ABSTRAK

Kualitas bubuk teh hitam sangat dipengaruhi oleh kadar air yang terkandung di dalamnya. Kadar air yang terlalu tinggi dapat memicu pertumbuhan jamur serta menurunkan mutu rasa dan aroma, sedangkan kadar air yang terlalu rendah dapat menimbulkan aroma gosong dan rasa hambar. Standar kadar air bubuk teh hitam yang baik berada pada kisaran 2%–4,5%. Namun, hasil produksi di PT Perkebunan Tambi, Wonosobo menunjukkan fluktuasi kadar air antara 0,9% hingga 12,5%, sehingga diperlukan upaya perbaikan proses produksi.

Penelitian ini menggunakan metode Taguchi dengan rancangan percobaan *Orthogonal array* L27(3^{13}) untuk mengidentifikasi faktor-faktor kontrol dan interaksi antar faktor yang berpengaruh signifikan terhadap kadar air. Faktor yang diteliti meliputi waktu pelayuan (A), waktu pengeringan (B), suhu pengeringan (C), dan ketebalan pengeringan (D), masing-masing pada tiga level. Interaksi yang terjadi antara suhu pengeringan dan waktu pengeringan (BxC), interaksi suhu pengeringan dengan ketebalan pengeringan (CxD) dan interaksi waktu pengeringan dan ketebalan pengeringan (BxD). Total 27 kombinasi eksperimen yang direplikasi tiga kali. Data dianalisis menggunakan *Signal to Noise Ratio* (S/N Ratio) dengan karakteristik *Nominal is Best* serta A*nalysis of Variance* (ANOVA) untuk menguji signifikansi faktor.

Hasil penelitian menunjukkan bahwa suhu pengeringan (C) dan waktu pengeringan (B) merupakan faktor paling dominan, sedangkan interaksi BxC juga berpengaruh signifikan terhadap kadar air. Kondisi optimal diperoleh pada kombinasi A3 (20 jam), B2 (25 menit), C2 (105 °C), dan D3 (1,5 cm) yang menghasilkan kadar air pada kisaran 2%–4,5%, sesuai standar mutu. Eksperimen konfirmasi membuktikan bahwa kombinasi tersebut mampu mengurangi variasi hasil serta menjaga kadar air lebih stabil dibanding kondisi awal. Dengan demikian, metode Taguchi terbukti efektif dalam memberikan rekomendasi *setting* parameter proses yang dapat meningkatkan konsistensi kualitas bubuk teh hitam di PT Perkebunan Tambi.

Kata Kunci: Teh hitam, Kadar air, Metode Taguchi, *Orthogonal array*, S/N Ratio

ABSTRACT

The quality of black tea powder is strongly influenced by its moisture content. Excessive moisture can trigger mold growth and decrease flavor and aroma quality, while too little moisture may cause a burnt smell and bland taste. The ideal moisture content for black tea powder is in the range of 2%–4,5%. However, production at PT Perkebunan Tambi, Wonosobo showed fluctuations between 0.9% and 12.5%, indicating the need for process improvement.

This study employed the Taguchi method with an Orthogonal array L27 (3^{13}) experimental design to identify control factors and their interactions that significantly affect moisture content. The factors examined included withering time (A), drying time (B), drying temperature (C), and drying thickness (D), each at three levels. Interactions considered were drying temperature with drying time (BxC), drying temperature with drying thickness (CxD), and drying time with drying thickness (BxD). A total of 27 experimental combinations were conducted with three replications. Data were analyzed using the Signal to Noise Ratio (S/N Ratio) with the Nominal is Best characteristic and Analysis of Variance (ANOVA) to test the significance of factors.

The results showed that drying temperature (C) and drying time (B) were the most dominant factors, while the BxC interaction also had a significant effect on moisture content. The optimal condition was achieved at the combination of A3 (20 hours), B2 (25 minutes), C2 (105 °C), and D3 (1,5 cm), which produced a moisture content in the range of 2%–4,5%, in line with the quality standard. Confirmation experiments demonstrated that this combination reduced variation and maintained more stable moisture content compared to the initial condition. Thus, the Taguchi method proved effective in providing recommended process parameter settings to improve the consistency of black tea powder quality at PT Perkebunan Tambi.

Keywords: Black tea, Moisture content, Taguchi method, Orthogonal array, S/N Ratio