

**PENGARUH PROBIOTIK SUSU FERMENTASI *Lactiplantibacillus pentosus*
STRAIN HBUAS53657 DAN SARI BUAH JERUK TERHADAP KADAR
GLUKOSA DARAH PUASA, KADAR MDA, DAN AKTIVITAS SOD
SERUM TIKUS HIPERGLIKEMIA**

TESIS



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ABSTRAK

PENGARUH PROBIOTIK SUSU FERMENTASI *Lactiplantibacillus pentosus* STRAIN HBUAS53657 DAN SARI BUAH JERUK TERHADAP KADAR GLUKOSA DARAH PUASA, KADAR MDA, DAN AKTIVITAS SOD SERUM TIKUS HIPERGLIKEMIA

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Peningkatan kadar glukosa darah puasa atau hiperglikemia karena kerusakan sel β pankreas dapat memicu kondisi stress oksidatif yang ditandai dengan peningkatan *Reactive Oxygen Species* (ROS) dan penurunan aktivitas enzim antioksidan. Susu kerbau yang difermentasi dengan probiotik *Lactiplantibacillus pentosus* Strain HBUAS53657 dan sari buah jeruk bersifat sebagai antidiabetik dan antioksidan sehingga mampu memperbaiki kondisi stress oksidatif. Penelitian ini bertujuan untuk mengetahui pengaruh probiotik susu fermentasi (PSF) *Lactiplantibacillus pentosus* strain HBUAS53657 terhadap kadar glukosa darah puasa, kadar MDA, dan aktivitas SOD serum tikus hiperglikemia.

Penelitian ini adalah penelitian eksperimental dengan rancangan *The Post-test Only Control Group* menggunakan 25 ekor tikus wistar jantan yang dibagi pada lima kelompok, yaitu kelompok kontrol negatif (K-), kontrol positif (K+), perlakuan 1 (P1) (PSF 1×10^8 cfu/ml + 20% sari jeruk), perlakuan 2 (P2) (PSF 1×10^9 cfu/ml + 20% sari jeruk), dan perlakuan 3 (P3) (PSF 1×10^{10} cfu/ml + 20% sari jeruk) selama 28 hari. Data terdistribusi normal dianalisis dengan One-way ANOVA dan *Post-hoc Bonferroni*.

Hasil penelitian menunjukkan pada semua kelompok yang diberi perlakuan PSF *Lactiplantibacillus pentosus* Strain HBUAS53657 (P1, P2, dan P3) terjadi penurunan kadar glukosa dengan rerata paling rendah pada kelompok P3, yaitu $104,2 \pm 22,88$ mg/dl ($p = 0,002$), dan terjadi penurunan kadar MDA dengan rerata terendah pada kelompok P2, yaitu $2,24 \pm 0,23$ nmol/mL ($p = 0,034$). Pemberian PSF juga berpengaruh terhadap peningkatan aktivitas SOD pada P3, yaitu $34,71 \pm 4,68$ Unit/mL ($p = 0,288$). Dari penelitian ini dapat disimpulkan bahwa PSF *Lactiplantibacillus pentosus* Strain HBUAS53657 dan sari buah jeruk berpengaruh dalam menurunkan kadar glukosa darah puasa, menurunkan kadar MDA, dan meningkatkan aktivitas SOD serum tikus hiperglikemia.

Kata kunci: probiotik, susu fermentasi, *Lactiplantibacillus pentosus*, glukosa, malondialdehida, superoksida dismutase

ABSTRACT

MILK FERMENTED WITH PROBIOTIC *Lactiplantibacillus pentosus* STRAIN HBUAS53657 AND ORANGE JUICE IMPROVES FASTING BLOOD GLUCOSE, MDA AND SOD SERUM ACTIVITY OF HYPERGLYCEMIC RATS

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An increase in fasting blood glucose levels or hyperglycemia due to pancreatic β -cell damage can trigger oxidative stress, characterized by an increase in Reactive Oxygen Species (ROS) and a decrease in antioxidant enzyme activity. Milk fermented with probiotic *Lactiplantibacillus pentosus* Strain HBUAS53657 and orange juice acts as an antidiabetic and antioxidant, thereby improving oxidative stress conditions. This study aimed to determine the effects of probiotic fermented milk (PFM) *Lactiplantibacillus pentosus* strain HBUAS53657 on fasting blood glucose levels, MDA levels, and SOD activity in hyperglycemic rats.

This was an experimental study using The Post-test Only Control Group design with 25 male Wistar rats divided into five groups: negative control K(-), positive control K(+), PFM *L. pentosus* HBUAS53657 dose 1×10^8 cfu/ml + 20% orange juice (P1), PFM *L. pentosus* HBUAS53657 dose 1×10^9 cfu/ml + 20% orange juice (P2), and PFM *L. pentosus* HBUAS53657 dose 1×10^{10} cfu/ml + 20% orange juice (P3) for 28 days. Normally distributed data were analyzed using *One-way ANOVA* and *Post-hoc Bonferroni*.

The results of the study showed a decrease in fasting blood glucose levels in all groups given PFM *Lactiplantibacillus pentosus* Strain HBUAS53657 (P1 P2, P3), with the lowest average fasting blood glucose level in the P3 group, which was 104.2 ± 22.88 mg/dl ($p = 0.002$). The study also showed a decrease in MDA levels in all groups given PSF with the lowest average MDA level in the P2 group, which was 2.24 ± 0.23 nmol/mL ($p = 0.034$). An increase in SOD was also observed in PSF treatment groups, with the highest average SOD activity in the P3 group, which was 34.71 ± 4.68 Unit/mL ($p = 0.288$). It is concluded that PFM *Lactiplantibacillus pentosus* Strain HBUAS53657 and orange juice is effective in reducing fasting blood glucose levels, decreasing MDA levels, and increasing SOD activity in hyperglycemic rats.

Keywords: probiotic, fermented milk, *Lactiplantibacillus pentosus*, glucose, malondialdehyde, superoxide dismutase