ABSTRAK

Giovani Mei Anggasta Telaumbanua, NIM 4223210008 (2026) Isolasi Dan Identifikasi Senyawa Bioaktif Asam Benzoat Dari Hasil Kultur *In vitro* Kemenyan Sumatra (*Styrax benzoin*).

Kemenyan Sumatra (*Styrax benzoin*) merupakan tanaman penghasil resin yang mengandung asam benzoat dan turunannya, namun produksinya memerlukan waktu lama serta proses penyadapan yang berpotensi merusak tanaman. Kultur in vitro dapat menjadi alternatif untuk memperoleh metabolit sekunder tanpa menunggu tanaman dewasa. Penelitian ini bertujuan mengidentifikasi keberadaan asam benzoat atau turunannya pada kultur in vitro kemenyan Sumatra. Sampel berupa biomassa kalus dari eksplan daun muda *S. benzoin* yang berasal dari Humbang Hasundutan, Sumatera Utara. Ekstraksi dilakukan secara bertingkat dengan metode refluks menggunakan n-heksana, etil asetat, dan etanol, kemudian dilanjutkan dengan ekstraksi cair–cair metode asam–basa menggunakan dietil eter. Senyawa hasil isolasi dianalisis menggunakan FTIR dan GC–MS. Dari 25 g biomassa kalus diperoleh ekstrak n-heksana 2,66 g, etil asetat 8,60 g, dan etanol 2,90 g. Ekstraksi lanjutan terhadap ekstrak etanol menghasilkan isolat sebanyak 0,28 g berupa serbuk coklat. Analisis GC–MS mengidentifikasi senyawa 4-hidroksi-2-metilbenzoat (turunan TMS) pada waktu retensi 36,516 menit dengan persentase luas puncak 0,67%. Hasil ini menunjukkan bahwa kultur kalus *S. benzoin* secara in vitro mampu menghasilkan metabolit sekunder golongan turunan asam benzoat, meskipun dalam jumlah relatif kecil.

Kata kunci : *Styrax benzoin*; kultur in vitro; biomassa kalus; asam benzoat; ekstraksi bertingkat.

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ABSTRACT

Giovani Mei Anggasta Telaumbanua, NIM 4223210008 (2026) Isolation and Identification of the Bioactive Compound Benzoic Acid from *In vitro* Culture of Sumatran Frankincense (*Styrax benzoin*).

Sumatran benzoin (*Styrax benzoin*) is a resin-producing plant known to contain benzoic acid and its derivatives. However, resin production requires a long period of growth and tapping practices that may damage the plant. In vitro culture offers an alternative approach for obtaining secondary metabolites without waiting for mature plants to produce resin. This study aimed to identify the presence of benzoic acid or its derivatives in the in vitro culture of Sumatran benzoin. The sample consisted of callus biomass derived from young leaf explants of *S. benzoin* collected from Humbang Hasundutan, North Sumatra. Sequential extraction was performed using the reflux method with n-hexane, ethyl acetate, and ethanol, followed by acid–base liquid–liquid extraction using diethyl ether. The isolated compounds were analyzed by FTIR and Gas Chromatography–Mass Spectrometry (GC–MS). From 25 g of callus biomass, 2.66 g, 8.60 g, and 2.90 g of crude extracts were obtained using n-hexane, ethyl acetate, and ethanol, respectively. Further acid–base extraction of the ethanol extract yielded 0.28 g of a brown powder isolate. GC–MS analysis identified 4-hydroxy-2-methylbenzoic acid (TMS derivative) at a retention time of 36.516 min with a peak area percentage of 0.67%. These results indicate that *S. benzoin* callus cultures grown in vitro are capable of producing benzoic acid derivative secondary metabolites, although in relatively small amounts.

Keywords : *Styrax benzoin*; in vitro culture; callus biomass; benzoic acid; sequential extraction.

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