

**RESPONS MORFOANATOMIS DAN HISTOKIMIA
AKAR TANAMAN BANDOTAN (*Ageratum conyzoides* L.)
TERHADAP PERLAKUAN SALINITAS**

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INTISARI

Bandotan (*Ageratum conyzoides* L.) merupakan tanaman liar sekaligus gulma bagi lahan pertanian yang mengandung berbagai senyawa metabolit sekunder sehingga berpotensi sebagai bahan obat tradisional. Perubahan salinitas tanah dapat mempengaruhi struktur pertumbuhan dan kandungan senyawa pada tanaman. Penelitian ini bertujuan untuk mengetahui respons morfoanatomis dan histokimia akar bandotan yang terpapar perlakuan salinitas garam NaCl serta mengetahui berbagai kandungan senyawa metabolit dan lokalisasinya. Bibit bandotan ditumbuhkan pada 4 jenis perlakuan, yaitu P0 (kontrol), P1 (2 dS/m), P2 (4 dS/m), dan P3 (6 dS/m) dengan volume penyiraman 114 ml setiap 3 hari sekali lalu ditumbuhkan hingga berumur 3 minggu. Pengamatan morfologis meliputi warna akar, tingkat kerimbunan, dan tingkat kekuatan akar. Pengamatan pertumbuhan berupa panjang akar. Pengamatan anatomis dibuat preparat awetan sayatan melintang pangkal dan ujung akar primer dengan metode *non embedding* lalu diambil data diameter akar, tebal epidermis, tebal korteks, diameter stele, tebal berkas pengangkut, diameter trakea, dan jumlah trakea. Analisis histokimia dibuat preparat segar akar primer bagian pangkal dan ujung untuk mengidentifikasi dan melokalisasi senyawa alkaloid, flavonoid, terpenoid, dan tanin. Uji histokimia meliputi alkaloid dengan reagen Dragendorff, flavonoid dengan larutan NaOH 5%, terpenoid dengan reagen Baljet, dan tanin (fenolik) dengan larutan FeCl₃ 10%. Data hasil kuantitatif diuji statistik menggunakan uji ANOVA dan uji Duncan, dianalisis secara kualitatif, lalu dibandingkan, dan dipaparkan secara deskriptif. Hasil menunjukkan bahwa akar bandotan berwarna hijau-putih kecoklatan dengan tingkat kerimbunan yang beragam dan tingkat kekuatan akar yang semakin mereduksi seiring peningkatan salinitas. Pangkal dan ujung akar mengalami penurunan diameter akar, tebal epidermis, tebal korteks, diameter stele, tebal berkas pengangkut, dan diameter trakea, serta peningkatan jumlah trakea. Kandungan metabolit pada akar bandotan berupa alkaloid, flavonoid, terpenoid, dan tanin yang semakin melimpah seiring dengan peningkatan salinitas dan terletak tersebar di jaringan epidermis, korteks, serta berkas pengangkut.

Kata kunci: lokalisasi, metabolit sekunder, morfoanatomis, NaCl

MORPHOANATOMICAL AND HISTOCHEMICAL RESPONSES OF BILLYGOAT WEED (*Ageratum conyzoides* L.) ROOTS TO SALINITY TREATMENT

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ABSTRACT

Bandotan (*Ageratum conyzoides* L.) is a wild plant and weed for agricultural land which contains various secondary metabolites that have potential as traditional medicine. Changes in soil salinity can affect the growth structure and content of metabolite in plants. This study aims to determine the morphoanatomical and histochemical responses of bandotan roots exposed to saline stress by NaCl and to determine the various metabolite compounds and their localization. Bandotan seedlings are grown in 4 types of treatment namely P0 (control), P1 (2 dS/m), P2 (4 dS/m), and P3 (6 dS/m) with 114 ml watering volume in every 3 days and then grown to 3 weeks old. Parameters observed are morphological, growth, anatomical, and histochemical data. Morphology includes root color, degrees of thickness, and strength level. Growth parameter is root length. In anatomy, preparations are made with preserved cross section at the base and tip of the primary root using nonembedding method then root diameter, epidermal and cortex thickness, stele diameter, vascular tissue thickness, trachea diameter, and number of trachea are taken. Histochemical analysis is made of fresh preparations of primary roots at the base and tip to identify and localize alkaloids, flavonoids, terpenoids, and tannins. Histochemical tests included alkaloids with Dragendorff reagent, flavonoids with NaOH 5% solution, terpenoids with Baljet reagent, and tannins (phenolics) with FeCl₃ 10% solution. The quantitative data are tested statistically using the ANOVA test and Duncan's test, analyzed qualitatively, then compared, and presented descriptively. The results showed that the roots color of bandotan are brownish green-white with varying degrees of thickness and the level of root strength decreased as the salinity increased. The root base and tip are decreased in root diameter, epidermal thickness, cortex thickness, stele diameter, vascular tissue thickness, and tracheal diameter, as well as an increase in the number of trachea. The metabolites in bandotan roots are alkaloids, flavonoids, terpenoids, and tannins which are increased and scattered in epidermis to vascular tissue.

Keywords: localization, morphoanatomical, NaCl, secondary metabolite