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Efektivitas Asam Humat, Biofertilizer, dan Nano Silika Terhadap Pertumbuhan dan Kadar Capsaicin Cabai Rawit (Capsicum frutescens L.)
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EFEKTIVITAS ASAM HUMAT, *BIOFERTILIZER,* DAN NANO SILIKA TERHADAP PERTUMBUHAN DAN KADAR CAPSAICIN CABAI RAWIT (*Capsicum frutescens* L.)

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INTISARI

Cabai rawit merupakan komoditas hortikultura bernilai ekonomis tinggi dan sangat digemari masyarakat. Akan tetapi, produktivitasnya terkadang masih terbatas karena adanya kendala akibat penurunan kesuburan tanah, ketidakseimbangan unsur hara, dan faktor lingkungan. Pendekatan pertanian dengan pemupukan bahan organik dan nano diperlukan untuk mendukung praktik pertanian berkelanjutan dan ramah lingkungan, seperti aplikasi asam humat, *biofertilizer*, dan nano silika. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian asam humat, *biofertilizer,* dan nano silika terhadap pertumbuhan dan kadar capsaicin cabai rawit (*Capsicum frutescens* L.) serta mengamati pengaruh faktor lingkungan terhadap pertumbuhan cabai rawit (*Capsicum frutescens* L.). Penelitian dilaksanakan di demplot penelitian Banteng, Sinduharjo, Kabupaten Sleman dengan enam perlakuan. Perlakuan terdiri dari aplikasi *biofertilizer* dosis 10 L/ha, aplikasi asam humat dosis 50 L/ha, aplikasi nano silika dosis 3 kg/ha, kombinasi *biofertilizer* dengan asam humat, kombinasi *biofertilizer* dengan nano silika, serta kombinasi asam humat dengan nano silika. Hasil penelitian menunjukkan bahwa perlakuan *biofertilizer* dosis 10L/ha merupakan dosis efektif untuk meningkatkan pertumbuhan cabai rawit meliputi tinggi tanaman, jumlah buah, berat buah, biomassa basah, biomassa kering, dan rasio tajuk akar. Perlakuan kombinasi asam humat dengan nano silika efektif untuk meningkatkan jumlah daun. Perlakuan nano silika efektif mempercepat waktu berbuah. Perlakuan asam humat menghasilkan kadar capsaicin tertinggi yaitu 4,517,39 mg/kg, perlakuan *biofertilizer* menghasilkan kadar capsaicin 2,357,37 mg/kg, dan perlakuan nano silika menghasilkan kadar capsaicin 1,280,28 mg/kg. Faktor lingkungan berupa intensitas cahaya paling berpengaruh terhadap pertumbuhan cabai rawit.

Kata kunci: asam humat, *biofertilizer,* capsaicin, nano silika.

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EFFECTIVITY OF HUMIC ACID, BIOFERTILIZER, AND NANO SILICA ON THE GROWTH AND CAPSAICIN LEVELS OF CHILI PEPPER (*Capsicum frutescens* L.)

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ABSTRACT

Chili pepper are a horticultural commodity with high economic value and are highly sought after by the public. However, their productivity is sometimes limited due to constraints resulting from decreased soil fertility, nutrient imbalances, and environmental factors. Agricultural approaches using organic and nano-fertilization are needed to support sustainable and environmentally friendly agricultural practices, such as the application of humic acid, biofertilizer, and nano-silica. This study aims to determine the effect of humic acid, biofertilizer, and nano-silica on the growth and capsaicin content of chili peppers (*Capsicum frutescens* L.) and to observe the effect of environmental factors on the growth of chili peppers (*Capsicum frutescens* L.). The study was conducted in the Banteng research demonstration plot, Sinduharjo, Sleman Regency with six treatments. The treatments consisted of biofertilizer application at a dose of 10 L/ha, humic acid application at a dose of 50 L/ha, nano-silica application at a dose of 3 kg/ha, a combination of biofertilizer with humic acid, a combination of biofertilizer with nano-silica, and a combination of humic acid with nano-silica. The results showed that the biofertilizer treatment dose of 10L/ha was an effective dose to increase the growth of chili pepper including plant height, number of fruits, fruit weight, wet biomass, dry biomass, and root crown ratio. The combination treatment of humic acid with nano silica is effective in increasing the number of leaves. Nano silica treatment was effective in accelerating fruiting time. Humic acid treatment produced the highest capsaicin content of 4,517.39 mg/kg, biofertilizer treatment produced capsaicin content of 2,357.37 mg/kg, and nano silica treatment produced capsaicin content of 1,280.28 mg/kg. Environmental factors in the form of light intensity had the most influence on the growth of chili pepper.

Keywords: biofertilizer, capsaicin, humic acid, nano-silica.