Prevention of endothelial dysfunction in streptozotocin-induced diabetic rats by Sargassum echinocarpum extract

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Abstrak

Tujuan Untuk mengevaluasi efek ekstraks Sargassum echinocarpum sebagai pencegahan disfungsi sel endotel aorta torasis tikus diabetes yang diinduksi streptozotocin. Metode Hewan uji dibagi lima kelompok, kelompok normal, diabetes dan diabetes yang diberi ekstrak rumput laut coklat (150, 300, dan 450 mg/kg BB per hari) diberikan selama 12 minggu setelah tikus mengalami diabetes. Diabetes diinduksi dengan streptozotocin (45 mg kg-1, i.p.) yang terlarut 0,1 M bufer sitrat, pH 4,5. Hewan uji dinyatakan diabetes pada hari kesepuluh setelah injeksi dan kadar gula darah menunjukkan > 200 mg dL-1. Setelah masa perlakuan, serum darah diambil untuk uji antioksidan enzim dan aorta torasis untuk uji relaksasi. Hasil Aktivitas superoksida dismutase (SOD), katalase (Kat), dan Glutation peroksidase (GSH-px) serum menurun. Pada tikus diabetes (3,31+ 0,12;67,17 + 0,62;35,10 + 0,83) dibanding kontrol (9,97 + 0,12;185,31 + 0,23;116,38 + 0,88).Pemberian ekstrak pada tikus diabetes meningkatkan aktivitas SOD, Kat, dan GSH-px serum. Respons vasodilatasi terhadap asetil kolin mengalami penurunan signifikan dibanding tikus kontrol. Perbaikan respon terlihat pada tikus diabetes yang diberi ekstrak Sargassum echinocarpum . Kesimpulan Ekstrak Sargassum echinocarpum memperbaiki stres oksidatif dan mencegah disfungsi endotel diabetes. Hal ini berkaitan sifat antioksidan ekstrak.
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Abstract
Aim This study aimed to elicit the protective effect of Sargassum echinocarpum extract on endothelial dysfunction in thoracic aorta of streptozotocin-induced diabetic rats. Methods The animals were divided into 5 groups. The first was normal, the second was diabetic non treated animals. The third to fifth groups were the diabetic animals which given Sargassum echinocarpum extract (150; 300, and 450 mg kg-1 body weight, respectively) by oral gavage and extract treatment was given for 12 weeks. Diabetes was induced by single administration of streptozotocin (45 mg kg-1, i.p.), dissolved in freshly prepared 0.1 M citrate buffer, pH 4.5. Diabetes was confirmed ten days latter in streptozotocin induced animals showing blood glucose levels > 200 mg dL-1 (11.1 mmol L-1) as monitored in the blood from tail vein using glucometer. After the treatment period, the blood serum acquired was used for antioxidant enzymes assays and the thoracic aorta was used for vasorelaxation assay. Results There was a significant decrease in the activity of superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GSH-px) in diabetic rats (3.31+ 0.12;67.17 + 0.62;35.10 + 0.83) comaped to control rats (9.97 + 0.12;185.31 + 0.23;116.38 + 0.88). Administration of Sargassum extract increased the activity of SOD, CAT, and GSH-px. The diabetic rats exhibit endothelial dysfunction as shown by loss of vasodilatory response to acethylcholine (ACH). This was restored by administration of Sargassum extract. Conclusion Sargassum echinocarpum extract ameliorates oxidative stress and reverses the endothelial dysfunction associated with diabetes. This effect appears to be due to its antioxidant properties