PENGARUH PEMBERIAN TEMPE GEMBUS TERHADAP KADAR *MALONDIALDEHYDE* (MDA) DAN ENZIM *SUPEROXIDE DISMUTASE* (SOD) PADA TIKUS SINDROM METABOLIK

EFFECT OF TEMPE GEMBUS *TO THE LEVELS OF MALONDIALDEHYDE (MDA) AND SUPEROXIDE DISMUTASE (SOD) ENZYME IN METABOLIC SYNDROME RATS*

Tesis
Untuk memenuhi sebagian persyaratan
Mencapai derajat S-2

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ABSTRAK

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Latar belakang : Sindrom metabolik dapat meningkatkan kondisi stres oksidatif yang ditandai dengan tingginya kadar MDA serta penurunan kadar enzim SOD. Tempe gembus merupakan salah satu bahan pangan yang mengandung isoflavon sebagai antioksidan yang dapat menurunkan pembentukan MDA dan meningkatkan kadar enzim SOD. Penelitian ini bertujuan menganalisis pengaruh pemberian tempe gembus terhadap kadar MDA plasma dan enzim SOD serum pada tikus sindrom metabolik.

Metode : Penelitian *quasi experimental, post test only control group design* pada 25 ekor tikus *Sprague Dawley* yang dibagi dalam 5 kelompok yaitu K(-) sebagai kelompok tikus sehat dan diberikan pakan standar, K(+) kelompok sindrom metabolik diinduksi pakan tinggi lemak, sukrosa, dan pakan standar, serta 3 kelompok perlakuan (P1,P2,P3) yaitu kelompok sindrom metabolik diinduksi pakan tinggi lemak, sukrosa, pakan standar, dan diintervensi tempe gembus (2,5g, 5g, dan 7,5g) selama 28 hari. Kadar MDA plasma diukur dengan metode *Thiobarbituric Acid Reactive Substance* (*TBARS*) dan kadar enzim SOD serum diukur dengan metode *Enzyme Linked Immunosorbent Assay* (*ELISA*). Analisis statistik menggunakan uji *Oneway Anova* serta uji korelasi *Spearman* dan *Pearson.*

Hasil : Pemberian tempe gembus secara statistik berpengaruh signifikan terhadap kadar MDA plasma tikus sindrom metabolik (p=0,000) tetapi tidak berpengaruh signifikan pada kadar enzim SOD serum (p=0,449). Tempe gembus 7,5 g merupakan dosis yang paling berpengaruh tehadap kadar MDA plasma dan enzim SOD serum. Hal ini ditunjukkan adanya perbedaan bermakna kadar MDA plasma pada setiap kelompok perlakuan (p<0,05), terkecuali pada kelompok K(-) dengan P3 (p>0,05), serta kadar enzim SOD serum pada kelompok P3 yang lebih tinggi dibanding kelompok perlakuan lainnya. Tidak didapatkan hubungan signifikan antara kadar MDA plasma dan indeks *Lee* setelah intervensi dengan kadar enzim SOD serum (p> 0,05). Ada hubungan signifikan antara indeks *Lee* setelah intervensi dengan kadar MDA plasma (p<0,05).

Simpulan : Pemberian tempe gembus dengan berbagai dosis dapat menurunkan kadar MDA plasma secara signifikan tetapi belum mampu membuktikan peningkatan kadar enzim SOD serum secara signifikan.

Kata kunci : *malondialdehyde*, sindrom metabolik, *superoxide dismutase*, tempe gembus,

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ABSTRACT

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Background: *Metabolic syndrome could increase the condition of oxidative stress that was marked by the high level of malondialdehyde (MDA) and decreasing level of superoxide dismutase (SOD) enzyme.* Tempe gembus *was one of food sources that contained isoflavones as antioxidants to decrease the MDA formation and increase of SOD enzyme level. This research aimed to analyze the effect of* tempe gembus *to the levels of plasma MDA and serum SOD enzyme in metabolic syndrome rats.*

Methods: *Quasi experimental research, post-test only control group design on 25 Sprague Dawley rats that were divided into 5 groups, i.e. K(-) as group of healthy rats were given standard food, K(+) as group of metabolic syndrome rats that induced by giving high fat food, sucrose and standard food, also 3 treatment groups (P1, P2, P3) as groups of metabolic syndrome rats that induced by giving high fat food, sucrose, standard food and get the intervention of* tempe gembus *(2.5 g, 5 g, and 7.5 g) for 28 days. The level of plasma MDA was measured by Thiobarbituric Acid Reactive Substance (TBARS) method and the level of serum SOD enzyme was measured by Enzyme Linked Immunosorbent Assay (ELISA) method. The statistical analysis used Oneway Anova test also Spearman and Pearson test.*

Results: Tempe gembus *statistically had a significant effect to the plasma MDA level of metabolic syndrome rats ($p=0.000$) but it did not have any significant effect in the level of serum SOD enzyme ($p=0.449$).* Tempe gembus *with the dose of 7.5 g was the most influential dose to the levels of plasma MDA and serum SOD enzyme. It was shown there were significant difference of plasma MDA level in each group ($p<0.05$), except in group K (-) with P3 ($p>0,05$), also the serum SOD enzyme level in group P3 was higher than other treatment groups. There were no significant correlation between plasma MDA level and index Lee after intervention with serum SOD enzyme level ($p>0.05$).There were significant correlation between index Lee after intervention with plasma MDA level ($p<0.05$).*

Conclusion: Tempe gembus *giving with various doses could decrease the level of plasma MDA significantly but did not able to prove the increasing level of serum SOD enzyme significantly.*

Keywords: *malondialdehyde, metabolic syndrome, superoxide dismutase,* tempe gembus

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