

INTISARI

Latar belakang: Diet kacang-kacangan yang mengandung senyawa bioaktif memiliki peran penting dalam proteksi kesehatan termasuk risiko obesitas. Penelitian ini bertujuan menganalisis pengaruh substitusi biji kacang gude (*Cajanus cajan* L.) terhadap ekspresi gen *Toll Like Receptor 4* (TLR4) dan kadar *Lipopolysaccharide Binding Protein* (LBP) pada tikus Sprague dawley dengan diet tinggi lemak dan fruktosa.

Tujuan: Mengetahui fungsi biji kacang gude sebagai bahan substitusi makanan terhadap mekanisme inflamasi tikus melalui TLR4 dan LBP, yang diberi pakan tinggi lemak.

Metode: Penelitian ini menggunakan desain *pretest and posttest with control design* pada pemeriksaan kadar enzim sedangkan untuk ekspresi gen menggunakan *posttest only with control design*. Sampel penelitian berupa 25 ekor tikus jantan *Sprague dawley* dibagi dalam 5 kelompok perlakuan, kelompok kontrol negatif; kontrol positif; kelompok dengan dosis kacang gude 33 gram/kg pakan; kelompok 66 gram/kg pakan; dan kelompok 99 gram/kg pakan. Analisis kadar LBP pada darah tikus menggunakan metode ELISA kemudian analisis statistiknya menggunakan uji *paired t-test* dan *One Way ANOVA*. Analisis ekspresi gen TLR4 menggunakan metode qPCR dilanjutkan dengan analisis statistik menggunakan uji Kruskal Wallis.

Hasil: Pemberian diet tinggi lemak dapat meningkatkan ekspresi gen TLR4 dan kadar LBP dibandingkan dengan kelompok kontrol. Substitusi kacang gude dapat menurunkan ekspresi gen TLR4 dengan $p \text{ value} = 0,006$. Pemberian kacang gude dosis 66 gram/kg pakan menunjukkan penurunan ekspresi gen TLR4 paling signifikan dibanding kelompok perlakuan lain, sedangkan dosis 33 dan 66 gram/kg pakan memberikan efek kadar LBP hampir setara dengan kelompok normal dengan $p \text{ value} = 0,065$ dan $p \text{ value} = 0,066$.

Simpulan: Diet tinggi lemak meningkatkan ekspresi gen TLR4 dan kadar LBP. Pemberian substitusi kacang gude 66 gram/kg pakan mampu menurunkan ekspresi gen TLR4 secara optimal diikuti dengan kadar LBP yang hampir menyerupai normal.

Kata Kunci: Diet, Ekspresi Gen, Kacang Gude, *Lipopolysaccharide Binding Protein*, *Toll Like Receptor 4*

ABSTRACT

Background: Nut diet which containing bioactive compounds have an important role in health including the risk of obesity. This study aimed to analyze the effect of gude bean (seed) substitution on toll like receptor 4 (TLR4) gene expression and lipopolysaccharide binding protein (LBP) levels which Sprague dawley rats with a high fat and high fructose diet.

Objective: To determine the function of gude bean (seed) as a food substitute for the inflammatory mechanism of rats fed a high fat diet via TLR4 and LBP.

Methods: This study used a pretest and posttest with control design to examine enzyme levels, while for gene expression, a posttest only with control design was used. The research sample consisted of 25 male Sprague dawley rats divided into 5 treatment groups, negative control group; positive control group; group with 33 grams/kg of feed; 66 grams/kg feed; and 99 gram/kg feed group. Analysis of LBP levels in rat blood using the ELISA method and then statistical analysis using paired t-test and One Way ANOVA. Analysis of TLR4 gene expression using the qPCR method followed by statistical analysis using the Kruskal Wallis test.

Result: High fat diet increased TLR4 gene expression and LBP levels compared to the control group. Gude bean (seed) substitution can decrease TLR4 gene expression with p value=0,006. Gude bean (seed) at a dose of 66 grams/kg of feed showed the most significant reduction in TLR4 gene expression, while doses of 33 and 66 grams/kg of feed gave effects on LBP levels that almost equivalent to the normal group with the p value=0,065 and p value=0,66.

Conclusion: High fat diet increased TLR4 gene expression and LBP levels. Giving gude bean (seed) substitution of 66 grams/kg of feed was able to optimally reduce TLR4 gene expression followed by LBP levels that almost resembled normal.

Keyword: Diet, Gene Expression, Gude bean, Lipopolysaccharide Binding Protein, Toll Like Receptor 4