

Efek Neuroprotektif Ekstrak Air Daun dan Minyak Biji Moringa Oleifera terhadap Disfungsi Otak pada Mencit dengan Diet Tinggi Lemak dan Fruktosa: Tinjauan pada Penanda Senescence = Neuroprotective effect of Moringa oleifera leaf water extract and seed oil on brain dysfunction in high fat and fructose diet mice: Focus on senescence markers

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Abstrak

Moringa oleifera (MO) telah terbukti memiliki efek neuroprotektif, namun efek neuroprotektif melalui jalur senescence belum diketahui. Penelitian ini bertujuan untuk mengetahui efek neuroprotektif ekstrak air daun (MOE) dan minyak biji MO (MOO) terhadap disfungsi otak melalui jalur senescence pada mencit yang diberi diet tinggi lemak dan fruktosa. Mencit DDY jantan sebanyak 10 ekor dibagi secara acak menjadi 4 kelompok: Normal; Diet Tinggi Lemak + Fruktosa 25% (HFD+FR); HFD+FR + MOE 500 mg/kgBB (HFD+FR+MOE); dan HFD+FR + MOO 2 mL/kgBB (HFD+FR+MOO). Dilakukan penilaian kognitif dengan Uji Y-maze dan Novel Objective Recognition (NOR). Dianalisis ekspresi p16, p21, dan BDNF dengan metode RT-PCR serta pewarnaan SA--Gal pada jaringan otak. Dilakukan analisis interaksi senyawa ekstrak air daun dan minyak biji Moringa oleifera terhadap protein target dengan molecular docking. Hasil analisis menunjukkan bahwa pemberian bersama MOE maupun MOO dapat meningkatkan persentase alternasi dan pengenalan objek baru, menurunkan ekspresi p16 dan p21, meningkat ekspresi BDNF, menurunkan intensitas warna biru pada organ otak. Berdasarkan analisis dengan molecular docking menunjukkan adanya interaksi senyawa terhadap reseptor TrkB. Temuan-temuan ini menunjukkan ekstrak air daun dan minyak biji Moringa oleifera memiliki potensi neuroprotektif melalui jalur senescence.

.....Moringa oleifera (MO) has been shown to have neuroprotective effects, but neuroprotective effects through the senescence pathway are not yet known. This study aimed to determine the neuroprotective effect of leaf water extract (MOE) and MO seed oil (MOO) against brain dysfunction through the senescence pathway in mice fed a diet high in fat and fructose. 10 male DDY mice were randomly divided into 4 groups: Normal; High Fat + Fructose Diet 25% (HFD+FR); HFD+FR + MOE 500 mg/kgBB (HFD+FR+MOE); and HFD+FR + MOO 2 mL/kgBB (HFD+FR+MOO). Cognitive assessment was carried out with the Y-maze Test and Novel Objective Recognition (NOR). Expression of p16, p21, and BDNF was analyzed by RT-PCR method and SA- β -Gal staining in brain tissue. Analysis of the interaction of leaf water extract compounds and Moringa oleifera seed oil on target proteins by molecular docking was carried out. The results of the analysis showed that co-administration of MOE and MOO can increase the percentage of alternation and recognition of new objects, decrease p16 and p21 expression, increase BDNF expression, decrease the intensity of blue color in brain organs. Based on analysis with molecular docking showed the interaction of compounds with TrkB receptor. These findings suggest the leaf water extract and seed oil of Moringa oleifera have neuroprotective potential through the senescence pathway.