

ABSTRAK

Karakteristik dan Aktivitas Antioksidan Ekstrak Buah Merah (*Pandanus conoideus*) terhadap MDA (*Malondialdehyde*) dan SOD (*Superoxide Dismutase*) pada Tikus Model Cedera Kepala

Latar Belakang: Cedera kepala merupakan masalah kesehatan global yang serius dengan tingkat mortalitas dan morbiditas tinggi. Stres oksidatif berperan penting dalam patofisiologi cedera kepala sekunder. Buah merah (*Pandanus conoideus*) diketahui memiliki kandungan antioksidan yang tinggi, terutama β -karoten, namun belum diteliti secara spesifik pada kondisi cedera kepala. Penelitian ini bertujuan untuk menganalisis karakteristik fisikokimia dan efektivitas antioksidan ekstrak buah merah terhadap kadar MDA dan SOD pada tikus model cedera kepala. **Metode:** Penelitian ini menggunakan desain eksperimental *in vivo* dengan post-test only control group design. Sebanyak 35 ekor tikus Wistar jantan dibagi menjadi 5 kelompok: kontrol sehat, kontrol sakit (cedera kepala tanpa terapi), dan tiga kelompok perlakuan yang diinduksi cedera kepala dengan dosis ekstrak buah merah 100, 200, dan 400 mg/kgBB. Ekstrak diperoleh melalui metode maserasi berulang dengan pelarut etanol 96%. Karakterisasi fisikokimia meliputi pengukuran pH dan bobot jenis, serta identifikasi dan kuantifikasi β -karoten menggunakan HPLC. Kadar MDA dan SOD dalam serum diukur menggunakan metode ELISA pada hari ke-15 setelah perlakuan. **Hasil:** Ekstrak buah merah memiliki pH 5,73 dan bobot jenis 0,996 g/cm³, membentuk emulsi tipe O/W yang stabil. Analisis HPLC menunjukkan keberadaan β -karoten dengan kadar sebesar 5,09 ppm, disertai senyawa bioaktif lainnya. Pemberian ekstrak buah merah belum mampu menurunkan kadar MDA secara bermakna pada semua dosis yang diuji ($p > 0,05$). Namun, ekstrak berhasil meningkatkan kadar SOD secara signifikan dibandingkan kelompok kontrol sakit pada semua dosis ($p < 0,001$), meskipun tidak menunjukkan perbedaan bermakna antar variasi dosis. **Kesimpulan:** Ekstrak buah merah memiliki karakteristik fisikokimia yang baik dan dindikasikan dapat meningkatkan aktivitas antioksidan endogen SOD, meskipun belum optimal menurunkan kadar MDA pada model cedera kepala.

Kata kunci: Cedera kepala, *Pandanus conoideus*, MDA, SOD, Stres oksidatif

ABSTRACT

Characteristics and Antioxidant Activity of Red Fruit Extract (*Pandanus conoideus*) against MDA (Malondialdehyde) and SOD (Superoxide Dismutase) in Rats with Head Injury Model

Background: Head injury is a serious global health problem with high mortality and morbidity rates. Oxidative stress plays an important role in the pathophysiology of secondary head injury. Red fruit (*Pandanus conoideus*) is known to have high antioxidant content, especially β -carotene, but has not been specifically studied in head injury conditions. This study aims to analyze the physicochemical characterization and antioxidant efficacy of red fruit extract on MDA and SOD levels in a head injury rat model. **Methods:** This study used an in vivo experimental design with a post-test only control group design. A total of 35 male Wistar rats were divided into 5 groups: healthy control, sick control (head injury without therapy), and three treatment groups induced with head injury with red fruit extract doses of 100, 200, and 400 mg/kgBW. The extract was obtained through a repeated maceration method with 96% ethanol solvent. Physicochemical characterization included measurement of pH and specific gravity, as well as identification and quantification of β -carotene using HPLC. MDA and SOD levels in serum were measured using the ELISA method on day 15 after treatment. **Results:** Red fruit extract had a pH of 5.73 and a specific gravity of 0.996 g/cm³, forming a stable O/W emulsion. HPLC analysis showed the presence of β -carotene at a level of 5.09 ppm, accompanied by other bioactive compounds. Administration of red fruit extract was not able to significantly reduce MDA levels at all doses tested ($p > 0.05$). However, the extract significantly increased SOD levels compared to the sick control group at all doses ($p < 0.001$), although there were no significant differences between dose variations. **Conclusion:** Red fruit extract has good physicochemical characteristics and is indicated to increase endogenous SOD antioxidant activity, although it is not yet optimal in reducing MDA levels in head injury models.

Keywords: Head injury, *Pandanus conoideus*, MDA, SOD, Oxidative stress