

ABSTRAK

Latar Belakang: Formaldehid menyebabkan stress oksidatif, peroksidasi lemak, berinteraksi dengan DNA dan protein, dan bersifat karsinogenik. Kayu secang sebagai antioksidan diduga dapat menekan sifat radikal bebas formaldehid.

Tujuan: mengetahui manfaat ekstrak kayu secang terhadap kadar SOD, MDA, caspase 3 pada serum darah, dan derajat kerusakan sel epitel nasal tikus yang terpapar gas formaldehid.

Metode: Rancangan *Randomized Post Test Only Control Group* dengan subyek tikus Sprague Dawley jantan usia 2-4 bulan, berat 200-300 gram, dan sehat. Hewan percobaan dibagi menjadi kelompok EKS (mendapat ekstrak etanol kayu secang 100, 400, dan 1000 mg/kg BB/hari), kelompok Vit C (mendapat vitamin C 0,075 mg/g BB/hari), kelompok negatif (paparan formaldehid), dan normal (tanpa paparan). Antioksidan diberikan 14 hari sebelum dan selama paparan formaldehid. Paparan formaldehid inhalasi 8 jam/hari dengan pola 5 hari (+), 2 hari (-), 5 hari (+), dan 2 hari (-). Pengukuran SOD dengan colorimetri, MDA dengan thiobarbituric acid, caspase 3 dengan Elisa, kerusakan sel epitel dengan analisis mikroskopis. Analisis data menggunakan One way anova, Kruskal-Wallis dan Mann Whitney dengan $\alpha=0,05$.

Hasil: Kadar terbaik SOD pada EKS 1000, MDA pada Vit C, Caspase 3 pada EKS 1000 dan Vit C, dan kerusakan sel epitel nasal pada EKS 1000. Intervensi kayu secang tidak memberikan perbedaan signifikan kadar MDA ($p=0,915$), namun memberikan perbedaan signifikan kadar SOD ($p=0,001$), caspase 3 ($p=0,012$), dan kerusakan sel epitel nasal ($p=0,03$).

Simpulan: Ekstrak kayu secang 1000 mg/kg BB/hari selama 28 hari memberikan hasil terbaik dalam mencegah penurunan SOD, menekan apoptosis dan kerusakan sel epitel nasal tikus. Vitamin C menekan pembentukan MDA lebih baik dibanding kayu secang.

Kata kunci: Formaldehid, Kayu secang, SOD, MDA, Apoptosis, Kerusakan sel

ABSTRACT

Background: Formaldehyde causes oxidative stress, and lipid peroxidation, interacts with DNA and proteins, and is carcinogenic. Sappan wood as an antioxidant is thought to suppress the free radical properties of formaldehyde.

Objective: determine the benefits of Sappan wood ethanol extract on SOD, MDA, and caspase 3 levels in blood serum, and the degree of damage to nasal epithelial cells of rats exposed to formaldehyde gas.

Method: A *Randomized Post Test Only Control Group* design with male Sprague Dawley rats 2-4 months, weighing 200-300 grams, and healthy. Experimental animals were divided into the EKS group (received ethanol extract of sappan wood 100, 400, and 1000 mg/kg body weight/day), group Vit C (received vitamin C 0.075 mg / g body weight/day), negative group (formaldehyde exposure), and normal (without exposure). Antioxidant is given 14 days before and during formaldehyde exposure. Exposure to inhaled formaldehyde 8 hours/day with patterns of 5 days (+), 2 days (-), 5 days (+), and 2 days (-). SOD measurement with Hydroxylamine, MDA with thiobarbituric acid, caspase 3 with Elisa, epithelial cell damage by microscopic analysis. Data analysis using One-way anova, Kruskal-Wallis, and Mann Whitney with $\alpha= 0.05$.

Results: The best levels of SOD in EKS 1000, MDA in Vit C, Caspase 3 in EKS 1000 and Vit C, and nasal epithelial cell damage in EKS 1000. The sappan wood intervention did not provide significant differences in MDA levels ($p = 0.915$) but gave significant differences in SOD levels ($p = 0.001$), caspase 3 ($p = 0.012$), and nasal epithelial ($p = 0.03$).

Conclusion: Sappan wood extract 1000mg/kg body weight/day for 28 days gave the best results in preventing SOD reduction, suppressing apoptosis, and epithelial cell damage to rat nasal. Vitamin C suppresses MDA formation better than Sappan wood extract.

Keywords: Formaldehyde, Sappan wood, SOD, MDA, Apoptosis, Cell damage