

EFEK ANTIDEPRESAN EKSTRAK KULIT PISANG AGUNG (*Musa x paradisiaca* “Agung Semeru”) PADA TIKUS WISTAR

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Intisari

Depresi dan ansietas seringkali dikaitkan dengan penurunan kadar monoamin di sistem saraf pusat dan peradangan. Terapi farmakologi konvensional menggunakan *selective serotonin reuptake inhibitors* (SSRI) memiliki keterbatasan seperti efek samping, biaya, dan stigma sosial. Penelitian ini bertujuan untuk mengeksplorasi potensi limbah kulit pisang agung (*Musa x paradisiaca* “Agung Semeru”) sebagai alternatif terapi, mengingat kandungan triptofan dan senyawa fenoliknya.

Penelitian eksperimental laboratorik ini menggunakan ekstrak etanol 50% kulit pisang agung (EKP) yang diberikan secara oral pada tikus Wistar jantan (usia 8 minggu). Ekstrak dianalisis kandungan triptofan (KLT), fenolik total (metode Folin-Ciocalteu), dan aktivitas antioksidan *in vitro* (metode penangkapan radikal DPPH). Pengujian efek antiansietas akut dilakukan dengan metode *light dark box* (LDA) dan *elevated plus maze* (EPM), sementara efek antidepresan akut diuji dengan *forced swim test* (FST). Untuk efek antidepresan kronik, tikus diinduksi stres menggunakan model *unpredictable chronic mild stress* (UCMS) selama 15 hari, diikuti pemberian terapi selama 30 hari. Kelompok perlakuan meliputi kontrol normal, kontrol negatif (UCMS + pembawa), kontrol positif (fluoksetin 7 mg/kgBB), EKP dosis 140 mg/kgBB tikus (EKP1), dan EKP dosis 280 mg/kgBB tikus (EKP2). Parameter perilaku yang diamati pada model kronik adalah *sucrose preference test* (SPT) dan *coat score*. Setelah perlakuan, dilakukan analisis imunohistokimia (IHK) untuk mengukur ekspresi protein 5-HT_{1A}, TNF- α , dan NOX2 di hipokampus. Data dianalisis secara statistik menggunakan uji ANOVA atau Kruskal-Wallis diikuti uji *post-hoc* yang sesuai ($p < 0,05$ atau $p < 0,1$).

Meskipun triptofan tidak diidentifikasi oleh TLC, EKP menunjukkan kandungan fenolik yang signifikan ($17,41 \pm 0,14$ mg GAE/g) dan aktivitas antioksidan sedang ($IC_{50} = 685,69 \pm 120,73$ ppm, uji DPPH). Hasil pengujian efek antiansietas dengan uji LDA dan EPM menunjukkan bahwa EKP tidak memiliki efek antiansietas ($p > 0,05$). Namun, EKP menunjukkan efek antidepresan akut dimana durasi imobilitas mengalami penurunan ($p < 0,0001$). Pada uji antidepresan kronik, EKP dosis 280 mg/kgBB (EKP2) menurunkan *coat score* dan meningkatkan ekspresi 5-HT_{1A} di hipokampus. Sementara itu, EKP dosis 140 mg/kgBB (EKP1) menurunkan ekspresi TNF- α . EKP tidak mempengaruhi berat badan, preferensi sukrosa, atau ekspresi NOX2. Disimpulkan bahwa EKP memiliki potensi sebagai antidepresan, terutama pada dosis 280 mg/kgBB tikus. Temuan ini menyoroti potensi ekstrak kulit pisang Agung sebagai sumber obat antidepresan baru, yang kemungkinan bekerja melalui kombinasi mekanisme serotonergik dan

antiinflamasi, menawarkan potensi strategi terapi alternatif atau komplementer dengan memanfaatkan produk samping pertanian.

Kata kunci: antidepresan, fenolik, kulit pisang agung, *Musa x paradisiaca* “Agung Semeru”, triptofan.

ANTIDEPRESSANT EFFECT OF BANANA PEEL EXTRACT (*Musa x paradisiaca* “Agung Semeru”) ON WISTAR RATS

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Abstract

Depression and anxiety are often associated with decreased monoamine levels in the central nervous system and inflammation. Pharmacological therapy using conventional Selective Serotonin Reuptake Inhibitors (SSRIs) has limitations, such as side effects, costs, and social stigma. Considering its tryptophan and phenolic compound content, this study explores the potential of banana peel waste (*Musa x paradisiaca* “Agung Semeru”) as an alternative therapy.

This experimental laboratory research used a 50% ethanol extract of Agung banana peel (EKP) administered orally to male Wistar rats (8 weeks old). The extract was analyzed for tryptophan content (TLC), total phenolic content (Folin-Ciocalteu method), and in vitro antioxidant activity (DPPH radical scavenging method). Acute antianxiety effects were tested using the light-dark box (LDA) and elevated plus maze (EPM) methods, while acute antidepressant effects were tested using the forced swim test (FST). For chronic antidepressant effects, rats were induced with stress using the unpredictable chronic mild stress (UCMS) model for 15 days, followed by 30 days of treatment administration. Treatment groups included normal control, negative control (UCMS + vehicle), positive control (fluoxetine 7 mg/kg b.w.), and an EKP dose of 140 mg/kg b.w. (EKP1), and EKP dose 280 mg/kg b.w. (EKP2). Behavioral parameters observed in the chronic model were the sucrose preference test (SPT) and coat score. After treatment, immunohistochemistry (IHC) analysis was performed to measure the expression of 5-HT_{1A}, TNF- α , and NOX2 proteins in the hippocampus. Data were statistically analyzed using ANOVA or Kruskal-Wallis tests, followed by appropriate post-hoc tests ($p < 0.05$ or $p < 0.1$).

Although tryptophan was not identified by TLC, EKP showed a significant phenolic content (17.41 ± 0.14 mg GAE/g) and moderate antioxidant activity ($IC_{50} = 685.69 \pm 120.73$ ppm, DPPH assay). The results of the antianxiety effect test with the LDA and EPM tests showed that EKP had no antianxiety effect ($p > 0.05$). However, EKP showed an acute antidepressant effect where the duration of immobility decreased ($p < 0.0001$). In the chronic antidepressant test, EKP at a dose of 280 mg/kg b.w. (EKP2) decreased the mantle score and increased the expression of 5-HT_{1A} in the hippocampus; meanwhile, EKP at a dose of 140 mg/kg b.w. (EKP1) decreased the expression of TNF- α . EKP did not affect body weight, sucrose preference, or NOX2 expression. It was concluded that EKP has potential as an antidepressant, especially at a dose of 280 mg/kg b.w. These findings highlight

the potential of Agung banana peel extract as a source for novel antidepressant agents, possibly acting through combined serotonergic and anti-inflammatory mechanisms, offering a potential alternative or complementary therapeutic strategy utilizing agricultural byproducts.

Keywords: antidepressant, antianxiety, *Musa x paradisiaca* “Agung Semeru”, phenolic, banana peel, tryptophan