

## INTISARI

**Latar Belakang:** Hipoksia yang diinduksi dengan metode hipoksia intermiten kronis (HIK) dapat menimbulkan stres oksidatif berlebihan akibat dari ketidakseimbangan produksi *reactive oxygen species* (ROS) dan antioksidan yang ditandai dengan peningkatan *malondialdehyde* (MDA) dan penurunan *superoxide dismutase* (SOD) pada hepar. Akumulasi stres oksidatif berpotensi mengganggu fungsi hepar yang ditandai dengan peningkatan enzim hepar yaitu *alanine aminotransferase* (ALT) dan *aspartate aminotransferase* (AST). Sumber antioksidan eksogen seperti buah tin (*Ficus carica*) berpotensi menjasi pangan fungsional untuk mengatasi dampak stres oksidatif berlebihan dalam perannya sebagai pemulung radikal bebas dan meningkatkan kinerja antioksidan endogen.

**Tujuan:** Meneliti kemampuan antioksidan *puree Ficus carica* (PFC) dalam melindungi jaringan hepar tikus *Sprague Dawley* (SD) dari stres oksidatif berlebihan akibat induksi HIK.

**Metode:** Penelitian eksperimental desain *pretest-posttest control* dan *posttest control design* dengan menganalisis pengaruh pemberian PFC terhadap induksi HIK selama 30 hari pada tikus SD. Induksi HIK dilakukan selama 4 jam (oksigen 10% dan nitrogen 90%) dan dilanjutkan reoksigenasi 20 jam (oksigen 21%). Tiga puluh (30) ekor tikus SD jantan dibagi menjadi 6 kelompok yaitu kelompok kontrol (netral, negatif, positif), kelompok PFC dosis 1,25; 2,5; dan 5 mL/200gBB. Analisis MDA dan SOD homogenat hepar menggunakan metode ELISA, serta metode fotometri untuk pemeriksaan ALT dan AST pada serum.

**Hasil:** Kelompok yang diinduksi HIK dan diberi PFC dosis 5 mL/200gBB/hari menunjukkan kadar MDA lebih rendah, kadar SOD dan rasio SOD/MDA lebih tinggi, kadar ALT dan AST serum lebih rendah jika dibandingkan kelompok kontrol negatif. *Puree Ficus carica* dosis 5 mL/200gBB/hari memiliki efek yang setara jika dibandingkan dengan vitamin E. Fenomena ini tidak ditemukan pada kelompok PFC dosis 1,25 dan 2,5 mL/200gBB/hari.

**Kesimpulan:** Kapasitas antioksidan pada PFC dosis tinggi menunjukkan proteksi terhadap penurunan fungsi hepar akibat stres oksidatif yang diinduksi HIK.

**Kata Kunci:** *Puree Ficus carica*, antioksidan, hipoksia, hipoksia intermiten kronis, stres oksidatif, fungsi hepar.

## ABSTRACT

**Background:** Hypoxia induction by a chronic intermittent hypoxia (CIH) method can causes an excessive oxidative stress due to an imbalance production of reactive oxygen species (ROS) versus available antioxidants which characterized by increase malondialdehyde (MDA) and a decrease superoxide dismutase (SOD) levels. The accumulation of oxidative stress in the liver tissue potentially disrupt its function characterized by an increase liver enzyme (alanine aminotransferase (ALT) and aspartate aminotransferase (AST)). Exogenous sources of antioxidants such as found in figs (*Ficus carica*) may exert beneficial effects in hypoxic condition, thus it may be potential as functional foods to overcome excessive oxidative stress. Biochemical compounds in figs may play roles as free radical scavengers as well as improving the performance of endogenous antioxidants.

**Objective:** To examine the effect of puree *Ficus carica* (PFC) in protecting the liver tissue of *Sprague Dawley* (SD) rats from excessive oxidative stress due to CIH induction.

**Method:** This is an experimental study, pretest-posttest and posttest control design, analysing the effect of PFC administration on 30 days CIH induction. Chronic intermittent hypoxia (CIH) induction is including 4 hours hypoxia events (10% oxygen and 90% nitrogen) and followed by 20 hours of reoxygenation (21% oxygen). Thirty male SD rats were divided into 6 groups (N=5), they are: neutral, negative, and positive control group, and 3 PFC interventions group (1.25; 2.5; and 5 mL/200gBW respectively). Malondialdehyde (MDA) and SOD liver homogenate were analysed using ELISA method; while ALT and AST serum analysed using photometric methods.

**Results:** The CIH and PFC-induced group at dose 5 mL/200gBW/day showed lower MDA levels, higher SOD levels, and higher SOD/MDA ratios, and lower ALT and AST serum levels compared to negative control groups. The group with 5 mL/200gBW/day dose of puree *Ficus carica* dose revealed a similar effect to which of vitamin E. This phenomenon was not found in the groups with 1.25 and 2.5 mL/200gBW/day.

**Conclusion:** Antioxidant capacity at high doses PFC resulted in protection against decreased liver function due to HI-induced oxidative stress.

**Keywords:** Puree *Ficus carica*, antioxidants, hypoxia, chronic intermittent hypoxia, oxidative stress, liver function.