

## ABSTRAK

Instalasi Pengolahan Air Limbah (IPAL) Sijenjang merupakan fasilitas pengolahan limbah domestik di Kota Jambi yang menghasilkan residu berupa lumpur (sludge). Sludge tersebut berpotensi mencemari lingkungan jika tidak dikelola, namun di sisi lain mengandung unsur hara makro seperti Nitrogen (N), Fosfor (P), dan Kalium (K) yang bermanfaat bagi tanaman. Penelitian ini bertujuan untuk mengetahui kualitas media tanam dari campuran sludge IPAL dan kompos berdasarkan kandungan NPK, serta mengetahui pengaruh perbandingan komposisinya terhadap pertumbuhan tanaman bayam (*Amaranthus sp.*).

Penelitian eksperimen ini menggunakan lima variasi perbandingan media tanam antara sludge dan kompos, yaitu E1 (100:0), E2 (75:25), E3 (50:50), E4 (25:75), dan E5 (0:100). Parameter yang diamati meliputi karakteristik kimia media (kadar air dan NPK) serta pertumbuhan vegetatif tanaman (tinggi tanaman dan jumlah daun) selama 28 hari.

Hasil penelitian menunjukkan bahwa campuran sludge dan kompos berpengaruh nyata terhadap kualitas hara media. Perlakuan E3 (50% sludge + 50% kompos) memberikan kualitas terbaik dengan kandungan N total tertinggi sebesar 2,48% dan Fosfor (P) tertinggi sebesar 0,11%. Sementara itu, kandungan Kalium (K) tertinggi ditemukan pada perlakuan E5 (100% kompos) sebesar 3,53%. Secara keseluruhan, pertumbuhan tinggi tanaman dan jumlah daun terbaik ditunjukkan oleh perlakuan E1, E2, dan E3, terutama pada pengamatan hari ke-21 hingga ke-28. Sebaliknya, perlakuan E4 dan E5 menghasilkan pertumbuhan terendah dikarenakan kurangnya Nitrogen (N) yang berfungsi untuk merangsang pertumbuhan tanaman secara keseluruhan terutama batang, cabang dan daun. Dapat disimpulkan bahwa pemanfaatan sludge IPAL dengan komposisi seimbang E2 (sludge 75%:kompos 25%) sangat efektif untuk meningkatkan kesuburan media tanam.

**Kata Kunci:** Sludge IPAL, Media Tanam, Bayam, Nitrogen, Fosfor, Kalium.

## ABSTRACT

The Sijenjang Wastewater Treatment Plant (WWTP) is a domestic waste treatment facility in Jambi City that produces residues in the form of sludge. The sludge has the potential to pollute the environment if not managed, but on the other hand it contains macronutrients such as Nitrogen (N), Phosphorus (P), and Potassium (K) that are beneficial to plants. This study aims to determine the quality of the planting medium from the mixture of WWTP sludge and compost based on NPK content, as well as to determine the effect of its composition comparison on the growth of spinach plants (*Amaranthus* sp.).

This experimental research used five variations of the comparison of planting media between sludge and compost, namely E1 (100:0), E2 (75:25), E3 (50:50), E4 (25:75), and E5 (0:100). The observed parameters included the chemical characteristics of the medium (moisture content and NPK) and plant vegetative growth (plant height and number of leaves) for 28 days.

The results of the study showed that the mixture of sludge and compost had a real effect on the quality of the nutrient media. The E3 treatment (50% sludge + 50% compost) provides the best quality with the highest total N content of 2.48% and the highest Phosphorus (P) of 0.11%. Meanwhile, the highest Potassium (K) content was found in the E5 treatment (100% compost) at 3.53%. Overall, the plant's high growth and best leaf count were indicated by the E1, E2, and E3 treatments, especially at observations on days 21 to 28. In contrast, the E4 and E5 treatments produce the lowest growth due to the lack of Nitrogen (N) which functions to stimulate the overall growth of the plant, especially the stems, branches and leaves. It can be concluded that the use of WWTP sludge with a balanced composition of E2 (75% sludge: 25% compost) is very effective in increasing the fertility of the planting medium.

**Keywords:** WWTP sludge, planting media, spinach, nitrogen, phosphorus, potassium.