

ABSTRACT

FORMULATION AND EVALUATION OF A BODY SCRUB CONTAINING BUTTERFLY PEA FLOWER EXTRACT (*Clitoria ternatea* L.) OBTAINED BY ULTRASOUND-ASSISTED EXTRACTION (UAE) AND AVOCADO SEED ABRASIVE POWDER (*Persea americana* Mill.): A STUDY OF ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES

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Background: Exposure to free radicals and bacterial infections on the skin encourages the development of natural cosmetic formulations with antioxidant and antibacterial activities by utilizing environmentally friendly natural ingredients, such as butterfly pea flower (*Clitoria ternatea* L.) and avocado seed (*Persea americana* Mill.).

Methods: This experimental study involved the extraction of butterfly pea flower using 96% ethanol through the Ultrasound-Assisted Extraction (UAE) method, followed by the formulation of a body scrub combined with avocado seed abrasive powder. Antibacterial activity was evaluated using the agar well diffusion method against *Staphylococcus aureus*, while antioxidant activity was assessed using the DPPH method.

Results: Butterfly pea flower extract exhibited antibacterial activity at concentrations of 10%, 15%, and 20% (w/v), with inhibition zone diameters of 2.8 mm, 5.5 mm, and 12.0 mm, respectively, for the extract, and 0.2 mm, 3.3 mm, and 7.5 mm for the body scrub formulation. The antibacterial activity of the body scrub showed a very strong and positive correlation with the extract ($r = 0.981$; $p < 0.001$), indicating that the antibacterial activity of the extract was maintained after formulation. In addition, the extract demonstrated antioxidant activity with an IC_{50} value of 54.116 $\mu\text{g/mL}$, while the body scrub formulations exhibited IC_{50} values of 93.39 $\mu\text{g/mL}$ (F1), 84.78 $\mu\text{g/mL}$ (F2), and 61.72 $\mu\text{g/mL}$ (F3), with no statistically significant difference between the extract and the formulations ($p > 0.05$).

Conclusions: Butterfly pea flower extract (*Clitoria ternatea* L.) has potential as an active ingredient in body scrub formulations combined with avocado seed (*Persea americana* Mill.) abrasive powder, exhibiting both antibacterial and antioxidant activities.

Keywords: Antibacterial, Antioxidant, Butterfly pea flower, Body scrub, DPPH

ABSTRAK

FORMULASI DAN EVALUASI *BODY SCRUB* EKSTRAK BUNGA TELANG (*Clitoria ternatea* L.) METODE *Ultrasound-Assisted Extraction* (UAE) DAN BUBUK ABRASIF BIJI ALPUKAT (*Persea americana* Mill.): STUDI AKTIVITAS ANTIOKSIDAN DAN ANTIBAKTERI

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Latar Belakang: Paparan radikal bebas dan infeksi bakteri pada kulit mendorong pengembangan sediaan kosmetik alami yang memiliki aktivitas antioksidan dan antibakteri dengan memanfaatkan bahan alam ramah lingkungan, seperti bunga telang (*Clitoria ternatea* L.) dan biji alpukat (*Persea americana* Mill.).

Metode: Penelitian eksperimental dilakukan dengan ekstraksi bunga telang menggunakan etanol 96% melalui metode *Ultrasound-Assisted Extraction* (UAE), diikuti formulasi sediaan *body scrub* yang dikombinasikan dengan bubuk abrasif biji alpukat. Aktivitas antibakteri diuji menggunakan metode difusi sumuran terhadap *Staphylococcus aureus*, sedangkan aktivitas antioksidan diuji menggunakan metode DPPH.

Hasil: Ekstrak bunga telang menunjukkan aktivitas antibakteri pada variasi konsentrasi 10%, 15%, dan 20% (b/v), dengan diameter zona hambat berturut-turut sebesar 2,8 mm, 5,5 mm, dan 12,0 mm, pada ekstrak bunga telang serta 0,2 mm, 3,3 mm, dan 7,5 mm pada sediaan *body scrub*. Aktivitas antibakteri sediaan menunjukkan hubungan yang sangat kuat dan searah dengan ekstrak ($r = 0,981$; $p < 0,001$), menandakan bahwa aktivitas antibakteri tetap terjaga setelah formulasi. Selain itu, ekstrak menunjukkan aktivitas antioksidan dengan nilai IC_{50} sebesar 54,116 $\mu\text{g/mL}$, sedangkan sediaan *body scrub* memiliki nilai IC_{50} sebesar 93,39 $\mu\text{g/mL}$ (F1), 84,78 $\mu\text{g/mL}$ (F2), dan 61,72 $\mu\text{g/mL}$ (F3), tanpa perbedaan yang signifikan secara statistik antara ekstrak dan sediaan ($p > 0,05$).

Kesimpulan: Ekstrak bunga telang (*Clitoria ternatea* L.) berpotensi digunakan sebagai bahan aktif dalam formulasi *body scrub* yang dikombinasikan dengan bubuk biji alpukat (*Persea americana* Mill.) dengan aktivitas antibakteri dan antioksidan.

Kata Kunci: Antibakteri, Antioksidan, Bunga telang, *Body scrub*, DPPH