

RINGKASAN

Tanaman melon (*Cucumis melo* L.) merupakan komoditas hortikultura bernilai ekonomi tinggi yang banyak digemari masyarakat karena rasanya manis dan kandungan gizinya. Namun, produktivitasnya masih rendah karena keterbatasan kesuburan tanah, terutama di tanah Entisol yang miskin hara dan organik. Tanah Entisol memiliki struktur berpasir, porositas tinggi, dan kemampuan menyimpan air serta unsur hara yang rendah. Oleh karena itu, perlu dilakukan upaya perbaikan tanah menggunakan bahan seperti mineral *wollastonite* (sumber silika dan kalsium) dan FABA (*fly ash dan bottom ash*). Pemberian silika diketahui dapat meningkatkan serapan hara, ketahanan tanaman terhadap stres, serta memperbaiki sifat fisik dan kimia tanah.

Penelitian dilakukan di Screenhouse Experimental Farm dan Laboratorium Ilmu Tanah, Fakultas Pertanian Universitas Jenderal Soedirman, dari Agustus 2024 hingga Maret 2025. Rancangan yang digunakan adalah RAK dengan dua faktor, yaitu takaran *wollastonite* (0, 5, 10, dan 15 g Si/*polybag*) dan FABA (0, 5, 10, dan 15 g Si/*polybag*), menghasilkan 16 kombinasi perlakuan yang diulang sebanyak tiga kali. Tanaman yang digunakan adalah melon varietas Golden Aroma. Variabel yang diamati meliputi pH tanah, daya hantar listrik (DHL), potensial redoks, ketersediaan unsur hara seperti N, Mg, Fe, dan Si dalam tanah, kadar Si pada daun, serta panjang akar tanaman. Data dianalisis menggunakan ANOVA dan uji lanjut DMRT pada taraf 5%.

Hasil penelitian menunjukkan bahwa pemberian FABA berpengaruh sangat nyata terhadap ketersediaan unsur Si dalam tanah, dan berpengaruh nyata terhadap DHL, potensial redoks, Fe-tersedia, serta panjang akar tanaman melon. Pemberian *wollastonite* menunjukkan pengaruh nyata terhadap peningkatan pH tanah pada fase vegetatif maksimum, serta terhadap DHL dan potensial redoks. Namun, tidak ditemukan interaksi yang signifikan antara perlakuan FABA dan *wollastonite* terhadap seluruh parameter yang diamati. Selain itu, kadar Si pada daun tidak menunjukkan perbedaan yang signifikan akibat perlakuan, dan panjang akar justru tertinggi ditemukan pada perlakuan tanpa pemberian FABA. Secara umum, penelitian ini menunjukkan bahwa *wollastonite* dan FABA berpotensi memperbaiki beberapa sifat kimia tanah Entisol, namun tidak semua perlakuan berdampak nyata terhadap pertumbuhan tanaman secara keseluruhan.

SUMMARY

Melon (*Cucumis melo* L.) is a high-value horticultural commodity widely favored by consumers due to its sweet taste and rich nutritional content. However, its productivity remains low, primarily due to poor soil fertility, especially in Entisol soils, which are deficient in nutrients and organic matter. Entisol soils are characterized by their sandy texture, high porosity, and low capacity to retain water and nutrients. Therefore, it is necessary to improve these soils by incorporating materials such as wollastonite (a source of silica and calcium) and FABA (fly ash and bottom ash). The application of silica has been shown to enhance nutrient uptake, increase plant resistance to stress, and improve both the physical and chemical properties of soil.

The study was conducted at the Screenhouse Experimental Farm and the Soil Science Laboratory of the Faculty of Agriculture, Jenderal Soedirman University, from August 2024 to March 2025. The research design used was a randomized complete block design (RCBD) with two factors: wollastonite application (0, 5, 10, and 15 g Si per polybag) and FABA application (0, 5, 10, and 15 g Si per polybag), resulting in 16 treatment combinations, each replicated three times. The plant used was the Golden Aroma variety of melon. Observed variables included soil pH, electrical conductivity (EC), redox potential, availability of nutrients such as N, Mg, Fe, and Si in the soil, leaf Si content, and root length. The data were analyzed using analysis of variance (ANOVA) followed by Duncan's Multiple Range Test (DMRT) at a 5% significance level.

The results showed that FABA application had a highly significant effect on soil-available Si and a significant effect on EC, redox potential, available Fe, and root length of melon plants. Wollastonite application significantly influenced soil pH at the vegetative maximum stage, as well as EC and redox potential. However, no significant interaction was found between the FABA and wollastonite treatments for any of the observed parameters. Furthermore, leaf Si content did not significantly differ among treatments, and the longest root length was observed in the treatment without FABA. Overall, the study indicates that both wollastonite and FABA have the potential to improve certain chemical properties of Entisol soils, although not all treatments had a significant impact on plant growth.