Aktivitas sitotoksik derivat asam galat terhadap non-small cell lung carcinoma (NSCLC) A549 = Cytotoxic activity of gallic acid derivatives on non small cell lung carcinoma (NSCLC) A549

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Abstrak

Asam galat adalah senyawa yang memiliki efek anti kanker termasuk pada kanker paru. Diduga, efektivitas asam galat sebagai agen sitotoksik dapat ditingkatkan dengan perubahan gugus samping. Penelitian ini bertujuan untuk menguji aktivitas sitotoksik asam galat dan turunan asam galat (alkil ester galat dan asam metoksi galat). Pada penelitian ini, sel A549 diberikan asam galat dan turunannya lalu diinkubasi selama 48 jam lalu akan diukur persentase viabilitas sel terhadap kontrol menggunakan MTS (3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium) assay. Data kemudian dianalisis menggunakan GraphPad Prism untuk mendapatkan inhibitory concentration (IC50).

Hasil penelitian menunjukkan bahwa asam galat, metil galat, etil galat, propil galat, butil galat, isobutil galat, t-butil galat, dan amil galat tidak memiliki aktivitas sitotoksik. Sedangkan isoamil galat menunjukkan aktivitas sitotoksik namun IC50 dari isoamil galat kemungkinan >51,2 μg/ml. Heptil galat dan oktil galat adalah dua senyawa yang memiliki efek sitotoksik pada sel A549 dengan nilai IC50 <51,2 μg/ml yaitu 19,11 μg/ml dan 41,23 μg/ml secara berurutan. Disimpulkan bahwa heptil galat dan oktil galat memiliki aktivitas sitotoksik yang lebih baik dari asam galat pada sel A549, sedangkan asam metoksi galat tidak memiliki aktivitas sitotoksik pada sel A549.
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Gallic acid is a substance with anti-cancer activity including lung cancer. The potency of gallic acid as a cytotoxic agent can be improved by modifying its side chains. This study was aimed to examine the cytotoxic activity of gallic acid and its derivates in lung cancer cells, A549. In this study, cells were treated with gallic acid and its derivates and were incubated for 48 hour. After incubation period, percentage of cell viability over control were tested using MTS (3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulophenyl)-2Htetrazolium) assay. Afterwards, data were analysed using GraphPad Prism to obtain inhibitory concentration (IC50).

The result showed gallic acid, methyl gallate, ethyl gallate, propyl gallate, butyl gallate, isobutyl gallate, t-butyl gallate, and amyl gallate did not have cytotoxic activity. Isoamyl gallate showed cytotoxic activity, but the IC50 value was probably >51,2 μg/ml. That gallic acid derivatives with cytotoxic activities and IC50 <51,2 μg/ml were heptyl gallate and octyl gallate with IC50 values of 19,11 μg/ml and 41,23 μg/ml, respectively. However, methoxy gallate (monometohoxy gallate, dimethoxy gallate, and trimethoxy gallate) did not show any cytotoxic activity. We conclude that heptyl gallate and octyl gallate have better cytotoxic activity in A549 cells compared to gallic acid, while methoxy gallates do not have cytotoxic activity in cell A549.