

PENGARUH TEPUNG LABU KUNING TERHADAP EKSPRESI GEN RETINOL BINDING PROTEIN 4 (RBP4) DAN PHOSPHOENOLPYRUVATE CARBOXYKINASE (PEPCK) PADA TIKUS YANG DIINDUKSI DIET TINGGI LEMAK DAN FRUKTOSA

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INTISARI

Latar belakang : Diet tinggi lemak dan fruktosa (DTLF) diketahui dapat menyebabkan stres oksidatif yang berakibat pada resistensi insulin dan ditandai dengan tingginya *homeostasis model assessment of insulin resistance* (HOMA-IR), ekspresi *retinol binding protein 4* (RBP4), serta *phosphoenolpyruvate carboxykinase* (PEPCK). Karotenoid yang terdapat pada labu kuning diketahui dapat mengurangi stres oksidatif.

Tujuan : Mengetahui pengaruh pemberian tepung labu kuning terhadap HOMA-IR, ekspresi gen RBP4, dan PEPCK pada tikus yang diinduksi DTLF.

Metode : Sebanyak 25 ekor tikus *Sprague Dawley* digunakan dalam penelitian ini. Tikus dibagi menjadi 5 kelompok : 1) normal; 2) DTLF; 3) DTLF + 0,16 g/200 g BB tepung labu kuning; 4) DTLF + 0,32 g/200 g BB tepung labu kuning; 5) DTLF + 0,64 g/200 g BB tepung labu kuning. Tikus diinduksi DTLF selama 25 hari dan diberi tepung labu kuning selama 4 minggu. Analisis HOMA-IR, ekspresi gen RBP4 di jaringan adiposa putih, dan PEPCK di jaringan hepar dengan metode *quantitative polymerase chain reaction* (qPCR) dilakukan di akhir penelitian.

Hasil : Nilai HOMA-IR pada kelompok yang diinduksi DTLF dan diberi tepung labu kuning lebih rendah dibandingkan dengan kelompok yang diinduksi DTLF tanpa tepung labu kuning ($p=0,007$). Ekspresi RBP4 baik pada kelompok yang diinduksi DTLF dan diberi tepung labu kuning maupun diinduksi DTLF tanpa tepung labu kuning tidak berbeda ($p=0,625$). Ekspresi PEPCK pada kelompok yang diinduksi DTLF dan diberi 0,16 g/200 g BB tepung labu kuning lebih rendah ($3,18 \pm 0,04$) dibandingkan dengan kelompok yang diinduksi DTLF tanpa tepung labu kuning ($p<0,001$).

Kesimpulan : Pemberian tepung labu kuning pada tikus yang diinduksi DTLF dapat memperbaiki resistensi insulin. Tingkat ekspresi PEPCK pada kelompok yang diberi tepung labu kuning 0,16 g/200 g BB lebih rendah, namun tingkat ekspresi RBP4 tidak mengalami perubahan.

Kata kunci : Diet tinggi lemak dan fruktosa, stres oksidatif, resistensi insulin, ekspresi gen RBP4, ekspresi gen PEPCK

EFFECT OF PUMPKIN POWDER ON RBP4 AND PEPCK GENE EXPRESSION IN RATS INDUCED HIGH FAT AND FRUCTOSE DIET

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ABSTRACT

Background: High fat and fructose diet (HFFD) induced oxidative stress and cause insulin resistance that marked by high of homeostasis model assessment of insulin resistance (HOMA-IR), high of retinol binding protein 4 (RBP4), and phosphoenolpyruvate carboxykinase (PEPCK) gene expression. Carotenoid in pumpkin may be reduce oxidative stress. The present study to evaluate the effect of pumpkin powder on HOMA-IR, RBP4 and PEPCK gene expression in rats induced HFFD.

Methods : Twenty five (25) male Sprague Dawley rats were used in this study. Five healthy rats were maintained and served as a control. Twenty healthy rats were divided into 4 groups : HFFD control, HFFD with 0.16 g/200 g body weight (BW) of pumpkin powder; HFFD with 0.32 g/200 g BW of pumpkin powder; HFFD with 0.64 g/200 g BW of pumpkin powder. Rats were induced HFFD during 25 days and the pumpkin powder were administrated for 4 weeks. At the end of treatment the HOMA-IR and tissues gene expression of RBP4 (from white adipose tissue) and PEPCK (from liver tissue) were measured.

Result : The HOMA-IR index was significantly lower in all treatments group ($p=0.007$), with the lowest HOMA-IR index observed in 0.64 g/200 g BW of pumpkin powder. There was no significantly difference RBP4 expression in white adipose tissue between HFFD group and all treatment groups ($p=0.625$). The PEPCK gene expression in liver tissue was significantly difference between HFFD group and all treatment groups ($p<0.001$), with the lowest expression observed in 0.16 g/200 g BW of pumpkin powder.

Conclusion : Pumpkin powder can improve insulin resistance in HFFD rats and decrease PEPCK gene expression possibly by reducing oxidative stress, although there was no change in RBP4 gene expression.

Key words : High fat and fructose diet, oxidative stress, insulin resistance, RBP4 gene expression, PEPCK gene expression