SINTESIS DAN UJI SITOTOKSISITAS 7,8-DIHIDROKSI-4'-METOKSI-ISOFLAVON TERHADAP SEL KANKER SERVIKS HeLa DAN KOLON WiDr SECARA *IN VITRO*

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INTISARI

Sintesis 7,8-dihidroksi-4'-metoksiisoflavon dari bahan awal *p*-anisaldehida telah dilakukan melalui jalur deoksibenzoin. Sintesis diawali dengan mengkonversi *p*-anisaldehida melalui beberapa tahap reaksi yaitu: reduksi alkohol, brominasi, nitrilisasi dan hidrolisis basa menghasilkan 4-metoksibenzil karboksilat. Senyawa 2,3,4-trihidroksifenil-4'-metoksibenzil keton (deoksibenzoin) diperoleh dari reaksi kondensasi Friedel-Crafts antara 4-metoksibenzil karboksilat, pirogalol dan reagen $BF_3 \cdot Et_2O$. Produk akhir, 7,8-dihidroksi-4'-metoksiisoflavon dihasilkan dari reaksi antara deoksibenzoin dan reagen $BF_3 \cdot Et_2O$/DMF/$POCl_3$, sebagai reagen penambah satu atom karbon dan proses siklisasi. Semua produk hasil sintesis dianalisis strukturnya menggunakan spektrometer FTIR, GC-MS, ^{1}H- dan ^{13}C-NMR. Senyawa 7,8-dihidroksi-4'-metoksiisoflavon diuji aktivitas sitotoksiknya sebagai agen antikanker terhadap sel kanker serviks HeLa dan kolon WiDr secara *in vitro* dengan metode MTT.

Hasil penelitian menunjukkan bahwa 4-metoksibenzil karboksilat, 2,3,4-trihidroksifenil-4'-metoksibenzil keton, dan 7,8-dihidroksi-4'-metoksiisoflavon diperoleh dengan rendemen berurutan sebesar 83, 93 dan 88%. Hasil uji sitotoksisitas terhadap 7,8-dihidroksi-4'-metoksiisoflavon mengindikasikan bahwa isoflavon cukup aktif dalam menghambat pertumbuhan sel kanker serviks HeLa dan kolon WiDr dengan nilai IC_{50} secara berurutan sebesar 37,07 dan 52,36 µg/mL.

Kata Kunci: *p*-anisaldehida, deoksibenzoin, isoflavon, antikanker

SYNTHESIS AND CYTOTOXICITY *IN VITRO* TEST OF 7,8-DIHYDROXY-4'-METHOXYISOFLAVONE AGAINST HeLa CERVICAL AND WiDr COLON CANCER CELLS

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ABSTRACT

Synthesis of 7,8-dihydroxy-4'-methoxyisoflavone from starting material *p*-anisaldehyde has been done by deoxybenzoin pathways. The synthesis was started by converting *p*-anisaldehyde via several steps of reaction, i.e alcohol reduction, bromination, nitrilisation and hydrolysis in alkaline condition to give 4-methoxybenzyl carboxylic acid. The compound of 2,3,4-trihydroxyphenyl-4'-methoxybenzyl ketone (deoxybenzoin) was obtained from Friedel-Crafts condensation reaction between 4-methoxybenzyl carboxylic acid, pyrogallol and $BF_3 \cdot Et_2O$. The final product, 7,8-dihydroxy-4'-methoxyisoflavone, was resulted from reaction between deoxybenzoin and $BF_3 \cdot Et_2O$/DMF/$POCl_3$ reagents, as the reagents for addition of one carbon atom and cyclization process. The structures of all products were analyzed using FTIR, GC-MS, ^{1}H- and ^{13}C-NMR spectrometers. The cytotoxicity of 7,8-dihydroxy-4'-methoxyisoflavone was tested *in vitro* against HeLa cervical and WiDr colon cancer cells with MTT method.

The results showed that 4-methoxybenzyl carboxylic acid, 2,3,4-trihydroxyphenyl-4'-methoxybenzyl ketone and 7,8-dihydroxy-4'-methoxy isoflavone were yielded in 83, 93 and 88%, respectively. The cytotoxicity test indicated that 7,8-dihydroxy-4'-methoxyisoflavone had a moderate activity for inhibiting the growth of HeLa cervical and WiDr colon cancer cells with IC_{50} values 37,07 and 52,36 µg/mL, respectively.

Keywords: *p*-anisaldehyde, deoxybenzoin, isoflavone, anticancer