

ABSTRAK

Penyakit kardiovaskuler merupakan problem di Indonesia salah satunya adalah infark miokardial akut (IMA). *Reactive oxygen species* (ROS) berperan penting dalam patofisiologi infark miokardial akut. Antioksidan telah dilaporkan mempunyai aktivitas menangkap radikal bebas dalam IMA. Tujuan penelitian ini adalah mengkaji aktivitas kardioprotektif, antioksidan dan antiapoptosis ekstrak etanol *Ulva lactuca* (EEUL) pada IMA.

Tikus jantan galur Wistar dibagi dalam 6 kelompok masing masing 6 ekor. Kelompok I merupakan kelompok kontrol, kelompok II diberi isoproterenol (ISO) dosis 85 mg/kg BB. Kelompok III, IV dan V diberi ISO dan EEUL dosis 250, 500 dan 750 mg/kg BB. Kelompok VI diberi melatonin dosis 10 mg/kg BB. EEUL dan melatonin diberikan secara peroral selama 28 hari. ISO diberikan secara subkutan pada hari ke 29 dan 30. Pada akhir penelitian dilakukan perekaman elektrokardiografi (EKG) pada tikus dan diambil sampel darah untuk penetapan kadar enzim penanda kerusakan jantung dan aktivitas antioksidan seperti superoksida dismutase (SOD), katalase (CAT) dan lipid peroksidase (LPX). Gambaran makroskopik ventrikel kiri jantung dilihat dengan pengecatan dengan *triphenyl tetrazolium chloride* (TTC). Gambaran infark miokardial akut secara mikroskopik dilakukan dengan pengecatan hematoxylin eosin (HE). Antibodi anti caspase-3 digunakan untuk mendeteksi apoptosis di miokardium.

Pemberian EUL dapat menurunkan CK, LDH dan ST elevasi secara signifikan ($p < 0,05$). Dosis tertinggi dapat menurunkan CK dan LDH sebesar 62,53% dan 77,70% dibanding kelompok ISO. Gambaran makroskopik dengan TTC mendukung aktivitas tersebut. Pemberian EEUL dapat meningkatkan aktivitas enzim SOD dan CAT dibandingkan kelompok yang diberi ISO dan menurunkan lipid peroksidase. Perlakuan dengan EEUL memperbaiki gambaran histopatologis dari tikus dan mengurangi skor luas infark miokardial. Pemberian EEUL dapat menurunkan ekspresi caspase-3 dibandingkan kelompok ISO secara signifikan ($p < 0,05$).

EEUL mempunyai aktivitas kardioprotektif dengan mengurangi ST elevasi, mengurangi luas infark dan skor luas infark serta enzim penanda nekrosis jantung. EEUL dapat memproteksi IMA melalui aktivitas antioksidan dan antiapoptosis.

Kata kunci : *Ulva lactuca* L, Isoproterenol, Infark Miokardial Akut

ABSTRACT

Cardiovascular diseases remain a problem in Indonesia, one of which is acute myocardial infarction (AMI). Reactive oxygen species (ROS) plays a major role in myocardial damage during acute myocardial infarction (AMI). Antioxidant has been reported to have activities to scavenge ROS in AMI. The aim of this study is to determine cardioprotective effect, antioxidant activity and antiapoptotic property of ethanolic extract *Ulva lactuca* L (EEUL) against acute myocardial infarction.

Male Wistar rats were divided into 6 groups of 6. Group I was control group. Group II was given isoproterenol (ISO) 85 mg/kg BW. Group III, IV, and V were given ISO plus EEUL 250, 500 and 750 mg/kg BW respectively. Group VI was given melatonin 10mg/kg BW. Both EEUL and melatonin were orally administrated for 28 days. ISO was injected subcutaneously twice, at day 29 and at day 30. At the end of study, electrocardiographic (ECG) was recorded and blood samples were collected for myocardial necrosis enzyme assay, antioxidant activities testing such as superoxidized dismutase (SOD), catalase (CAT) and lipid peroxidase (LPX). Macroscopic feature from left ventricle of the heart were also examined by using triphenyl tetraolium chloride (TTC) staining. The feature of myocardial infarction visualized by using hematoxylen eosin (HE) staining. Antibody anti caspase-3 was used to detect myocardial apoptotic cells.

The group which given EEUL reduce the level of CK, LDH and ST segment elevation ($p < 0.05$). The highest doses showed reduction of 62.53% and 77.70% in the level of CK and LDH, respectively, compared with ISO treated group. Macroscopic examination using TTC staining supported these above results. The activities of endogenous antioxidants (SOD and CAT) in the group treated with EEUL increase significantly compared with ISO treated group. Interestingly, EEUL treated group decrease significantly the activity of lipid peroxidase. Pretreatment with EEUL showed a better morphology in myocardial tissues. Scoring the area of myocardial infarction supports the result of antioxidant testing, demonstrated that there is a significant reduction of infarction area in EEUL treated group compared with ISO group. The expression of caspase-3 in group treated with EEUL was also found lower than ISO treated group ($p < 0.05$).

EEUL has cardioprotective effect by to restory ST segment elevation and reducing the area, scoring the area and myocardial necrosis enzyme level. EEUL has protection effect against acute myocardial infarction due to its with antioxidant and antiapoptotic properties.

Key words : *Ulva lactuca* L, Isoproterenol, Acute myocardial infarction