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Research Article

Effects of Sodium Bisulfite Soaking on the Quality of Durian Seed Flour and its Application to Dakak-dakak Production (West Sumatra's Traditional Snack)

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Abstract

Objective: This study aimed to investigate the effects of sodium metabisulfite soaking on the quality of durian seed flour and its application in producing dakak-dakak (West Sumatra's traditional snack). **Materials and Methods:** The concentrations of sodium metabisulfite used in this study were: A (0.7%), B (0.6%), C (0.5%), D (0.4%) and E (0%, as control). The parameters observed include water content, ash content, protein content, fat content, carbohydrate content, sulfite residue, flour yield, gelatinization temperature, water absorption, color, oil absorption and product acceptance by sensory analysis. **Results:** Sodium metabisulfite soaking significantly influenced almost all quality parameters of durian seed flour. The best quality of flour was obtained using formula A with flour yield 21.22%, water absorption 247.42%, water content 8.38%, ash 1.07%, fat 1.15%, protein 2.61%, carbohydrate 87.24%, sulfite residue 62.28 ppm and lightness (77.73). However, with regard to final product acceptance of dakak-dakak based on sensory analysis, formula B was the best. **Conclusion:** Our results indicated that the use of sodium metabisulfite improved the quality of durian seed flour and the final product of dakak-dakak.

Key words: Durian seed flour quality, sodium metabisulfite, dakak-dakak

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Durian (*Durio zibethinus* Murr) is a popular seasonal fruit in Southeast Asia, particularly in Malaysia, Indonesia, Thailand and the Philippines[1]. Until now, durian seed has not been well utilized since the seed becomes waste.

Durian seed flour has a high carbohydrate content and longer shelf life and hence could be used as an alternative raw material for making dakak-dakak. However, upon processing the durian seeds, the flour appears yellowish white in color. So that the durian seed flour can appear white, soaking with sodium metabisulfite ($Na_2S_2O_5$) is suggested. In addition to improving the quality of the flour, $Na_2S_2O_5$ treatment can inactivate the enzyme and inhibit microbial growth[2]. Dakak-dakak is one of the traditional snacks in Batusanggkar region in West Sumatra, Indonesia, made out of rice flour and having a hard but crispy texture. Efforts have been put in to develop natural food resources in Indonesia, especially in West Sumatra[3]. Therefore, this study investigated the potential to utilize durian seed flour for making dakak-dakak.

MATERIALS AND METHODS

Materials: Raw materials used were durian seed, calcium hydroxide ($Ca(OH)_2$), $Na_2S_2O_5$ and water. In addition, analytical grade reagents from different sources were used.

Experimental design: Five formulations have been developed for our study:

A = Soaking with 0.7% $Na_2S_2O_5$
B = Soaking with 0.6% $Na_2S_2O_5$
C = Soaking with 0.5% $Na_2S_2O_5$
D = Soaking with 0.4% $Na_2S_2O_5$
E = Without $Na_2S_2O_5$ soaking (control)

Making of durian seed flour: The making of durian seed flour was based on the method of Afif [4] with a slight modification. Durian seed was sorted, washed and boiled at 80°C for 30 min. Then, the durian seed after removing the pericarp was sliced and soaked in calcium hydroxide for 60 min. After soaking them in $Na_2S_2O_5$ for 80 min, they were dried at 60°C for 17 h. Finally, durian seed was floured by disc milling method.

Production of dakak-dakak: The production of dakak-dakak was based on the method of Roza[5] with slight modification. A dough was prepared by mixing 100 g rice flour, 50 g durian seed flour and 1 g salt in 100 mL water. The dough was made into dakak-dakak, fried, drained and cooled.

Observation: The quality parameters of durian seed flour as well as of dakak-dakak were observed and recorded, including their physical and analytical properties such as water content, ash content, protein content, fat content, carbohydrate content, sulfite residue, yield, gelatinization temperature, water absorption, color and oil absorption. The acceptability of the final product of dakak-dakak was assessed through sensory analysis.

RESULTS AND DISCUSSION

Durian seed waste has high amounts of starch; therefore, it could be used as an alternative raw material for rice in snack making. According to Suarti *et al.*[6], the treatment of durian seed flour with $Na_2S_2O_5$ improved the physicochemical properties of the flour.

Moreover, in agreement with Suarti *et al.*[6], our results show that soaking in $Na_2S_2O_5$ improved the physical properties of durian seed flour, including its yield, gelatinization temperature, whiteness and fat absorption. However, water absorption of durian seed flour was not affected by various treatments with $Na_2S_2O_5$ (Fig. 1).

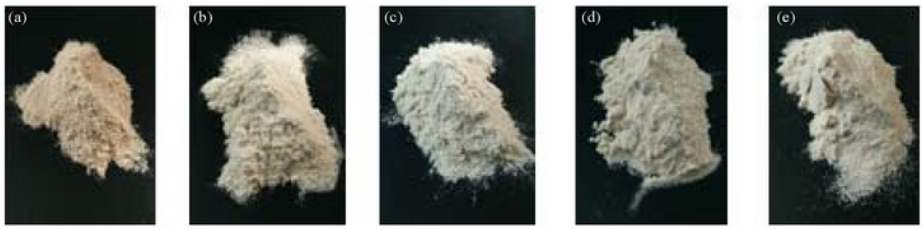

Fig. 1: Appearance of durian seed flour

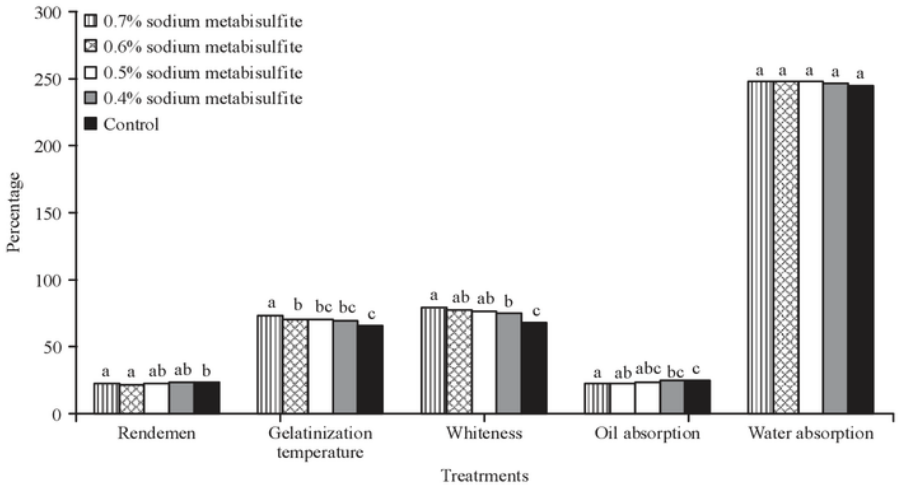

Fig. 2: Physical properties measurement of durian seed flour

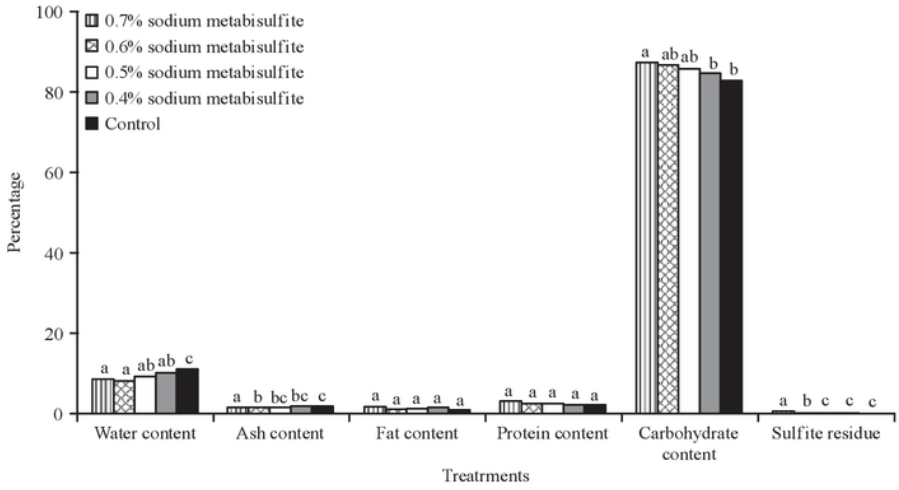

Fig. 3: Chemical properties measurement of durian seed flour

Color is the most important parameter to assess the quality of the flour. Sodium metabisulfite ($Na_2S_2O_5$) treatment improved the lightness of durian seed flour and lighter flour is an indication that the flour is of higher quality (Fig. 2).

Based on chemical analyses (Fig. 3), water content of treated durian seed flour was lower as compared to the control. Less water availability means longer shelf life. However, soaking in $Na_2S_2O_5$ reduced the ash content of durian seed flour as compared to the control. The high concentration of $Na_2S_2O_5$ enlarged the flour pores and triggered mineral diffusion from inside to outside of the flour. Moreover, $Na_2S_2O_5$ treatment enhanced the availability of carbohydrates in the treated flour, while both protein and fat content of treated flour were not affected. In addition, treated flour contained more sulfite residue as compared to the control but within the maximum limit of 500 ppm as prescribed by the Indonesian Food Safety Body (BPOM-RI). Although Suarti *et al.*[6] developed durian seed flour using sodium metabisulfite, it applied the durian seed flour to produce a final food product called dakak-dakak. Based on the radar chart of organoleptic sensory tests, including analysis of color, aroma, texture and taste, the

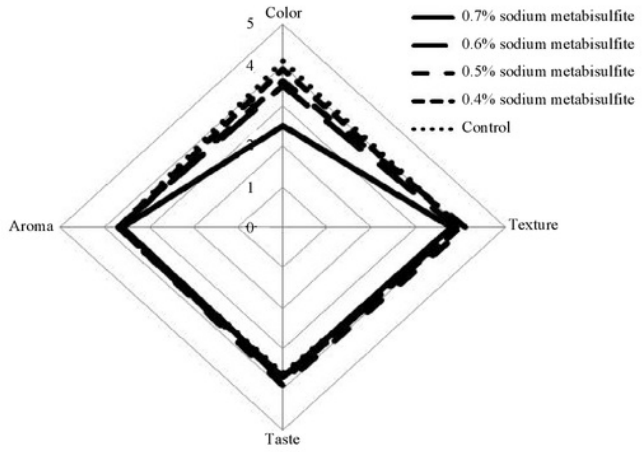

Fig. 4: Sensory analysis of dakak-dakak snack

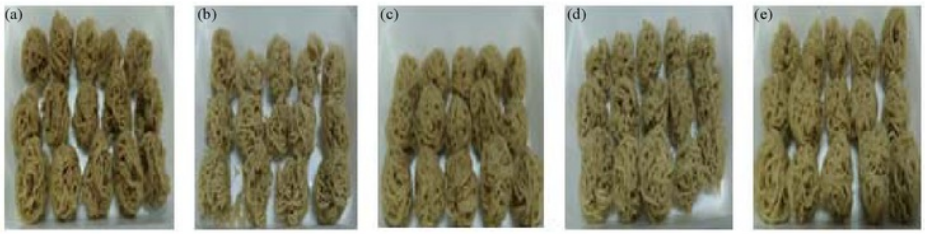

Fig. 5: Appearance of dakak-dakak snack

final product of dakak-dakak produced using durian seed flour processed using 0.6% $Na_2S_2O_5$ was the most acceptable one (Fig. 4, 5). In this direction, more studies for enhancing the diversity of West Sumatra's traditional foods by using natural product waste need to be developed.

CONCLUSION

Durian seed waste can be used as a source of raw material for snack making. The quality of durian seed flour was significantly improved by $Na_2S_2O_5$ treatment. Dakak-dakak made out of durian seed flour could be an attractive variant of Indonesian traditional snack.

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