

PENGARUH PENCACAHAN, LAMA DISTILASI, DAN DEBIT AIR

PENDINGIN TERHADAP RENDEMEN DAN KUALITAS MINYAK

ATSIRI DAUN CENGKEH (*Syzygium aromaticum*)

INTISARI

Industri penyulingan minyak atsiri daun cengkeh atau minyak daun cengkeh banyak didirikan di berbagai daerah di Indonesia sebagai upaya untuk memanfaatkan potensi limbah daun cengkeh yang melimpah namun bernilai ekonomi rendah. Tujuan dari penelitian ini adalah menganalisis pengaruh faktor pencacahan, lama distilasi, dan debit air pendingin terhadap respons rendemen dan kualitas minyak daun cengkeh serta menentukan kombinasi terbaik untuk menghasilkan minyak daun cengkeh menggunakan metode Taguchi berbasis *Orthogonal Array* (OA) jenis $L_4(2^3)$ dan *Grey Relational Analysis* (GRA) dengan studi kasus industri mitra di Kendal, Jawa Tengah. Penelitian ini ikut berkontribusi mendukung inovasi produk rempah Indonesia melalui salah satu pendekatan Kosmopolis Rempah yaitu inovasi. Eksperimen dilakukan untuk mendapatkan data respons rendemen (%) dan kualitas minyak daun cengkeh berbasis persyaratan mutu SNI 06-2387-2006. Pengolahan dan analisis data dilakukan menggunakan perhitungan efek *means* dan *Signal to Noise Ratio* (SNR), perhitungan ANOVA, dan *Grey Relational Analysis* (GRA). Hasil penelitian ini adalah faktor pencacahan berpengaruh signifikan terhadap rendemen dan kualitas minyak daun cengkeh dalam 3 parameter kualitas (eugenol total, kadar eugenol, betakariofilen). Faktor lama distilasi berpengaruh signifikan terhadap rendemen dan kualitas minyak daun cengkeh dalam 2 parameter kualitas (eugenol total dan betakariofilen). Faktor debit air pendingin tidak berpengaruh signifikan terhadap rendemen dan kualitas minyak daun cengkeh. Kombinasi terbaik dalam menghasilkan minyak daun cengkeh adalah daun dicacah, lama distilasi 6 jam, dan debit air pendingin 1,2L/menit. Kata kunci: cengkeh, GRA, kualitas minyak atsiri, rendemen, Taguchi

THE EFFECTS OF CHOPPING, DISTILLATION TIME, AND COOLING

WATER FLOW RATE ON THE YIELD AND QUALITY OF CLOVE

LEAF ESSENTIAL OIL (*Syzygium aromaticum*)

ABSTRACT

Distillation industries for clove leaf essential oil or Clove Leaf Oil (CLO) have been established in various regions in Indonesia as an effort to utilize the abundant potential of clove leaf waste but with low economic value. The purpose of this study was to analyze the effect of the chopping, distillation time, and cooling water flow rate on the yield and quality of clove leaf oil and determine the best combination of the three factors to produce clove leaf oil using the Taguchi method based on Orthogonal Array (OA) types $L_4(2^3)$ and Grey Relational Analysis (GRA) with case studies of partner industries in Kendal, Central Java. This research contributes to supporting the innovation of Indonesian spice products through one of the “Kosmopolis Rempah” approaches. Experiments were carried out to obtain response data on yield (%) and quality of clove leaf essential oil based on SNI 06-2387-2006 quality requirements. Data processing and analysis was carried out using means effect calculations and Signal to Noise Ratio (SNR), ANOVA calculations, and Grey Relational Analysis (GRA). The results of this study were that the chopping factor had a significant effect on the yield and quality of clove leaf oil in 3 quality parameters (total eugenol, eugenol content, beta-caryophyllene). The distillation time factor has a significant effect on the yield and quality of clove leaf oil in 2 quality parameters (total eugenol and beta-caryophyllene). The cooling water flow rate factor has no significant effect on the yield and quality of clove leaf oil. The best combination in producing clove leaf oil is chopped leaves, distillation time is 6 hours, and cooling water flow rate is 1.2 L/minute.

Keywords: cloves, essential oil quality, GRA, Taguchi, yield