

## **ABSTRACT**

### **THE EFFECT OF ADDING NPK FERTILIZER AND TAPIOCA FLOUR ON CHARACTERISTICS OF ORGANIC FERTILIZER PELLETS USED BY OPEFB OF USED MUSHROOMS AND OTHER AGRICULTURAL WASTE MEDIA**

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Oil palm empty fruit bunches (OPEFB) used as medium for straw mushrooms can be used as organonitrophos fertilizer based on local resources with raw materials from other agricultural wastes such as cow dung, chicken manure, coconut coir powder, MSG industrial waste, and husk charcoal. Organonitrophos fertilizer has a weakness, namely it has a nutrient content that is still insufficient for plant needs, especially for food crops and fruitful horticulture, therefore it needs to be combined with inorganic fertilizers. This research tries to combine OPEFB organonitrophos fertilizer and NPK fertilizer added with tapioca flour with the aim of producing different levels of solubility so that pellet fertilizer can be applied only once at the beginning of planting but according to its solubility, pellet fertilizer will break down and release nutrients alternately. This research was conducted with two factors, namely tapioca flour with three levels of 0%; 7.5%; 15% and NPK fertilizer with three levels of 0%, 3% and 6%. The material used in this study was organic fertilizer from the results of the experiment where the empty fruit bunches of oil palm were initially used as a growth medium for edible mushroom, after the cultivation experiment was completed, the empty fruit bunches of the former edible mushroom media were continued to be used as a mixture in the production of Organonitrophos fertilizer, other ingredients, namely NPK fertilizer and tapioca flour. Compost fertilizer that has been mixed with NPK fertilizer and tapioca flour is then added with sufficient water. The next process is making pellets with an extruder machine. The pellet fertilizer was then tested for density (bulk density and particle density), impact resistance, vibration resistance, compressive strength, pH, hygroscopicity,

and solubility. Each experiment was carried out with three replications. The results showed that tapioca flour and NPK fertilizer had a significant effect on several physical properties of pellet fertilizer, namely in bulk density (465.85 – 577.09 kg/m<sup>3</sup>), impact resistance (27.27 – 83.84%) and pH (6 ,29 – 8.44). From the experimental results obtained pellet fertilizer with 15% tapioca flour and 6% NPK fertilizer (T2N2) produced the highest solubility and 0% tapioca flour content and 0% NPK fertilizer (T0N0) produced the lowest solubility.

**Keywords** : OPEFB, Pellet fertilizer, Nutrition, Solubility

## **ABSTRAK**

### **PENGARUH PENAMBAHAN PUPUK NPK DAN TEPUNG TAPIOKA TERHADAP KARAKTERISTIK PUPUK ORGANIK PELET BERBAHAN BAKU TKKS BEKAS MEDIA JAMUR MERANG DAN LIMBAH PERTANIAN YANG LAIN**

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Tandan kosong kelapa sawit (TKKS) bekas media jamur merang dapat dijadikan pupuk organonitrofos berbasis sumberdaya lokal dengan berbahan baku hasil dari limbah pertanian lainnya seperti kotoran sapi, kotoran ayam, serbuk sabut kelapa, limbah industri MSG, dan arang sekam. Pupuk organonitrofos memiliki kelemahan, yaitu memiliki kandungan hara yang masih kurang mencukupi kebutuhan tanaman terutama untuk tanaman pangan dan hortikultura yang berbuah oleh sebab itu perlu dikombinasikan dengan pupuk anorganik. Penelitian ini mencoba untuk melakukan penggabungan pupuk organonitrofos TKKS dan pupuk NPK ditambah dengan tepung tapioka dengan tujuan menghasilkan tingkat kelarutan yang berbeda sehingga pupuk pelet dapat diaplikasikan sekali saja pada masa awal tanam tetapi sesuai kelarutannya pupuk pelet akan hancur dan melepaskan nutrisi secara bergantian. Penelitian ini dilakukan dengan dua faktor yaitu tepung tapioka dengan tiga taraf 0%; 7,5%; 15% dan pupuk NPK dengan tiga taraf 0%, 3% dan 6%. Bahan yang digunakan pada penelitian ini adalah pupuk organik dari hasil percobaan dimana tandan kosong kelapa sawit awalnya digunakan sebagai tempat pertumbuhan media jamur merang, setelah percobaan budidaya selesai tandan kosong kelapa sawit bekas media jamur merang dilanjut digunakan untuk campuran dalam produksi pupuk Organonitrofos, bahan lainnya yaitu pupuk NPK dan tepung tapioka. Pupuk kompos yang sudah dilakukan perlakuan pencampuran dengan pupuk NPK dan tepung tapioka kemudian ditambahkan air secukupnya. Proses selanjutnya yaitu pembuatan pelet dengan mesin *extruder*. Pupuk pelet kemudian diuji massa jenis (massa jenis curah dan massa jenis partikel), ketahanan benturan, ketahanan getar, kuat tekan, pH, higroskopisitas, dan kelarutan. Setiap percobaan dilakukan dengan tiga ulangan.

Hasil penelitian menunjukkan tepung tapioka dan pupuk NPK berpengaruh nyata terhadap beberapa sifat fisik pupuk pelet yaitu pada massa jenis curah (465,85 – 577,09 kg/m<sup>3</sup>), ketahanan benturan (27,27 – 83,84%) dan Ph (6,29 – 8,44). Dari hasil percobaan diperoleh pupuk pelet dengan kandungan tepung tapioka 15% dan pupuk NPK 6% (T2N2) menghasilkan kelarutan tertinggi dan kandungan tepung tapioka 0% dan pupuk NPK 0% (TON0) menghasilkan kelarutan terendah.

**Kata Kunci :** TKKS, Pupuk pelet, Nutrisi, Kelarutan