RINGKASAN

Konsumsi tepung terigu yang terus meningkat di Indonesia menimbulkan peningkatan terhadap impor, sehingga diperlukan upaya substitusi dengan memanfaatkan sumber pangan lokal. Ubi jalar ungu (*Ipomoea batatas* L.) merupakan salah satu komoditas lokal yang berpotensi sebagai substitusi terigu, karena Indonesia merupakan penghasil ubi jalar keempat dunia sejak tahun 1968 (Departemen Pertanian, 2009). Salah satu inovasi pengembangannya adalah *egg roll*, yaitu produk *bakery* berbasis tepung dan telur yang diformulasikan dengan substitusi tepung ubi jalar ungu sebagai produk pangan lebih sehat karena kandungan antosianin. Penentuan optimasi proporsi tepung terigu dan tepung ubi jalar ungu menggunakan metode *Simplex Lattice Design*. Penelitian ini bertujuan untuk 1) Mengetahui jumLah proporsi yang optimal dari tepung terigu dan tepung ubi jalar ungu menggunakan metode *Simplex Lattice Design* (SLD). 2) Mengetahui karakteristik fisik, kimia dan sensori *egg roll* dari kombinasi perlakuan yang optimal.

Penelitian dilaksanakan di Kawasan BRIN Subang dari bulan September 2024 sampai Desember 2024. Formula pembuatan *egg roll* terdiri dari tepung terigu, tepung telur, tepung ubi jalar ungu, air, gula pasir, margarin, susu skim, ovalet, dan bubuk vanili. Penentuan optimasi proporsi tepung ubi jalar ungu yang digunakan berkisar antara 30–40% dan tepung terigu 60%–70%, dihasilkan delapan kombinasi perlakuan yaitu E1 32,5%:67,5%, E2 35,5%:65%, E3 35%:65%, E4 30%:70%, E5 40%:60%, E6 30%:70%, E7 40%:60% dan E8 37,5%:62,5%. Variabel yang dioptimasi meliputi antosianin (mg/100 g), aktivitas antioksidan (%), *hardness*, *fracturability*, warna (*L*, *a*, *b*), dan *overall* sensori *egg roll*. Data hasil pengamatan dianalisis ragam pada *software Design Expert* versi 13 dengan metode *Simple Lattice Design*. Variabel yang dikarakterisasi untuk perlakuan optimal *egg roll* meliputi kadar air, kadar abu, kadar lemak, kadar protein, karbohidrat, antosianin, aktivitas antioksidan, *hardness*, *fracturability*, dan sensori. Data sensori yang diperoleh dianalisis menggunakan Uji Kruskal-Wallis, apabila terdapat perbedaan nyata maka dilanjut uji Mann-Whitney.

Hasil optimasi menunjukkan bahwa formulasi optimum terdapat pada kombinasi 40% tepung ubi jalar ungu dan 60% tepung terigu dengan nilai *desirability* 0,902. Karakteristik kimia produk optimal meliputi kadar air 3,21±0,03%, lemak 15,78±2,83%, karbohidrat 72,81±1,5%, protein 6,72±0,99%, antosianin 11,88±0,07 mg/100 g, dan aktivitas antioksidan 86,8±0,78%. Parameter warna adalah L* 45,15±2,1; a* 16,01±0,19; b* 5,31±0,76, dengan tekstur *hardness* 17,05±2,18 N dan *fracturability* 11,34±0,2 mm. Skor organoleptik menunjukkan warna ungu kecoklatan (3,67), aroma khas ubi jalar ungu (3,43), rasa khas ubi jalar ungu (3,37), tekstur renyah (4,0), dan tingkat penerimaan keseluruhan (4,23) dengan kriteria disukai oleh panelis. Hasil ini menunjukkan *egg roll* dengan substitusi 40% tepung ubi jalar ungu memiliki kualitas fisikokimia dan sensori yang baik sesuai dengan SNI 2973:2011, serta berpotensi sebagai produk pangan sehat yang mengandung antosianin.

SUMMARY

The increasing consumption of wheat flour in Indonesia has led to a rise in imports, creating a need for substitution efforts by utilizing local food sources. Purple sweet potato (Ipomoea batatas L.) is one of the local commodities with potential as a wheat flour substitute, as Indonesia has been the fourth-largest producer of sweet potatoes in the world since 1968 (Ministry of Agriculture, 2009). One innovative development is the egg roll, a bakery product based on flour and eggs, formulated with purple sweet potato flour as a substitute to create a healthier product due to its anthocyanin content. The optimization of the proportion of wheat flour and purple sweet potato flour was carried out using the Simplex Lattice Design (SLD) method. This study aimed to: (1) Determine the optimal proportion of wheat flour and purple sweet potato using the SLD method; and (2) characterize the physical, chemical, and sensory properties of egg rolls from the optimal treatment combination.

The research was conducted at the BRIN Subang area from September to December 2024. The egg roll formulation consisted of wheat flour, egg powder, purple sweet potato flour, water, granulated sugar, margarine, skim milk, ovalet, and vanilla powder. The optimization of the purple sweet potato flour proportion ranged from 30–40%, and wheat flour from 60–70%, resulting in eight treatment combinations: E1 32,5%:67,5%, E2 35,5%:65%, E3 35%:65%, E4 30%:70%, E5 40%:60%, E6 30%:70%, E7 40%:60% and E8 37,5%:62,5%. The variables optimized included anthocyanin content (mg/100 g), antioxidant activity (%), hardness, fracturability, color (L, a*, b*), and overall sensory evaluation of the egg roll. Observation data were analyzed using analysis of variance (ANOVA) in Design Expert software version 13 with the Simple Lattice Design method. For the optimal treatment, the egg rolls were characterized for moisture content, ash content, fat content, protein content, carbohydrates, anthocyanin content, antioxidant activity, hardness, fracturability, and sensory attributes. Sensory data were analyzed using the Kruskal–Wallis test, and if significant differences were found, the Mann–Whitney test was applied.*

The optimization results indicated that the optimum formulation was 40% purple sweet potato flour and 60% wheat flour, with a desirability value of 0.902. The chemical characteristics of the optimal product included: moisture content 3.21±0.02%, fat 15.78±2.3%, carbohydrates 75.55±1.5%, protein 6.72±0.81%, anthocyanin 11.88±0.07 mg/100 g, and antioxidant activity 86.8±0.78%. The color parameters were L 45.15±2.1, a* 16.01±0.19, b* 5.31±0.76, with texture measurements of hardness 17.05±2.18 N and fracturability 11.34±0.2 mm. The organoleptic scores indicated slightly brownish purple color (3.67), characteristic purple sweet potato aroma (3.43), characteristic flavor (3.37), crispy texture (4.0), and overall acceptance (4.23), categorized as liked by the panelists. These results indicate that egg rolls with 40% purple sweet potato flour substitution have good physicochemical and sensory quality according to SNI 2973:2011, and have potential as a healthy food product containing anthocyanins.*