Pengaruh Ekstrak Moringa oleifera Terhadap Profil Lipid dan Ekspresi Gen Fgf21, Pgc-1, dan Srebp pada Anakan Tikus dari Induk Defisiensi Protein = Moringa oleifera Extract Effect on Lipid Profiles and Expressions of Fgf21, Pgc-1Î±, and Srebps in Offsprings of Protein Deficient Rats

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Abstrak

<p>Latar Belakang: Asupan protein yang rendah pada masa kehamilan dapat menyebabkan terjadinya intrauterine growth restriction (IUGR). IUGR berkaitan erat terhadap dislipidemia dan perubahan metabolisme lipid secara abnormal pada anak yang dilahirkan. Peningkatan asupan protein pada anak diharapkan mampu mengatasi kondisi tersebut. Moringa oleifera (MO) merupakan salah satu sumber makanan kaya nutrisi dan protein. Penelitian ini bertujuan untuk meneliti efektivitas kandungan protein dari ekstrak etanol MO (EEMO) dalam mengatasi defisiensi protein pada anakan tikus dari induk defisiensi protein dengan mengamati profil lipid serta beberapa gen regulator metabolisme lipid di hati. Metode: Anakan tikus usia 3 minggu yang telah disapih dari induk yang mengalami defisiensi protein diberikan pakan rendah protein (protein 9%) dengan penambahan EEMO 400 mg atau 800 mg, atau diberikan pakan normal (protein 18%) selama 5 minggu. Kelompok pembanding adalah anakan dari induk tikus yang diberikan pakan normal tanpa pemberian EEMO. Pada akhir penelitian dilakukan pemeriksaan berat badan, pengukuran profil lipid darah dengan spektrofotometri, pemeriksaan ekspresi mRNA Fgf21, Pgc1a, Srebp1c, dan Srebp2 dengan menggunakan qRT-PCR, serta pemeriksaan ekspresi protein FGF21 di hati dengan imunohistokimia. Hasil: Pemberian EEMO tidak memberikan perbaikan kenaikan berat badan dibandingkan kelompok defisiensi protein (DP). Pemberian EEMO tidak meningkatkan kadar kolesterol total, trigliserida, dan HDL secara signifikan dibandingkan kelompok DP. Hanya EEMO 400 mg yang mampu menurunkan rasio TG/HDL dan EEMO 800 mg yang mampu meningkatkan kadar LDL secara bermakna terhadap kelompok DP. Pemberian EEMO tidak dapat menurunkan ekspresi mRNA Fgf21, Pgc1a, Srebp1c, dan Srebp2 di hati model hewan coba, namun pemberian EEMO 400 mg terbukti dapat menurunkan ekspresi protein FGF21 secara signifikan di hati. Kesimpulan: Pemberian ekstrak EEMO secara tunggal belum mampu memperbaiki kondisi dislipidemia dan perbaikan gen regulator metabolisme lipid di hati model hewan coba defisiensi protein.
.....Background: Low protein intake during pregnancy can cause intrauterine growth restriction (IUGR). IUGR is closely related to dyslipidemia and abnormal changes in lipid metabolism in offspring. It is hoped that increasing protein intake in offspring will overcome this condition. Moringa oleifera (MO) is rich in nutrients and protein. This study aims to examine the effectiveness of the protein content of ethanolic extract of MO (EEMO) in overcoming protein deficiency in rat offspring from protein-deficient mothers by observing the lipid profile and several lipid metabolism regulatory genes in the liver. Methods: After weaning from mothers with protein deficiency, three-weeks-old rat pups were given a low protein diet (9% protein) with the addition of EEMO 400 mg or 800 mg, or a normal diet (18% protein) for 5 weeks. The comparison group was offspring from mother rats that were given

normal food without EEMO. At the end of the study, body weight was examined, blood lipid profile was measured using spectrophotometry, examination of Fgf21, Pgc1a, Srebp1c, and Srebp2 mRNA expression using qRT-PCR, and examination of FGF21 protein expression in the liver using immunohistochemistry. Results: EEMO administration did not improve weight gain compared to the protein deficient group (DP). Administration of EEMO did not significantly increase total cholesterol, triglyceride, and HDL levels compared to the DP group. Only EEMO 400 mg reduced the TG/HDL ratio and EEMO 800 mg increased LDL levels significantly compared to the DP group. Administration of EEMO could not reduce the expression of Fgf21, Pgc1a, Srebp1c, and Srebp2 mRNA in the liver of experimental animal models, however, administration of EEMO 400 mg was proven to reduce FGF21 protein expression in the liver significantly. Conclusion: The administration of EEMO extract alone has not been able to improve the condition of dyslipidemia and repair lipid metabolism regulatory genes in the liver of animal models of protein deficiency.</p>