

PENGARUH BIOCHAR TERHADAP PERTUMBUHAN,
STATUS HORMONAL, GLUKOSINOLAT, DAN PROLIN
SAWI CINA (*Brassica rapa* subsp. *pekinensis* (Lour.) Rupr.)
DI BAWAH KONDISI CEKAMAN KEKERINGAN

Nida Lidya Susanti
20/470724/PBI/01755

INTISARI

Biochar merupakan pembenah tanah berbasis karbon yang sangat stabil. *Biochar* sekam padi dapat meningkatkan kapasitas menahan air tanah melalui peningkatan porositas dan fungsionalitas tanah. Penelitian ini dilakukan untuk menginvestigasi pengaruh *biochar* sekam padi terhadap karakteristik kimia tanah dan pengaruhnya terhadap pertumbuhan, profil fitohormon, glukosinolat, dan prolin sawi Cina pada kondisi kapasitas lapang yang berbeda. Benih sawi Cina dikecambahkan dan kecambah ditransplantasikan ke dalam *polybag* yang berisi tanah dan *biochar* dengan persentase berbeda, yakni 0%, 3%, 5%, atau 10%. Tanaman ditumbuhkan di *screen house* dan kapasitas lapang tanah dipertahankan pada 100%, 80%, 60%, atau 40% selama empat minggu. Hasil penelitian mengindikasikan bahwa *biochar* mampu memperbaiki karakteristik kimia tanah dengan meningkatkan pH, C organik, KTK, N total, N tersedia, dan P tersedia. Kondisi kapasitas lapang 100%, 60%, atau 40% menghambat pertumbuhan, namun perlakuan jangka panjang menyebabkan sawi Cina lebih toleran terhadap kondisi kekeringan maupun kelebihan air. Perlakuan *biochar* 10% optimal dalam meningkatkan jumlah daun, luas daun, bobot basah dan kering tanaman, dan kadar klorofil daun sedangkan konsentrasi 5% atau 10% berpengaruh dalam meningkatkan diameter batang sawi Cina dibanding konsentrasi *biochar* lainnya. *Biochar* sebanyak 5% meningkatkan panjang akar sawi Cina pada kapasitas lapang 100%. Perlakuan 5% atau 10% *biochar* optimal dalam menurunkan kadar prolin pada kapasitas lapang 60% atau 40%. Konsentrasi 10% *biochar* pada kapasitas lapang 60% atau 40% optimal dalam meningkatkan nilai RWC daun dibandingkan perlakuan *biochar* lainnya. Perlakuan 5% atau 10% *biochar* pada kapasitas lapang 100% atau 80%, 3% *biochar* pada kapasitas lapang 60%, dan 10% *biochar* pada kapasitas lapang 40%, meningkatkan kadar glukosinolat. Peningkatan kadar relatif auksin, giberelin, sitokin, asam jasmonat, asam salisilat, dan penurunan asam absisat ditemukan pada perlakuan 3% *biochar* pada kapasitas lapang 60% atau 40%. Profil fitohormon serupa ditemukan pula pada perlakuan 5% atau 10% *biochar* pada kapasitas lapang 80% atau 100%. Berdasarkan hasil penelitian ini dapat disimpulkan bahwa *biochar* meningkatkan toleransi sawi Cina terhadap kekeringan dengan cara mengubah profil fitohormon, meningkatkan kadar glukosinolat, serta menurunkan kadar prolin.

Kata kunci: *Biochar*, Sawi Cina, Kekeringan, Profil fitohormon, Glukosinolat

EFFECTS OF BIOCHAR ON GROWTH,
HORMONAL STATUS, GLUCOSINOLATE, AND PROLINE OF
CHINESE CABBAGE (*Brassica rapa* subsp. *pekinensis* (Lour.) Rupr.)
UNDER DROUGHT STRESS

Nida Lidya Susanti
20/470724/PBI/01755

ABSTRACT

Biochar is a very stable carbon-based soil amendment. Rice husk biochar can increase soil water-holding capacity by increasing soil porosity and functionality. This study investigated the effect of rice husk biochar on soil chemical characteristics and its effect on growth, phytohormone profiles, glucosinolate and Chinese cabbage proline under different field capacity conditions. Chinese cabbage seeds were germinated, and the seedlings were transplanted into polybags containing soil and biochar with different percentages, namely 0%, 3%, 5%, or 10%. The plants were grown in the screen house, and field capacity was maintained at 100%, 80%, 60%, or 40% for four weeks. The results indicated that biochar was able to improve soil chemical characteristics by increasing pH, organic C, CEC, total N, available N, and available P. Field capacity conditions of 100%, 60%, or 40% inhibited the growth of Chinese cabbage, but the long-term treatment made Chinese cabbage more tolerant of drought conditions and excess water. Treatment of 10% biochar is optimal in increasing the number of leaves, leaf area, plant wet and dry weight, and leaf chlorophyll content, while concentrations of 5% or 10% affect increasing Chinese cabbage stem diameter compared to other biochar concentrations. Biochar of as much as 5% increased Chinese cabbage root length at 100% field capacity. Treatment of 5% or 10% biochar is optimal in reducing proline levels at field capacity of 60% or 40%. The concentration of 10% biochar at 60% or 40% field capacity is optimal in increasing leaf RWC values compared to other biochar treatments. Treatment of 5% or 10% biochar at 100% or 80% field capacity, 3% biochar at 60% field capacity, and 10% biochar at 40% field capacity increased glucosinolate levels. Increased relative levels of auxins, gibberellins, cytokines, jasmonic acid, salicylic acid, and decreased abscisic acid were found in 3% biochar treatment at 60% or 40% field capacity. Similar phytohormone profiles were found in 5% or 10% biochar treatment at 80% or 100% field capacity. Based on the results of this study, it can be concluded that biochar increases Chinese cabbage tolerance to drought by changing the phytohormone profile, increasing glucosinolate levels, and decreasing proline levels.

Keywords: *Biochar, Chinese cabbage, Drought, Phytohormone profile, Glucosinolates*