SKRIPSI SARJANA FARMASI

ISOLASI DAN KARAKTERISASI METABOLIT SEKUNDER LICHEN *Teloschistes flavicans* (sw) Norman SERTA UJI AKTIVITAS ANTIBAKTERI

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ABSTRAK

ISOLASI DAN KARAKTERISASI METABOLIT SEKUNDER LICHEN *Teloschistes flavicans* (sw). Norman SERTA UJI AKTIVITAS ANTIBAKTERI

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Kajian fitokimia lichen *Teloschistes flavicans* yang dikoleksi di PT. Perkebunan Nusantara Danau kembar, Kabupaten Solok telah dilakukan. *Thallus* kering (658 g) lichen diekstraksi menggunakan *n*-heksan, etil asetat dan metanol. Ketiga ekstrak diuji aktivitas antibakteri dengan metode difusi agar. Ekstrak *n*-heksan dan etil asetat dilanjutkan untuk diisolasi karena memiliki aktivitas antibakteri terhadap bakteri *Klebsiella pneumoniae, Streptoccus pneumonia, Streptococcus pyogenes, Moraxella catarrhalis* dengan konsentrasi 20% memberikan daya hambat 11,95- 14,05 mm. Endapan *n*-heksan diisolasi dengan menggunakan kolom kromatografi dengan fase diam silika gel 60 dan menggunakan metode *Step Gradient Polarity* (SGP). Hasil kolom kromatografi didapatkan senyawa murni TF.2. Endapan etil asetat didapatkan senyawa murni TF.1. Senyawa TF.1 berupa kristal jarum berwarna jingga dan senyawa TF.2 berupa kristal jarum berwarna putih. Pengujian kemurnian senyawa dilakukan dengan pengecekan KLT. Karakterisasi senyawa dilakukan dengan penentuan spektrum UV, IR, LC-MS/MS, NMR dan *Single-crystal X-ray Diffraction* (SC-XRD). Senyawa TF.1 dan TF.2 pada KLT masing-masing didapatkan Rf 0,725 dan 0,573. Analisis spektrum senyawa TF.1 pada UV-Vis memperlihatkan serapan λ 267,00nm; 283,50 nm dan 433,00 nm. Pada data FTIR memperlihatkan bilangan gelombang 2932,38 cm^{-1} dan 1374.17cm^{-1} (C-H alifatik) , 1611,52 cm^{-1} (C=C aromatik), 1229.20 cm^{-1} (CO), 1140.33 cm^{-1} dan 1032.30 cm^{-1} (OH fenolik). Dari spektrum LC-MS/MS dan NMR diketahui senyawa TF.1 memiliki rumus molekul $C_{16}H_{12}O_2$. Analisis spektrum senyawa TF.2 pada UV-Vis memperlihatkan λ max 268,50 nm. Pada data FTIR memperlihatkan bilangan gelombang 3416,13 cm^{-1} (OH), 2936,63 cm^{-1} (C-H), 1731,32cm^{-1} (C=O), 1579 cm^{-1} (C=C), 1255,53 cm^{-1} (C-O-C) dan 842,09 cm^{-1} (C-Cl). Dari spektrum LC-MS/MS dan NMR diketahui senyawa TF.2. memiliki rumus molekul $C_{18}H_{16}Cl_2O_5$. Senyawa TF.1 dan TF.2 memiliki aktivitas antibakteri terhadap bakteri uji *Klebsiella pneumoniae, Streptoccus pneumonia, Streptococcus pyogenes, Moraxella catarrhalis* dengan konsentrasi hambat minimal 1,2%.

Kata kunci: TF 1**,** TF 2, *Klebsiella pneumoniae, Streptoccus pneumonia, Streptococcus pyogenes, Moraxella catarrhalis*

ABSTRACT

ISOLATION AND CHARACTERIZATION OF SECONDARY METABOLITE OF LICHEN *Teloschistes flavicans* (sw). Norman AND ANTIBACTERIAL EVALUATION

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The phytochemical studies of lichen *Teloschistes flavicans* collected from PT. Perkebunan Nusantara, Danau Kembar, Kabupaten Solok had been done. The dry of lichen's thallus (658g) were exstracted with *n*-hexane, ethyl acetate and methanol. The three extracts were tested for antibacterial activity using the agar diffusion method. *N*-hexane and ethyl acetate extract were continued for isolation because they have antibacterial activity against bacteria *Klebsiella pneumoniae*, *Streptoccus pneumonia*, *Streptococcus pyogenes*, *Moraxella catarrhalis* with concentration of 20% give inhibition zone are 11.95- 14.05 mm. The *n*-hexane precipitate were isolated using column chromatography with silica gel 60 as the stationary phase and using *Step Gradient Polarity* (SGP) method. From the chromatography column a pure compound TF.2 was obtained. From the ethyl acetate precipitate a pure compound TF.1 was obtained. TF.1 compound was an orange needles crystal dan the TF.2 compound was a white needles crystal. Compound purity testing was carried out by KLT. The characterization of compound was carried out determination of UV, IR, LC-MS/MS, NMR and Single-crystal X-ray Diffraction (SC-XRD). TF.1 and TF.2 each compound in TLC to obtaining Rf 0.725 dan 0.573. Spectrum analysis of TF.1 compounds at UV-Vis give absorption at ƛ 267.00 nm; 283.50 nm; and 433.00 nm. The FTIR data showed wave number 2932.38 cm^{-1} and 1374.17 cm^{-1} (C-H alifatik), 1611.52 cm^{-1} (C=C aromatic), 1229.20 cm^{-1} (CO), 1140.33 cm^{-1} and 1032.30 cm^{-1} (OH fenolik). In LC-MS/MS and NMR spectra noted that molecular formula of the TF.1 compound is $C_{16}H_{12}O_2$. TF. 2 compound at UV-Vis give maximum absorbtion (λ max) 268.50 nm. The FTIR data showed wave number 3416.13 cm^{-1} (OH), 2936.63 cm^{-1} (C-H), 1731.32 cm^{-1} (C=O), 1579 cm^{-1} (C=C), 1255.53 cm^{-1} (C-O-C) dan 842.09 cm^{-1} (C-Cl). In LC-MS/MS and NMR spectra noted that molecular formula of the TF.2 compound is $C_{18}H_{16}Cl_2O_5$. The TF.1 and TF.2 compound has antibacterial activity against bacteria *Klebsiella pneumoniae*, *Streptoccus pneumonia*, *Streptococcus pyogenes*, *Moraxella catarrhalis* with minimal inhibitory concentration 1.2%.

Key word: TF 1**,** TF 2, *Klebsiella pneumoniae*, *Streptoccus pneumonia*, *Streptococcus pyogenes, Moraxella catarrhalis*