PENGARUH PROBIOTIK SUSU FERMENTASI *Lactiplantibacillus pentosus* Strain HBUAS 53657 TERHADAP AKTIFITAS GLUTATHIONE PEROXIDASE SERUM DAN HISTOPATOLOGI PANKREAS TIKUS HIPERGLIKEMIA

TESIS

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PADANG

2024

ABSTRAK

PENGARUH PROBIOTIK SUSU FERMENTASI *Lactiplantibacillus pentosus* Strain HBUAS 53657 TERHADAP AKTIFITAS GLUTATHIONE PEROXIDASE SERUM DAN HISTOPATOLOGI PANKREAS TIKUS HIPERGLIKEMIA

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Hiperglikemia merupakan suatu keadaan dimana terjadi peningkatan gula darah yang disebabkan karena gangguan produksi atau kerja insulin sehingga memicu stres oksidatif. Probiotik susu fermentasi *Lactiplantibacillus pentosus* strain HBUAS 53657 (PSF) mempunyai efek antioksidan dan antimikroba yang dapat menurunkan stres oksidatif. Penelitian ini bertujuan untuk mengetahui pengaruh probiotik susu fermentasi Lactiplantibacillus pentosus Strain HBUAS 53657 terhadap aktifitas *Glutathione Peroxidase* (GPx) serum dan histopatologi pankreas tikus hiperglikemia.

Penelitian ini menggunakan rancangan ekperimental dengan *post test only group design* menggunakan 25 ekor tikus wistar jantan dewasa dibagi menjadi 5 kelompok (n=5/kelompok) yaitu tikus normal (K-), tikus hiperglikemia (K+), tikus hiperglikemia yang mendapat PSF dosis $1x10^8$ CFU (P1), $1x10^9$ CFU (P2) dan $1x10^{10}$ CFU (P3) selama 28 hari. Aktifitas GPx serum diperiksa dengan spektrofometer, luas pulau Langerhans diukur dengan ImageJ, dan kerusakan pulau Langerhans dinilai menggunakan Skor Ningrum. Perbedaan antar kelompok dianalisis menggunakan uji One Way ANOVA dan Kruskal walis.

Hasil penelitian menunjukkan pemberian PSF pada semua dosis meningkatkan aktifitas GPx serum dengan dosis optimal $1x10^9$ CFU ($p=0.002$), meningkatkan luas pulau Langerhans ($p=0,001$) dan menurunkan derajat kerusakan pulau Langerhans ($p< 0,001$) secara linear menurut kenaikan dosis.

Dapat disimpulkan bahwa pemberian probiotik susu fermentasi Lactiplantibacillus pentosus strain HBUAS53657 meningkatkan aktifitas Glutathione peroxidase serum dan mendorong peningkatan luas pulau pankreas dan kerusakan pulau Langerhans.

Kata Kunci: Probiotik, Glutathione peroxidase, Hiperglikemia, pulau langerhans

ABSTRACT

THE EFFECT OF FERMENTED MILK PROBIOTICS *Lactiplantibacillus pentosus* strain HBUAS 53657 ON SERUM GLUTATHIONE PEROXIDASE ACTIVITY AND PANCREATIC HISTOPATHOLOGY OF HYPERGLYCEMIC RATS

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Hyperglycemia is a condition characterized by an increase in blood sugar levels caused by impaired insulin production or function, which triggers oxidative stress. The probiotic fermented milk containing Lactiplantibacillus pentosus strain HBUAS 53657 (PSF) has antioxidant and antimicrobial effects that can reduce oxidative stress. This study aims to investigate the effect of the probiotic fermented milk Lactiplantibacillus pentosus Strain HBUAS 53657 on serum Glutathione Peroxidase (GPx) activity and pancreatic histopathology in hyperglycemic rats.

This research utilized an experimental design with a post-test-only group design involving 25 adult male Wistar rats divided into 5 groups (n=5/group): normal rats (K-), hyperglycemic rats (K+), hyperglycemic rats receiving PSF at doses of 1x10^8 CFU (P1), 1x10^9 CFU (P2), and 1x10^10 CFU (P3) for 28 days. Serum GPx activity was measured using a spectrophotometer, the area of the Langerhans islets was measured using ImageJ, and Langerhans islet damage was assessed using the Ningrum Score. Differences between groups were analyzed using One Way ANOVA and Kruskal-Wallis tests.

The results showed that administration of PSF at all doses increased serum GPx activity with an optimal dose of 1x10^9 CFU ($p=0.002$), increased the area of the Langerhans islets ($p=0.001$), and decreased the degree of Langerhans islet damage ($p<0.001$) linearly according to the increase in dose.

It can be concluded that the administration of the probiotic fermented milk Lactiplantibacillus pentosus strain HBUAS 53657 increases serum Glutathione Peroxidase activity and promotes improvement in pancreatic islet area and Langerhans islet damage.

Keywords Probiotics, Glutathione peroxidase, Hyperglycemia, Langerhans islets