

THE EFFECT OF TAPE, TEMPE, AND BREAD YEAST AS BIOACTIVATORS ON NITROGEN, PHOSPHORUS, AND POTASSIUM LEVELS IN LIQUID ORGANIC FERTILIZER

Nurlelah¹, Siti Hani Istiqomah², Adib Suyanto³

^{1,2,3} Department of Environmental Health Poltekkes Kemenkes Yogyakarta
Tatabumi Street No.3 Banyuraden, Gamping, Sleman
E-mail: nurlelah181309@gmail.com

ABSTRACT

Background: The closure of the Piyungan Landfill has triggered indiscriminate littering among the Yogyakarta community. Data from the 2024 National Waste Management System (SIPSN) indicates that waste generation in the Special Region of Yogyakarta (DIY) reached 702,140 tons/year, with 52.13% being organic waste, predominantly originating from markets. Fruit and vegetable waste production at Kranggan Market can reach 2,100–5,600 kg/day. Unprocessed organic waste has the potential to pollute the environment and endanger health. The production of Liquid Organic Fertilizer (POC) rich in nitrogen, phosphorus, and potassium (NPK) can be implemented as an effort to address this problem. The addition of yeast bioactivators can support the activity of microorganisms in the POC fermentation.

Objective: To determine the effect of various yeast types as bioactivators on NPK levels in POC.

Method: This study was a quasi-experimental study with a post-test only with control group design. The study was conducted from April to July 2025 with four treatment groups and three replications. Data analysis used one-way ANOVA and post-hoc tests.

Results: This study found that the average levels of nitrogen, phosphorus, and potassium in each treatment were 0.001447%; 0.000007%; 0.001382% in the tape yeast treatment, 0.000536%; 0.000008%; 0.001509% in the tempe yeast treatment, 0.001017%; 0.000129%; 0.00152% in the bread yeast treatment, and 0.000299%; 0.000008%; and 0.001237% in the control group. The NPK levels of the POC did not meet the SNI 19-7030-2004 quality standards because they were below 0.4% for nitrogen, 0.1% for phosphorus, and 0.2% for potassium. However, it was found that the tape yeast bioactivator affected nitrogen levels ($p < 0,001$) and bread yeast increased phosphorus levels ($p < 0,003$). In contrast, tempe yeast did not significantly affect NPK levels and potassium levels are not influenced by the type of yeast bioactivator.

Conclusion: Tape yeast affected nitrogen levels, bread yeast affected phosphorus levels, while tempe yeast did not affect NPK levels, and potassium levels in the POC were not affected by the yeast bioactivator.

Keywords: LOF; NPP; organic market waste; yeast bioactivator

**PENGARUH RAGI TAPE, TEMPE, DAN ROTI SEBAGAI
BIOAKTIVATOR TERHADAP KADAR NITROGEN,
FOSFOR, DAN KALIUM DALAM PUPUK
ORGANIK CAIR**

Nurlelah¹, Siti Hani Istiqomah², Adib Suyanto³

^{1,2,3} Jurusan Kesehatan Lingkungan Poltekkes Kemenkes Yogyakarta
Jl. Tatabumi No.3 Banyuraden, Gamping, Sleman
E-mail: nurlelah181309@gmail.com

ABSTRAK

Latar Belakang: Penutupan TPST Piyungan memicu perilaku membuang sampah sembarangan di kalangan masyarakat Yogyakarta. Data SIPSN 2024 menyatakan bahwa timbulan sampah di DIY mencapai 702.140 ton/tahun, dengan 52,13% merupakan sampah organik yang dominan berasal dari pasar. Produksi sampah buah dan sayur di Pasar Kranggan dapat mencapai 2.100–5.600 kg/hari. Sampah organik yang tidak diolah berpotensi mencemari lingkungan dan membahayakan kesehatan. Pembuatan Pupuk Organik Cair (POC) yang kaya nitrogen, fosfor dan kalium (NPK) dapat dilakukan sebagai upaya untuk menanggulangi permasalahan tersebut. Penambahan bioaktivator ragi dapat dilakukan untuk mendukung aktivitas mikroorganisme dalam fermentasi POC.

Tujuan: Mengetahui pengaruh variasi jenis ragi sebagai bioaktivator terhadap kadar NPK dalam POC.

Metode: Jenis penelitian ini adalah *Quasi Eksperimen* dengan desain penelitian *Post-test Only with Control Group*. Penelitian dilaksanakan pada bulan April-Juli 2025 dengan 4 kelompok perlakuan 3 kali pengulangan. Analisis data menggunakan *One-Way ANOVA* dan *Post Hoc Test*.

Hasil: Pada penelitian ini diketahui bahwa rata-rata kadar nitrogen, fosfor, dan kalium pada setiap perlakuan, yaitu 0,001447%; 0,000007%; 0,001382% pada perlakuan ragi tape, 0,000536%; 0,000008%; 0,001509% pada perlakuan ragi tempe, 0,001017%; 0,000129%; 0,00152% pada perlakuan ragi roti, dan 0,000299%; 0,000008%; dan 0,001237% pada kelompok kontrol. Kadar NPK POC tersebut belum memenuhi standar baku mutu SNI 19-7030-2004 karena dibawah 0,4% untuk nitrogen, 0,1% untuk fosfor dan 0,2% untuk kalium. Namun diketahui bahwa bioaktivator ragi tape berpengaruh terhadap kadar nitrogen (p 0,001) dan ragi roti meningkatkan kadar fosfor (p 0,003). Sebaliknya, ragi tempe tidak berpengaruh signifikan terhadap kadar NPK dan kadar kalium tidak dipengaruhi oleh jenis bioaktivator ragi.

Kesimpulan: Ragi tape berpengaruh terhadap kadar nitrogen, ragi roti berpengaruh terhadap kadar fosfor, sedangkan ragi tempe tidak berpengaruh terhadap kadar NPK, serta kadar kalium dalam POC tidak dipengaruhi oleh bioaktivator ragi.

Kata Kunci: POC; NPK; sampah organik pasar; bioaktivator ragi