Aktivitas sitotoksik senyawa turunan asam galat terhadap sel kanker payudara MCF 7 = Cytotoxic effects of gallic acid derivatives on hormone dependent breast cancer MCF 7

Maya Dorothea, author

Abstrak

[Asam galat adalah salah satu senyawa yang berpotensi menjadi obat baru bagi kanker. Banyak penelitian yang telah menguji aktivitas asam galat sebagai antikanker, tetapi asam galat bersifat sangat hidrofilik sehingga sulit untuk menembus membran sel. Untuk meningkatkan aktivitas sitotoksisitas dan hidrofobisitas, dibuat senyawa turunan asam galat yaitu alkil galat dan metoksi galat. Aktivitas diuji pada sel MCF-7 menggunakan MTS (3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium) assay dengan inkubasi selama 48 jam. Aktivitas setiap senyawa ditentukan dengan menggunakan nilai IC50. Dari seluruh senyawa yang diuji, isoamil galat, heptil galat dan oktil galat, merupakan senyawa yang aktif sebagai antikanker MCF-7 dengan nilai IC50 58,11; 25,94 dan 42,34. Berdasarkan ekstrapolasi garis, isobutil galat dan juga dapat menurunkan persentase viabilitas sel, meskipun nilai IC50-nya belum dapat ditentukan dari penelitian ini. Metoksi galat tidak memiliki efek penghambatan pada sel kanker payudara MCF-7. Oleh karena itu, dapat disimpulkan bahwa isobutil, isoamil, heptil dan oktil galat merupakan senyawa turunan asam galat yang memiliki aktivitas sitotoksik sedangkan metoksi galat tidak memiliki aktivitas sitotoksik terhadap MCF-7.;Gallic acid is a potential chemotherapeutic agent. Many studies have proven the
anti cancer activity of gallic acid, including in breast cancer. However, gallic acid is a hydrophilic molecule, which restrict the substance from passing the cell membrane. To increase the potential cytotoxicity and its hydrophobicity, two groups of gallic acid derivatives, alkyl gallates and methoxy gallates, were developed. The activity of these derivatives were tested in MCF-7 cell lines, using MTS (3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium) assay, and then incubated for 48 hours. Percentage of cell viability over control were assessed. Cytotoxic activities of gallic acid and its derivatives were determined using IC50 values. Among all of the gallic acid derivatives, isoamyl gallate, heptyl gallate and octyl gallate were the most potential drugs to treat MCF-7 breast cancer with IC50 values of 58,11; 25,94 and 42,34 μg/ml, respectively. Based on the trendline prediction, isobutyl gallate also showed cytotoxic activity towards MCF-7, although the IC50 values cannot be determined in this research. Methoxy gallates do not have any inhibitory activity towards breast cancer MCF-7. In conclusion, isobutyl, isoamyl, heptyl and octyl gallate are gallic acid derivatives with cytotoxic activity, while methoxy gallates

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