SINTESIS KALKON, FLAVON DAN FLAVANON DARI VERATRALDEHIDA SERTA UJI SITOTOKSISITASNYA TERHADAP SEL KANKER HeLa, WiDr, T47D DAN MCF-7 SECARA *IN VITRO*

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INTISARI

Senyawa 2',4'-dihidroksi-3,4-dimetoksikalkon (**1**) telah berhasil disintesis menggunakan metode *Claisen-Schmidt* dari veratraldehida dan 2',4'-dihidroksi asetofenon dalam pelarut etanol. Reaksi dilakukan selama 48 jam pada temperatur kamar menggunakan katalis basa KOH. Sintesis 7-hidroksi-3',4'-dimetoksiflavon (**2**) dilakukan melalui reaksi siklisasi oksidatif senyawa **1** menggunakan katalis I_2 dalam pelarut DMSO pada kondisi refluks selama 1 jam. Senyawa 7-hidroksi-3',4'-dimetoksiflavanon (**3**) disintesis melalui isomerisasi senyawa **1** menggunakan katalis natrium asetat maupun asam sulfat pada kondisi refluks selama 12 jam. Karakterisasi senyawa **1**, **2** dan **3** menggunakan UV-Vis, GC-MS/MS *direct*, ^{1}H-NMR dan ^{13}C-NMR. Uji aktivitas senyawa **1**, **2** dan **3** terhadap sel kanker HeLa, WiDr, T47D dan MCF-7 dilakukan dengan metode MTT (3-(4,5-dimetiltiazol-2-il)-2,5-difeniltetrazoliumbromida).

Hasil penelitian menunjukkan bahwa senyawa **1**, **2** dan **3** telah teridentifikasi dan diperoleh rendemen berturut-turut sebesar 49, 23 dan 73%. Hasil uji sitotoksisitas menunjukkan senyawa **1** menghambat sel kanker T47D, WiDr, dan MCF-7 dengan IC_{50} 27,85; 31,60 dan 57,54 μg/mL termasuk dalam kategori sedang. Aktivitas senyawa **2** dan **3** termasuk dalam tidak aktif terhadap sel kanker HeLa, WiDr, T47D maupun MCF-7 (IC_{50}>100 μg/mL). Hasil uji sitotoksisitas senyawa **1**, **2** dan **3** terhadap sel Vero diperoleh IC_{50}>100 μg/mL. Indeks selektivitas senyawa **1** terhadap WiDr dan T47D sebesar 3,23 dan 3,66.

Kata kunci : kalkon, flavon, flavanon, antikanker, sitotoksisitas

SYNTHESIS OF CHALCONE, FLAVONE AND FLAVANONE FROM VERATRALDEHYE AND THEIR IN VITRO CYTOTOXICITY TEST AGAINTS HeLa, WiDr, T47D AND MCF-7 CANCER CELLS

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ABSTRACT

Compound of 2',4'-dihydroxy-3,4-dimethoxychalcone (**1**) has been successfully synthesized using the *Claisen-Schmidt* method of veratraldehyde and 2',4'-dihydroxyacetophenone in ethanol. The reaction was carried out for 48 h under room temperature with KOH as base catalyst. The synthesis of 7-hydroxy-3',4'-dimethoxyflavone (**2**) by oxidative cyclization reaction of compound **1** using the catalyst I_2 in DMSO, under reflux conditions for an hour. The 7-hydroxy-3',4'-dimethoxyflavanone (**3**) was synthesized by isomerization of compound **1** using a sodium acetate or sulfuric acid as catalyst under reflux conditions for 12 h. Caracterization of compound **1**, **2** and **3** using UV-Vis, GC-MS/MS direct, ^{1}H-NMR and ^{13}C-NMR. The cytotoxicity of compound 1, **2** and **3** was tested against HeLa, WiDr, T47D and MCF-7 cancer cells by MTT (3-(4,5-dimethyltiazol-2-yl)-2,5-diphenyltetrazoliumbromida) assay.

The results showed that compounds **1**, **2** and **3** have been investigated with a successive yield of 49, 23 and 73%. The result of cytotoxicity test showed compound **1** inhibited T47D, WiDr and MCF-7 cancer cells with IC_{50} 27.85, 31.60 and 57.54 µg/mL were into the moderate category. The activities of compounds **2** and **3** include inactiv category of cancer cells HeLa, WiDr, T47D or MCF-7 (IC_{50} >100 µg/mL). The result of cytotoxicity test of compound **1**, **2** and **3** against Vero cell obtained IC_{50} >100 µg/mL. The selectivity index of compound **1** against WiDr and T47D was 3.23 and 3.66.

Keyword : chalcone, flavone, flavanone, anticancer, cytotoxicity