Peran Ekstrak Kedelai Kaya Lunasin dalam Penurunan Ekspresi MMP-9 Jaringan Kolon Mencit yang Diinduksi AOM/DSS = Inhibition of MMP-9 Expression by Lunasin-rich Soybean Extract on Colon Tissues of Mice Induced by Azoxymethane and Dextran Sodium Sulfate

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Abstrak

Latar belakang: Kanker kolorektal merupakan salah satu kanker dengan tingkat mortalitas kedua di dunia pada tahun 2020. MMP-9 adalah protein yang mendegradasi matriks ekstraseluler agar sel kanker dapat bermetastasis. Penelitian terbaru menemukan ekstrak kedelai kaya lunasin memberikan efek antikanker. Tujuan penelitian ini adalah untuk mengetahui apakah lunasin dapat menurunkan ekspresi protein MMP-9 pada sel kanker kolon.
Metode: Mencit Swiss Webster sebanyak 30 ekor dibagi ke dalam enam kelompok. Lima dari enam kelompok tersebut diinduksi dengan azoksimetan (AOM) dan dekstran sodium sulfat (DSS) selama dua minggu. Setelah itu, ekstrak kedelai kaya lunasin diberikan pada kelompok mencit yang dibagi menjadi tiga kelompok yaitu 250 mg/kgBB, 300 mg/kgBB, dan 350 mg/kgBB selama empat minggu. Selain itu, satu kelompok diberikan aspirin 150 mg/kgBB sebagai kontrol positif. Selanjutnya, dilakukan pewarnaan imunohistokimia MMP-9 terhadap jaringan kolon distal mencit yang telah dikorbankan, lalu diamati di bawah mikroskop. Hasil interpretasi ekspresi MMP-9 dinyatakan dalam indeks H-score menggunakan aplikasi ImageJ dengan plugin IHC profiler.
Hasil: Terdapat perbedaan secara signifikan antara kelompok negatif dengan kelompok intervensi pemberian ekstrak kedelai kaya lunasin dosis 250 mg/kgBB (p = 0,048) dengan nilai indeks H-score rata-rata 120,55% dan 350 mg/kgBB (p = 0,001) dengan indeks HScore rata-rata 113,25%.
Kesimpulan: Pemberian ekstrak kedelai kaya lunasin menurunkan ekspresi MMP-9 pada sel epitel kripta jaringan kolon distal mencit yang diinduksi oleh AOM/DSS. Penurunan ekspresi MMP-9 terjadi pada kelompok ekstrak kedelai kaya lunasin dosis 250 mg/kgBB dan 350 mg/kgBB.
.....Introduction: Colorectal cancer is one of the cancers with the second mortality rate in the world in 2020. MMP-9 is a protein that degrades the extracellular matrix so that cancer cells can metastasize. Recent studies have found that lunasin-rich soybean extract has an anticancer effect. The purpose of this study is to determine whether lunasin can reduce the expression of MMP-9 protein in colon cancer cells.
Method: 30 Swiss Webster mice were divided into six groups. Five of the six groups were induced with azoximethane (AOM) and dextran sodium sulfate (DSS) for two weeks. After that, soybean extract rich in lunasin was given to a group of mice which were divided into three groups, namely 250 mg/kgBW, 300 mg/kgBW, and 350 mg/kgBW for four weeks. In addition, one group was given aspirin 150 mg/kgBW as a positive control. Furthermore, immunohistochemical staining of MMP-9 was performed on the distal colon tissue of the sacrificed mice, then observed under a microscope. The results of the interpretation of the MMP-9 expression were expressed in the form of an H-score index using the ImageJ application with the IHC profiler plugin.
Result: There was a significant difference between the negative group and the intervention group with 250 mg/kgBW of soybean extract (p = 0.048) with an average H-Score index value of 120.55% and 350

mg/kgBW ($p = 0.001$) with an average H-Score index of 113.25%.
Conclusion: Administration of lunasin-rich soybean extract decreased MMP-9 expression in crypt epithelial cells of the distal colon tissue of mice induced by AOM/DSS. The decrease in MMP-9 expression occurred in the soybean extract group rich in lunasin at doses of 250 mg/kgBW and 350 mg/kgBW.