ABSTRAK

Jihan Zulfa Nabila. 2026. Formulasi dan Karakterisasi Sabun Batang Berbasis Minyak Kelapa dan *Olive Oil* dengan Penambahan Minyak Atsiri Bunga Mawar (*Rosa hybrida*) sebagai Implementasi Prinsip *Green Chemistry*. *Skripsi*. Program Studi Teknik Kimia, FT, Universitas PGRI Madiun. Pembimbing (I) Dyan Hatining Ayu S, S.ST., M.T.(II) Mohammad Arfi Setiawan, S.Si., M.Pd.

Penelitian ini bertujuan untuk memformulasi dan mengkarakterisasi sabun batang berbasis minyak kelapa dan *olive oil* dengan penambahan minyak atsiri bunga mawar (*Rosa hybrida*) sebagai implementasi prinsip *green chemistry*. Minyak atsiri bunga mawar diekstraksi menggunakan metode *soxhlet* dengan pelarut n-heksana, dilanjutkan distilasi sederhana untuk memisahkan pelarut dari ekstrak. Ekstraksi dilakukan pada dua kondisi bahan (bunga segar dan bunga kering) dengan variasi massa 75 g dan 100 g, masing-masing diulang 4 kali. Minyak atsiri terbaik (dari bunga segar 100 g) selanjutnya diformulasikan ke dalam tiga variasi sabun padat, yaitu F1 (100% minyak kelapa), F2 (100% *olive oil*), dan F3 (kombinasi 50:50), dengan penambahan minyak atsiri 5 mL pada setiap formula. Karakterisasi sabun meliputi uji organoleptik, pH, stabilitas busa, aktivitas antibakteri terhadap *Staphylococcus aureus* dan *Escherichia coli* menggunakan metode difusi sumuran, serta uji hedonik oleh 55 panelis. Hasil penelitian menunjukkan bahwa minyak atsiri dari bunga kering menghasilkan volume lebih besar (rata-rata 8,8 mL) dibandingkan bunga segar (2,45 mL), namun bunga segar menghasilkan aroma yang lebih tajam dan segar. Seluruh formula sabun memenuhi standar SNI 3532:2021 dengan pH 9,65–10,61. Stabilitas busa tertinggi dicapai oleh F1 (95,65%) dan F3 (89,47%), sedangkan F2 (87,50%) juga tergolong sangat baik. Aktivitas antibakteri seluruh formula tergolong lemah dengan zona hambat 1,61–3,11 mm. Uji hedonik menunjukkan F3 (kombinasi 50:50) merupakan formula paling disukai panelis dengan tekstur lebih lembut, aroma lebih khas, dan lebih cocok di kulit, dengan estimasi harga Rp 3.000 - 4.000. Penerapan prinsip *green chemistry* tercermin dari penggunaan bahan baku terbarukan, proses relatif aman, dan produk *biodegradable*. Penelitian ini menunjukkan bahwa kombinasi minyak kelapa dan olive oil menghasilkan sabun dengan karakteristik seimbang dan berpotensi dikembangkan secara komersial.

Kata Kunci: *green chemistry*, minyak atsiri mawar, minyak kelapa, *olive oil*, sabun batang

ABSTRACT

Jihan Zulfa Nabila. 2026. Formulation and Characterization of Coconut and Olive Oil-Based Bar Soap with the Addition of Rose (*Rosa hybrida*) Essential Oil as an Implementation of Green Chemistry Principles. *Thesis. Chemical Engineering Study Program, Faculty of Engineering*, Universitas PGRI Madiun. *Advisor* (I) Dyan Hatining Ayu S, S.ST., M.T. *Co-Advisor* (II) Mohammad Arfi Setiawan, S.Si., M.Pd.

This study aims to formulate and characterize bar soap based on coconut oil and olive oil with the addition of rose essential oil (Rosa hybrida) as an implementation of green chemistry principles. Rose essential oil was extracted using the Soxhlet method with n-hexane solvent, followed by simple distillation to separate the solvent from the extract. Extraction was carried out on two material conditions (fresh and dried flowers) with mass variations of 75 g and 100 g, each repeated 4 times. The best essential oil (from fresh flowers 100 g) was then formulated into three variations of bar soap, namely F1 (100% coconut oil), F2 (100% olive oil), and F3 (50:50 combination), with the addition of 5 mL essential oil in each formula. Soap characterization included organoleptic test, pH, foam stability, antibacterial activity against Staphylococcus aureus and Escherichia coli using well diffusion method, as well as hedonic test by 55 panelists. The results showed that essential oil from dried flowers produced larger volume (average 8.8 mL) compared to fresh flowers (2.45 mL), but fresh flowers produced a sharper and fresher aroma. All soap formulas met SNI 3532:2021 standards with pH 9.65–10.61. The highest foam stability was achieved by F1 (95.65%) and F3 (89.47%), while F2 (87.50%) also showed excellent stability. The antibacterial activity of all formulas was classified as weak with inhibition zones of 1.61–3.11 mm. The hedonic test showed that F3 (50:50 combination) was the most preferred formula by panelists with softer texture, more distinctive aroma, and more suitable for the skin, with an estimated price of IDR 3,000 - 4,000. The application of green chemistry principles is reflected in the use of renewable raw materials, relatively safe processes, and biodegradable products. This study shows that the combination of coconut oil and olive oil produces soap with balanced characteristics and has the potential to be developed commercially.

Keywords: *bar soap, coconut oil, green chemistry, olive oil, rose essential oil.*