

DISERTASI

Uji Efektifitas Daun Kelor (*Moringa oleifera*) Terhadap Kadar 8-oxoguanine DNA glycosylase-1 (OGG1), Kadar 8-hydroxy-2'-deoxyguanosine (8-OHdG) dan Malondialdehyde (MDA) Pada Tikus (*Rattus norvegicus*) Diabetes Mellitus

**Suatu Eksperimental Murni Laboratorium
Pada Tikus Putih (*Rattus norvegicus*)**



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ABSTRAK

Uji Efektifitas Daun Kelor (*Moringa oleifera*) Terhadap Kadar 8-oxoguanine DNA glycosylase (OGG1), Kadar 8-hydroxy-2'-deoxyguanosine (8-OHdG) dan Malondialdehyde (MDA) Pada Tikus (*Rattus norvegicus*) Diabetes Mellitus.

Pendahuluan. Diabetes mellitus ditandai dengan hiperglikemi. Hiperglikemi berperan dalam meningkatkan stres oksidatif melalui produksi *Reactive Oxygen Species* (ROS). Peningkatan stres oksidatif pada diabetes mellitus menyebabkan peroksidasi lipid yang dapat ditandai dengan meningkatnya kadar *Malondialdehyde* (MDA), serta kerusakan DNA oksidatif yang tercermin dari tingginya kadar 8-hydroxy-2'-deoxyguanosine (8-OHdG). Kerusakan DNA akibat stres oksidatif akan mengaktifkan mekanisme perbaikan DNA, salah satunya melalui enzim 8-oxoguanine glycosylase-1 (OGG1) yang berperan dalam jalur *base excision repair*. Daun kelor (*Moringa oleifera*) mengandung senyawa antioksidan alami seperti flavonoid dan polifenol yang berpotensi menurunkan stres oksidatif dan kerusakan DNA pada kondisi diabetes mellitus. Penelitian ini bertujuan untuk menganalisis efektifitas daun kelor (*Moringa oleifera*) terhadap kadar 8-oxoguanine DNA glycosylase (OGG1), kadar 8-hydroxy-2'-deoxyguanosine (8-OHdG) dan *Malondialdehyde* (MDA) pada tikus (*Rattus norvegicus*) diabetes mellitus.

Metodologi. Penelitian ini menggunakan sampel tikus jantan (*Rattus norvegicus*) galur Wistar sebanyak 25 ekor, dengan umur 2,5 bulan dan berat 200-250 gr, dengan desain *Post Test Control Only Group Design*. Penelitian terdiri dari kelompok kontrol negatif, kontrol positif dan kelompok perlakuan pemberian ekstrak daun kelor dengan dosis 250 mg/kgBB, 500 mg/kgBB dan 1.000 mg/kg. Pemeriksaan kadar OGG1 dan 8-OHdG dilakukan dengan uji ELISA dan MDA dengan Spektrofometer. Uji normalitas menggunakan Shapiro Wilk. Data OGG1 dan 8-OHdG terdistribusi normal, dilanjutkan uji parametrik dengan *one way ANOVA*, taraf kepercayaan 95% ($p = 0,05$). Data MDA terdistribusi tidak normal ($p < 0,05$) dilanjutkan dengan uji nonparametrik uji *Kruskal Wallis*. Data MDA menunjukkan signifikan ($p < 0,05$) dan uji beda masing - masing kelompok menggunakan *Uji Post Hoc Mann Whitney*.

Hasil. Hasil penelitian secara statistik didapatkan tidak ada efek ekstrak daun kelor terhadap kadar OGG1 ($p = 0,986$), tidak ada efek ekstrak daun kelor terhadap kadar 8-OHdG ($p = 0,227$) dan terdapat efek ekstrak daun kelor terhadap kadar MDA ($p = 0,001$).

Kesimpulan. Hasil penelitian menunjukkan ekstrak daun kelor belum efektif untuk memperbaiki kadar OGG-1 dan 8-OHdG, namun efektif dalam memperbaiki kadar MDA.

Kata kunci ; Stress Oksidatif, Reactive Oxygen Species, OGG1, 8-OHdG, MDA

ABSTRACT

Testing the Effectiveness of Moringa Leaves (*Moringa oleifera*) on Levels of 8-oxoguanine DNA glycosylase-1 (OGG1), 8-Hydroxy-2'-Deoxyguanosine (8-OHdG), and Malondialdehyde (MDA) in Diabetic Mellitus Rats (*Rattus norvegicus*)

Introduction. Diabetes mellitus is characterized by hyperglycemia. Hyperglycemia plays a role in increasing oxidative stress through the production of Reactive Oxygen Species (ROS). Increased oxidative stress in diabetes mellitus causes lipid peroxidation which can be characterized by increased levels of Malondialdehyde (MDA), as well as oxidative DNA damage which is reflected in high levels of 8-hydroxy-2'-deoxyguanosine (8-OHdG). DNA damage due to oxidative stress will activate DNA repair mechanisms, one of which is through the enzyme 8-oxoguanine glycosylase-1 (OGG1) which plays a role in the base excision repair pathway. Moringa leaves (*Moringa oleifera*) contain natural antioxidant compounds such as flavonoids and polyphenols which have the potential to reduce oxidative stress and DNA damage in diabetes mellitus. This study aims to analyze the effectiveness of Moringa oleifera leaves on levels of 8-oxoguanine DNA glycosylase (OGG1), levels of 8-hydroxy-2'-deoxyguanosine (8-OHdG) and Malondialdehyde (MDA) in rats (*Rattus norvegicus*) with diabetes mellitus.

Methodology. This research used a sample of 25 male rats (*Rattus norvegicus*) of the Wistar strain, aged 2.5 months and weighing 200-250 grams, with a Post Test Control Only Group Design. The study consisted of a negative control group, a positive control and a treatment group given Moringa leaf extract at a dose of 250 mg/kgBW, 500 mg/kgBW and 1,000 mg/kg. Examination of OGG1 and 8-OHdG levels was carried out using ELISA and MDA tests with a spectrophotometer. Normality test using Shapiro Wilk. OGG1 and 8-OHdG data were normally distributed, followed by parametric testing with one way ANOVA, 95% confidence level ($p = 0.05$). The MDA data was not normally distributed ($p < 0.05$) followed by the non-parametric Kruskal Wallis test. MDA data shows significance ($p < 0.05$) and the difference test for each group uses the Mann Whitney Post Hoc Test.

Results. The results of the research statistically showed that there was no effect of Moringa leaf extract on OGG1 levels ($p = 0.986$), there was no effect of Moringa leaf extract on 8-OHdG levels ($p = 0.227$) and there was an effect of Moringa leaf extract on MDA levels ($p = 0.001$).

Conclusion. The results of the study showed that Moringa leaf extract was not yet effective in improving OGG-1 and 8-OHdG levels, but was effective in improving MDA levels.

Keywords: Oxidative Stress, Reactive Oxygen Species, OGG1, 8-OHdG, MDA