SINTESIS SENYAWA KALKON, FLAVON, DAN FLAVANON DARI 4-DIMETILAMINOBENZALDEHIDA DAN UJI SITOTOKSISITAS TERHADAP SEL KANKER SERVIKS (HeLa), KOLON (WiDr), SERTA SEL KANKER PAYUDARA (T47D DAN MCF-7) SECARA *IN VITRO*

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INTISARI

Telah dilakukan sintesis 2'-hidroksi-4-dimetilaminokalkon **(senyawa 1)**, 4'-dimetilaminoflavon **(senyawa 2)**, dan 4'-dimetilaminoflavanon **(senyawa 3)** menggunakan bahan dasar 2'-hidroksiasetofenon dan 4-dimetilaminobenzal-dehida (DMAB). Uji aktivitas antikanker senyawa **1**, **2**, dan **3** telah dilakukan menggunakan metode *Microculture Tetrazolium Technique* (MTT).

Senyawa **1** disintesis menggunakan metode *Claisen-Schmidt* dari 4-dimetilaminobenzaldehida (DMAB) dan 2'-hidroksiasetofenon dalam pelarut etanol. Reaksi dilakukan pada kondisi refluks selama 1 jam menggunakan katalis KOH 40% (b/v). Sintesis senyawa **2** dilakukan melalui reaksi siklisasi oksidatif senyawa **1** menggunakan katalis iodin (I_2) dalam pelarut dimetil sulfoksida (DMSO) pada kondisi refluks selama 1 jam. Senyawa **3** disintesis melalui isomerisasi senyawa **1** menggunakan katalis natrium asetat (CH_3COONa) pada kondisi refluks selama 18 jam. Karakterisasi senyawa **1**, **2**, dan **3** menggunakan spektrometer FTIR, *Direct Inlet*-MS, ^{1}H– dan ^{13}C–NMR. Uji aktivitas senyawa **1**, **2**, dan **3** terhadap sel kanker HeLa, WiDr, T47D, dan MCF-7 dilakukan dengan metode MTT.

Hasil penelitian menunjukkan bahwa senyawa **1**, **2**, dan **3** telah berhasil disintesis dan diperoleh rendemen berturut-turut sebesar 82, 74, dan 56%. Hasil uji sitotoksisitas menunjukkan bahwa senyawa **1** dan **2** aktif menghambat sel kanker HeLa dengan IC_{50} (inhibitory concentration) berturut-turut sebesar 33,88 dan 67,60 μg mL^{-1} termasuk dalam kategori sedang dan tidak aktif dalam menghambat sel kanker WiDr, T47D, serta MCF-7. Senyawa **3** termasuk dalam kategori tidak aktif terhadap penghambatan keempat sel kanker tersebut.

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

SYNTHESIS OF CHALCONE, FLAVONE AND FLAVANONE FROM 4-DIMETHYLAMINOBENZALDEHYDE AND THEIR IN VITRO CYTOTOXIC TESTING AGAINTS CERVICAL (HeLa), COLON (WiDr), AND BREAST (T47D AND MCF-7) CANCER CELL LINES

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ABSTRACT

Synthesis of 2'-hydroxy-4-dimethylaminochalcone (Compound **1**), 4'-di methylaminoflavone (Compound **2**), and 4'-dimethylaminoflavanone (Compound **3**) using starting material of 2'-hydroxyacetophenone and 4-dimethylamino benzaldehyde (DMAB) have been done. The anticancer activity tests of compounds **1**, **2**, and **3** have been carried out using Microculture Tetrazolium Technique (MTT) method.

Compound **1** has been synthesized using Claisen-Schmidt method of 4-dimethylaminobenzaldehyde (DMAB) and 2'-hydroxyacetophenone in ethanol. The reaction was carried out under reflux conditions for 1 h with KOH 40% (b/v). Synthesis of compound **2** by oxidative cyclization reaction of compound **1** using the iodine (I_2) catalyst in dimethyl sulfoxide (DMSO) was carried out under reflux condition for 1 h. Compound **3** was synthesized by isomerization of compound **1** using sodium acetate (CH_3COONa) as the catalyst under reflux condition for 18 h. The structure of compounds **1**, **2**, and **3** were confirmed using FT-IR, *Direct Inlet*-MS, ^1H– and ^{13}C–NMR spectrometers. The cytotoxicity of compounds **1**, **2**, and **3** were tested against HeLa, WiDr, T47D, and MCF-7 cancer cell lines by MTT assay.

The results show that compounds **1**, **2**, and **3** have been successfully synthesized with a yield of 82, 74, and 56%, respectively. The cytotoxicity test show that compounds **1** and **2** can inhibit HeLa cancer cell line with IC_{50} of 33.88 and 67.60 μg mL^{-1} respectively in the moderate category and inactive category of inhibit WiDr, T47D and MCF-7 cancer cell lines. Compound **3** is inactive category of inhibit all the cancer cell lines.

Keywords: anticancer, flavanone, flavone, chalcone, cytotoxicity