving the quality of potato starch glass noodle were studied.

Materials and Methods

Tapioca and sago starches, before and after phosphorylation, were used in the partial substitution of potato starch in the production of the glass noodle. A commercial phosphorylated tapioca starch, MTS283 (phosphorylated using phosphorus oxychloride), which was donated by Tapioca Development Corp. Ltd., Thailand was also used. Phosphorylated tapioca and sago starches were produced in the laboratory using a mixture of sodium tripolyphosphate and sodium trimetaphosphate in accordance to the method recommended by Hussin (1998). Glass noodles were prepared using the procedure described by Kusnandar (1998) and the levels of starch substitution were 17%, 35% and 50%. The characteristics of intermediate products during processing such as dough, wet noodles after cooking and frozen noodles were observed visually. The properties of both uncooked and cooked glass noodles such as their diameter, transparency, cutting stress, cooking loss, swelling index, stickiness, elasticity, firmness and sensory quality were determined.

Results and Discussion

Tapioca and sago starches phosphorylated using a mixture of 5% sodium tripolyphosphate and 2% sodium trimetaphosphate at pH 9.5 and heated to 130°C for 2 hours produced starch pastes with restricted swelling and low solubility, no viscosity breakdown, increased heat tolerance and shear force, and high cold paste consistency. The tapioca starch, which was phosphorylated using phosphorus oxychloride (MTS283) also had similar characteristics. Substituting potato starch with tapioca starch phosphate up to 17%, MTS283 up to 35% or sago starch phosphate up to 35% improved the strength of uncooked glass noodles, managed to reduce cooking loss, swelling index and stickiness of cooked glass noodles, and resulted in glass noodles which were more elastic and firmer in comparison to the glass noodles made from potato starch only. Substitution with native tapioca or sago starch up to 17% was also possible and produced noodles with acceptable quality. The advantages of using phosphorylated tapioca and sago starches as compared to using their native starches in glass noodles, at the same level of substitution, were the uncooked noodles were more transparent and less brittle, and the cooked noodles were more elastic, firmer and more acceptable in terms of taste. Of the three phosphorylated starches, substitution with MTS283 was preferred as it resulted in noodles with qualities, which were comparable to that of glass noodles containing 100% mungbean starch.

Conclusions

Substitution of potato starch up to 17% with tapioca starch phosphate, up to 35% with MTS283 (commercial tapioca starch phosphate) or up to 35% with sago starch phosphate improved the quality of glass noodle. Substitution of potato starch with native tapioca or sago starch up to 17% was also possible but the noodles prepared using modified starches were better.

References

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Supported by IRPA Grant 01-02-04-0110