

**RESPONS PERTUMBUHAN DAN FISILOGI TANAMAN BAYAM
(*Amaranthus tricolor*) TERHADAP CEKAMAN LOGAM TIMBAL (Pb)**

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ABSTRAK

Bayam (*Amaranthus tricolor*) merupakan sayuran yang rentan terkontaminasi logam berat, salah satunya timbal. Penelitian ini bertujuan untuk menganalisis respons pertumbuhan dan fisiologi tanaman bayam terhadap cekaman timbal ($\text{Pb}(\text{NO}_3)_2$) menggunakan sistem hidroponik sumbu. Penelitian telah dilakukan menggunakan rancangan acak lengkap satu faktor dengan empat perlakuan konsentrasi timbal, yaitu 0, 1, 3, dan 5 ppm, diulangi 2 kali. Data dianalisis menggunakan ANOVA satu arah, dan uji lanjut dengan Duncan Multiple Range Test pada taraf kepercayaan 95%. Respons pertumbuhan yang diamati yaitu tinggi tanaman, jumlah daun, warna daun, berat segar tajuk dan akar, serta berat kering tajuk dan akar. Respons fisiologi yang diamati yaitu kadar klorofil tanaman, serapan timbal pada akar dan daun. Hasil penelitian diperoleh bahwa tanaman bayam yang dipapar $\text{Pb}(\text{NO}_3)_2$ mengalami penurunan tumbuh yang signifikan, pada parameter tinggi tanaman, jumlah daun, berat segar tajuk dan akar, berat kering tajuk dan akar, serta kadar klorofil. Perlakuan timbal tersebut juga menyebabkan kerontokan akar, perubahan warna daun menjadi kekuningan, serta terdapat bintik kuning dekat pertulangan daun. Analisis serapan logam timbal pada batang dan daun bayam menunjukkan nilai serapan meningkat seiring penambahan konsentrasi timbal pada perlakuan. Perlakuan $\text{Pb}(\text{NO}_3)_2$ dengan konsentrasi 5 ppm menunjukkan hasil yang terendah pada seluruh parameter pengamatan

Keywords: Amaranthus tricolor, Cemaran Logam, Sistem Hidroponik, Timbal

**GROWTH AND PHYSIOLOGICAL RESPONSES OF GREEN
AMARANTH (*Amaranthus tricolor*) EXPOSED TO METAL LEAD (Pb)**

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ABSTRACT

Green amaranth (*Amaranthus tricolor*) is a popular vegetable in Indonesia as a source of vitamins and minerals. However, this plant is susceptible to contamination of heavy metals such as lead. The study aimed to analyze the growth responses and morphophysiological of green amaranth in response to the application of lead in the forms of $(\text{Pb}(\text{NO}_3)_2)$ using a wick hydroponic system. The study used a single factor arranged in a complete randomized design with four treatments of lead level, i.e. 0, 1, 3, and 5 ppm, replicated 2 times. Data were analyzed using one-way ANOVA and post hoc test with Duncan Multiple Range Test in p -value 0.05. The growth responses were observed by measuring the plant height, the number of leaves, leaf color, shoot and roots fresh weight, also its dry weight. Whereas, the physiological responses was observed by analyzing the leaf chlorophyll levels. The results showed that the applications of $(\text{Pb}(\text{NO}_3)_2)$ decreased plant height, leaf number, fresh weight of shoot and roots, dry weight of shoot and roots, also the chlorophyll levels. These lead treatments caused root loss, changed the leaf color became yellowish-green, and caused yellow-spotted surrounding the midrib. Analysis of lead uptake in stems and leaves showed that the lead absorption increased along with the applications of $(\text{Pb}(\text{NO}_3)_2)$ in the treatment. The treatment of 5 ppm of $(\text{Pb}(\text{NO}_3)_2)$ showed the lowest result on all parameters.

Keywords: *Amaranthus tricolor*, Hydroponic System, Lead, Metal Pollution.