



Development of rice blended with purple sweet potato instant porridge



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Abstract

This study aimed to develop rice blended with purple sweet potato instant porridge. Processed rice flour (PRF) was prepared by drum drying. Processed purple sweet potato flour (PPF) was prepared by two drying methods. For tray drying, purple sweet potato was steamed for 20 min and dried with hot air drier at 60, 70 and 80°C. For drum drying, purple sweet potato was blended with water (60% w/w) and slurry was dried using double drum drier at 120, 130, and 140°C with rotation speed of 1.5 rpm. PPF made from 80°C tray drying had similar hue value to that of control (steamed purple sweet potato) and had high anthocyanin content. Instant porridge was prepared by blending PRF and PPF with ratios of 70:30, 60:40, 50:50 and 40:60. More portion of PPF from 80°C tray drying induced color of porridge closer to control and more anthocyanin content. There were no significant differences ($p \geq 0.05$) of rehydration ratio and overall acceptability scores of instant porridges made from different ratios of PPF. The ratio of 60:40 was recommended when all qualities were evaluated.

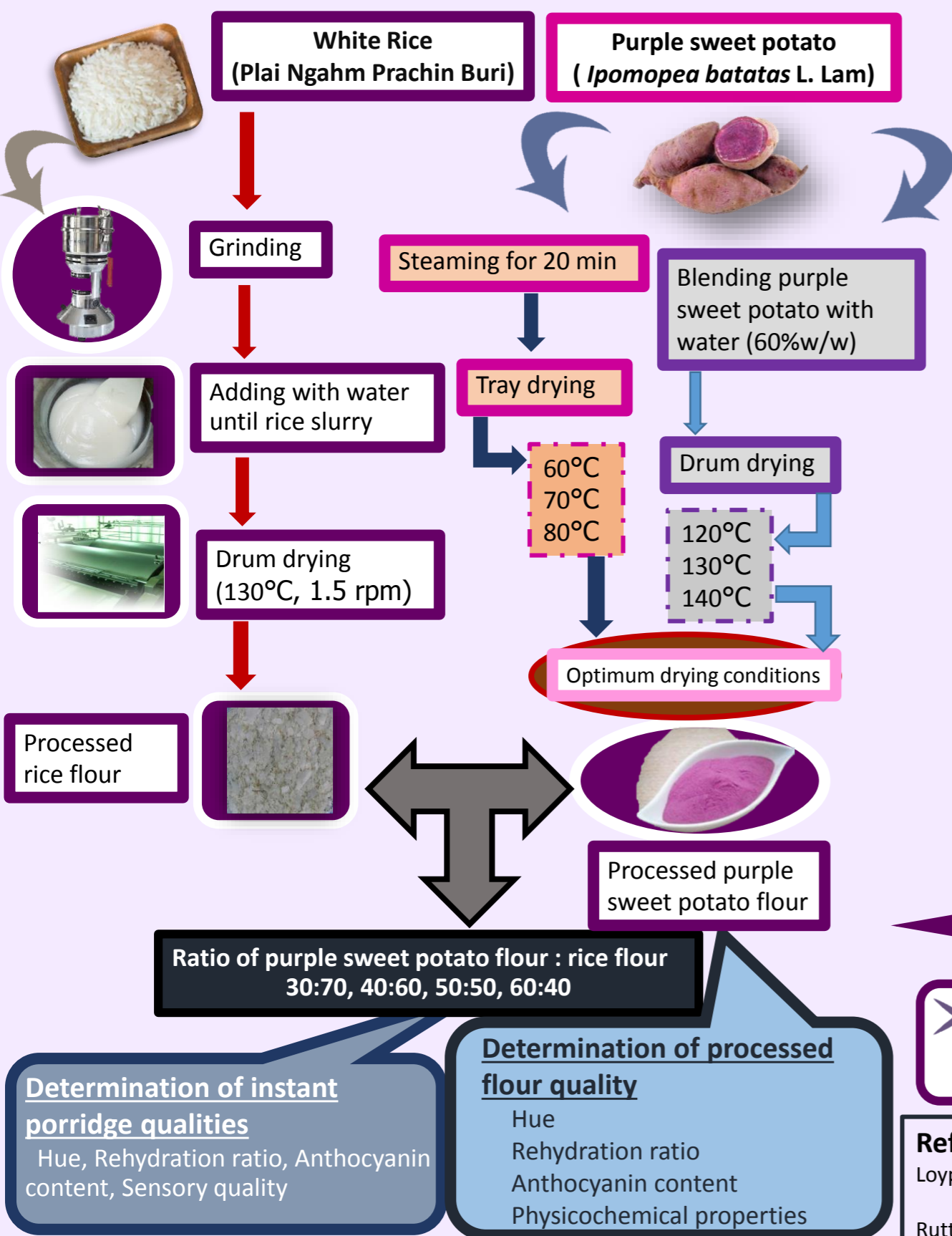
Introduction

Plai Ngham rice is grown in flooded condition but rice it is low quality rice. Instant rice porridge has become breakfast product in many countries (Olivera et al. 2015). Rice is used to produce instant rice porridge. There are different kinds of porridges composition vegetables and fruit. These contains phytochemical compounds especially polyphenols have high free radical scavenging activity, intermediate antioxidant activity and antimutagenicity. There is a high concentration of anthocyanin in adding purple flesh sweet potatoes (Teow et al. 2007). Adding purple sweet potato in instant rice porridge will enhance health benefits of the product.

Objective

- To determine optimum drying method and drying condition for preparing processed purple sweet potato flour
- To develop rice blended with purple sweet potato instant porridge

Materials and methods



Results and Discussion

Tray drying

Hue value

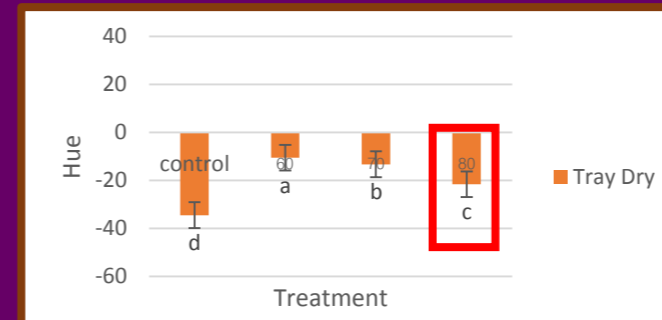


Fig. 1(a) Hue of processed purple sweet potato flour prepared by tray drying

Rehydration ratio

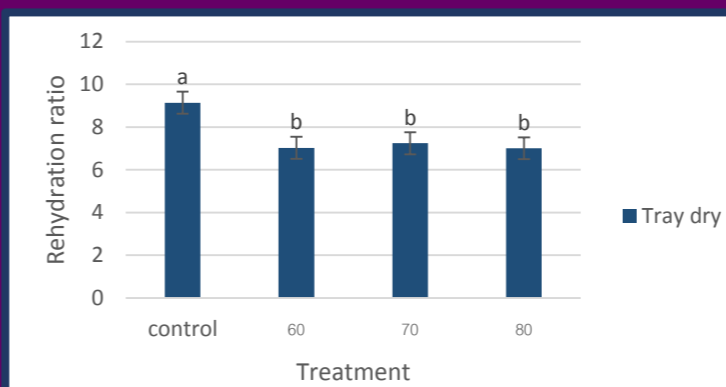


Fig. 2 (a) Rehydration ratio of processed purple sweet potato flour prepared by tray drying

Anthocyanin content

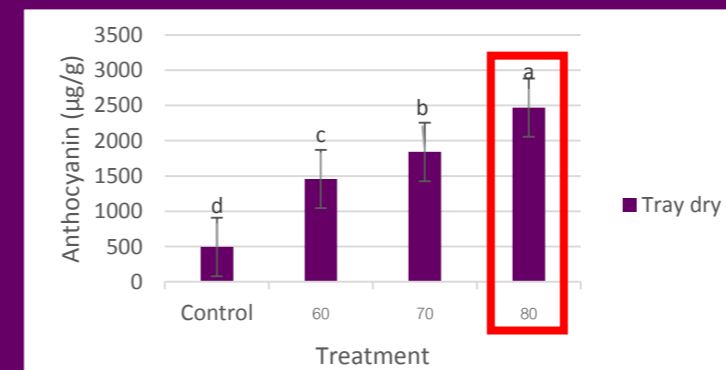


Fig. 3 (a) Anthocyanin content of processed purple sweet potato flour prepared by tray drying

Drum drying

• More changes of color in drum drying PPF might be due to non-enzymatic browning from intense heat treatment (Galaz et al., 2017).

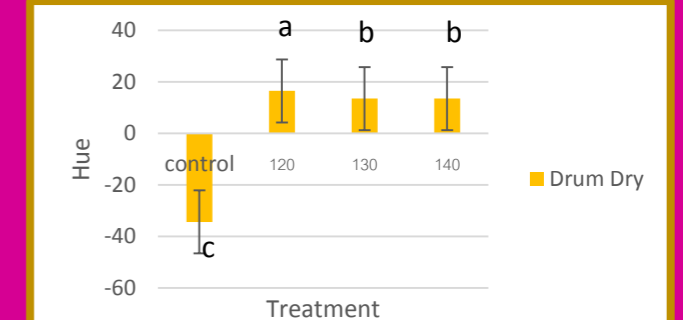


Fig. 1(b) Hue of processed purple sweet potato flour prepared by drum drying

• Increased temperature the rehydration ratio also increase, because of the amount of starch content (Agunbiade et al., 2006).

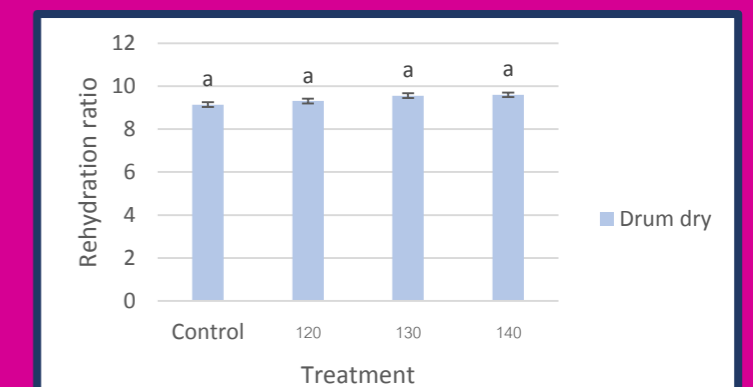


Fig. 2 (b) Rehydration ratio of processed purple sweet potato flour prepared by drum drying

• PPF was steamed lead to enhance the polymeric anthocyanin content though temperature higher (Yang et al., 2008).

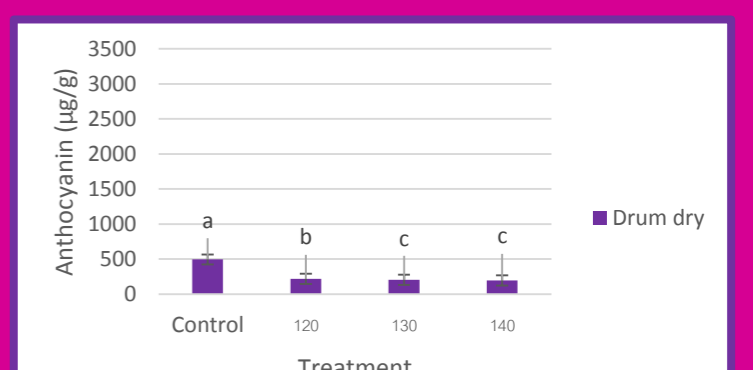


Fig. 3 (b) Anthocyanin content of processed purple sweet potato flour prepared by drum drying

Quality of rice blended with purple sweet potato instant porridge

Hue value

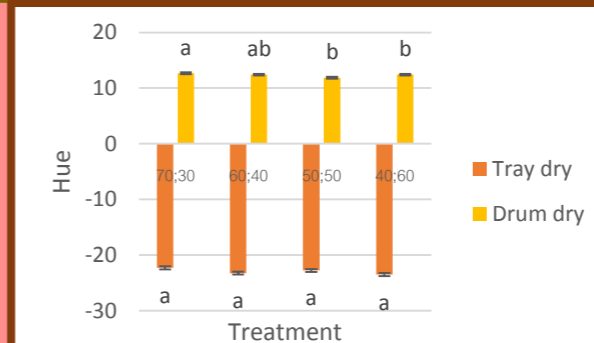


Fig. 4 (a) Hue of rice blended with purple sweet potato instant porridge

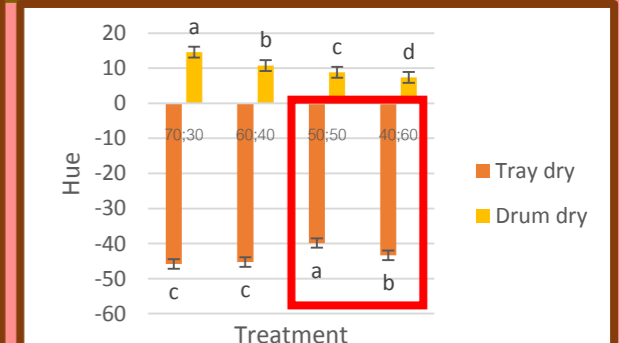


Fig. 4 (b) Hue of rehydrated rice blended with purple sweet potato instant porridge

Rehydration ratio

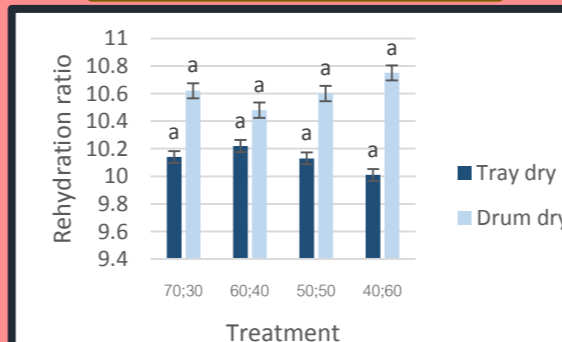


Fig. 5 Rehydration ratio of rice blended with purple sweet potato instant porridge

Anthocyanin

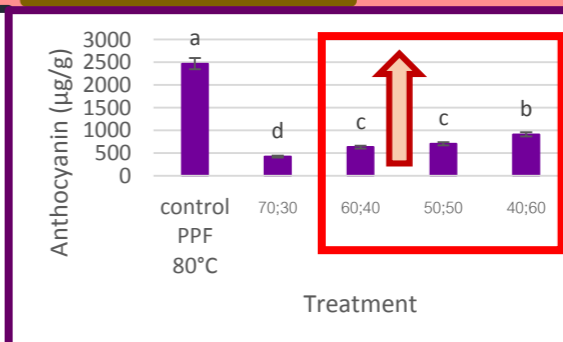


Fig. 6 Anthocyanin content of rice blended with purple sweet potato instant porridge

Sensory Quality

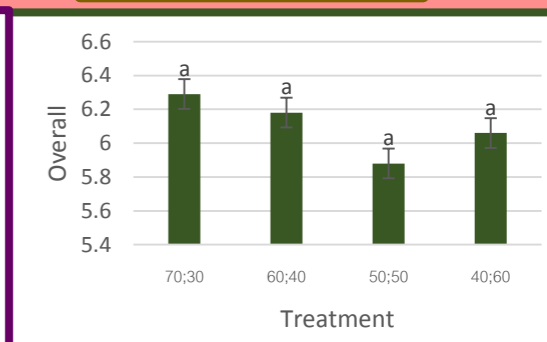


Fig. 7 Overall acceptability scores of rehydrated rice blended with purple sweet potato instant porridge

Conclusion

• The optimum method to prepare processed purple sweet potato flour was drying using hot air drier at 80°C.

• Increase of PPF (80°C tray drying) in instant rice porridge made color more similar to control and enhanced anthocyanin content. However, it did not affect rehydration time and overall acceptability of panelists.
• Ratio of 60:40 was recommended for making rice blended with purple sweet potato instant porridge.

References

- Loypimai, P., Moongngarm, A. 2015. Utilization of pregelatinized banana flour as a Functional ingredient in instant porridge. Food Science and Technology: 311- 318.
- Ruttarattanamongkol, K., Chittrakorn, S., Weerawatanakorn, M., Dangpium, N. 2016. Effect of drying condition on properties, pigments and antioxidant activity retentions of pretreated orange and purple-fleshed sweet potato flours. Journal Food Science Technology 53(4) : 1811-1822.