

ABSTRAK

Produktivitas agrikultur terancam menurun akibat peningkatan ekstremitas cuaca dan iklim akibat pemanasan global. Curah hujan yang mendadak tinggi maupun rendah menjadi hambatan dalam penyerapan nutrisi bagi tanaman yang berkembang maupun berbuah. Untuk mengatasi masalah tersebut, penggunaan pupuk sering digunakan, namun dalam jumlah banyak terakumulasi sebagai polusi nutrisi. Sebagai solusinya, hydrogel mampu mengunci air dan nutrisi dalam jangka waktu dan gangguan yang terukur selama kekeringan dan hujan deras. Sebagai solusi nutrisi bagi tanaman, C-dots bekerja dalam memicu penyerapan nutrisi oleh tanaman. Dengan menggabungkan dua nanomaterial tersebut, CANOGEL disintesis untuk mendukung aktivitas agrikultur dalam metode pertanian konvensional. Hydrogel disintesis dengan menerapkan proses crosslinking fisis Freeze-Thawing pada larutan Air-PVA berkonsentrasi 24% pada suhu 0°C selama 20 jam, dan thawing suhu ruangan selama 4 jam. Adapun C-dots disintesis melalui pemanasan hydrothermal larutan pigmen antosianin dari kulit manggis dan urea pada suhu 250°C selama 30 menit. CANOGEL mampu menahan air dengan peningkatan durasi 312,5% dan meningkatkan laju pertumbuhan tanaman sebanyak 15%

Kata kunci : Carbon Nanodots, PVA Hydrogel, Freeze-Thaw, Planting Medium

ABSTRACT

Agricultural productivity is threatened to decline due to increased weather and climate extremities due to global warming. Sudden high and low rainfall becomes an obstacle in the absorption of nutrients for plants that develop and bear fruit. To solve the problem, the use of fertilizers is often used, but in large quantities accumulates as nutrient pollution. As a solution, hydrogels are able to lock in water and nutrients within measurable periods of time and disruption during droughts and heavy rainfall. As a nutrient solution for plants, C-dots work in triggering nutrient absorption by plants. By combining the two nanomaterials, CANOGEL was synthesized to support agricultural activities in conventional farming methods. Hydrogel was synthesized by applying the Freeze-Thawing physical crosslinking process to a 24% concentrated Water-PVA solution at 0°C for 20 hours, and room temperature thawing for 4 hours. The C-dots were synthesized through hydrothermal heating of anthocyanin pigment solution from mangosteen peel and urea at 250°C for 30 minutes. CANOGEL is able to retain water with an increase in duration of 312.5% and increase plant growth rate by 15%

Keywords: Carbon Nanodots, PVA Hydrogel, Freeze-Thaw, Planting Medium