

SKRIPSI SARJANA FARMASI

***PROFILING FITOKIMIA DAN UJI AKTIVITAS SITOTOKSIK HASIL
FREEZE-DRYING AIR REBUSAN DAUN CEMARA SUMATERA (*Taxus
sumatrana*) TERASIDIFIKASI DAN NON-ASIDIFIKASI TERHADAP SEL
KANKER PAYUDARA T47D***



Oleh

ANGGUN SALSABILA

NIM : 2211012035

Pembimbing 1: Prof. apt. Dachriyanus, Ph.D

Pembimbing 2: Prof. apt. Fatma Sri Wahyuni, Ph.D

**FAKULTAS FARMASI
UNIVERSITAS ANDALAS
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ABSTRAK

PROFILING FITOKIMIA DAN UJI AKTIVITAS SITOTOKSIK HASIL FREEZE-DRYING AIR REBUSAN DAUN CEMARA SUMATERA (*Taxus sumatrana*) TERASIDIFIKASI DAN NON-ASIDIFIKASI TERHADAP SEL KANKER PAYUDARA T47D

Oleh :

ANGGUN SALSABILA

NIM : 2211012035

(Program Studi Sarjana Farmasi)

Taxus sumatrana merupakan salah satu spesies genus *Taxus* yang secara empiris dimanfaatkan masyarakat sebagai air rebusan daun untuk membantu pengobatan kanker. Namun, terdapat keterbatasan bukti ilmiah mengenai profil metabolit dan aktivitas sitotoksik air rebusan daun *T. sumatrana*. Penelitian ini bertujuan mengevaluasi profil metabolit dan aktivitas sitotoksik *freeze-drying* air rebusan daun *T. sumatrana* terhadap sel kanker payudara T47D secara *in vitro*. Sebagai salah satu strategi preparasi sampel, dilakukan perlakuan asidifikasi menggunakan HCl 1 N hingga pH ± 4 untuk mengevaluasi pengaruh perubahan kondisi pH terhadap profil metabolit yang dihasilkan serta kaitannya dengan aktivitas sitotoksik. Sampel kemudian distandardisasi melalui pemeriksaan organoleptik, kadar air, susut pengeringan, kadar abu total, kadar sari larut air, dan skrining fitokimia. Profil metabolit dianalisis menggunakan LC-HRMS, sedangkan aktivitas sitotoksik diuji menggunakan metode MTT *assay*. Hasil penelitian menunjukkan kedua sampel memenuhi parameter standardisasi dan mengandung golongan fenolik serta flavonoid. Analisis LC-HRMS menunjukkan bahwa perlakuan asidifikasi menghasilkan perubahan profil metabolit yang ditandai dengan perbedaan metabolit yang terdeteksi serta meningkatnya kelimpahan relatif 10-Deacetylbaecatin III, salah satu metabolit khas genus *Taxus*, pada sampel terasidifikasi. Berdasarkan analisis regresi linear, diperoleh estimasi nilai IC_{50} sebesar 393,996 $\mu\text{g/mL}$ pada sampel terasidifikasi dan 1290,23 $\mu\text{g/mL}$ pada sampel non-asidifikasi, dengan nilai koefisien determinasi (R^2) masing-masing 0,6778 dan 0,6963, sehingga hasil tersebut masih perlu diinterpretasikan secara hati-hati. Berdasarkan hasil penelitian, perlakuan asidifikasi memengaruhi profil metabolit *freeze-drying* air rebusan daun *T. sumatrana* dan diikuti oleh kecenderungan aktivitas sitotoksik yang lebih tinggi terhadap sel kanker payudara T47D dibandingkan sampel non-asidifikasi.

Kata kunci: Daun *Taxus sumatrana*, *freeze-drying*, asidifikasi, profil fitokimia, LC-HRMS, sitotoksik, MTT *assay*, T47D, IC_{50}

ABSTRACT

PHYTOCHEMICAL PROFILING AND CYTOTOXIC ACTIVITY OF FREEZE-DRIED ACIDIFIED AND NON-ACIDIFIED INFUSION OF SUMATRAN YEW (*Taxus sumatrana*) LEAVES AGAINST T47D BREAST CANCER CELLS

By :

ANGGUN SALSABILA

Student ID : 2211012035

(Bachelor of Pharmacy)

Taxus sumatrana is a species of the genus *Taxus* that is empirically utilized by the community in the form of a leaf infusion to aid in cancer treatment. However, there is limited scientific evidence regarding the metabolite profile and cytotoxic activity of *T. sumatrana* leaf infusion. This study aims to evaluate the metabolite profile and cytotoxic activity of the freeze-dried leaf infusion of *T. sumatrana* against T47D breast cancer cells in vitro. As a sample preparation strategy, an acidification treatment using 1 N HCl was performed to reach a pH of approximately 4 to evaluate the effect of pH alteration on the resulting metabolite profile and its correlation with cytotoxic activity. The samples were then standardized through organoleptic examination, moisture content, loss on drying, total ash content, water-soluble extractive value, and phytochemical screening. The metabolite profile was analyzed using LC-HRMS, while the cytotoxic activity was tested using the MTT assay method. The results showed that both samples met the standardization parameters and contained phenolic and flavonoid groups. LC-HRMS analysis revealed that the acidification treatment induced changes in the metabolite profile, characterized by differences in the detected metabolites and an increased relative abundance of 10-Deacetylbaccatin III a characteristic metabolite of the genus *Taxus* in the acidified sample. Based on linear regression analysis, the estimated IC₅₀ value was 393.996 µg/mL for the acidified sample and 1290.23 µg/mL for the non-acidified sample, with coefficient of determination (R²) values of 0.6778 and 0.6963, respectively, indicating that these results should still be interpreted with caution. In conclusion, the acidification treatment affects the metabolite profile of the freeze-dried *T. sumatrana* leaf infusion, followed by a tendency toward higher cytotoxic activity against T47D breast cancer cells compared to the non-acidified sample.

Keywords: *Taxus sumatrana* leaves, freeze-drying, acidification, phytochemical profiling, LC-HRMS, cytotoxicity, MTT assay, T47D, IC₅₀