

**PA-104**

**Nitrogen (N) Use Efficiency and Yield in Rice under Varying Types and Rates of N Source**

Woo-Jin Kim<sup>1</sup>, Jwakyung Sung<sup>1\*</sup>

<sup>1</sup>Dept. of Crop Science, Chungbuk National University, Cheongju 28644, Korean

**[Introduction]**

Organic composts derived from livestock manure, food waste and etc. have been used to take an advantage soil improvement as well as crop yield on a nation scale. However, the occurrence of organic wastes is reported to often exceed the carrying capacity in agricultural land. In this study, we evaluated yield of rice and nitrogen use efficiency (NUE) affected by the type of organic composts and application rates.

**[Materials and Method]**

Rice seedlings (cv. Saechucheongbyeon) were transplanted in the experimental station of Chungbuk National University at late May in 2019. The study consisted of nine treatments and the type and rate of nitrogen (N) sources was as follows: T1 - No N fertilizer; T2 - 100% Chemical fertilizer (CF) of standard recommendation; T3 - 100% CF of soil-testing recommendation; T4 ~ T6 - 100, 150 and 300% livestock manure compost (LMC) as an alternative N by soil-testing recommendation; and T7 ~ T9 - 100, 150 and 300% compost including food waste and livestock manure (FW-LMC) as an alternative N by soil-testing recommendation. The rice cultivation practices such as irrigation, insecticides and herbicides followed a rural development administration (RDA, Korea) guide.

**[Results Discussion]**

The yield of rice was significantly higher in the fertilized compared to the control, and it was derived from the increase in panicle (per plant), spikelet (per panicle) and filled grain rate. Excess application rates (1.5 and 3.0 times stronger) showed decreasing trend of filled grain rate in both LMC and FW-LMC, and it is considered as a result of the competitiveness of photosynthetic product (carbohydrate) between grain and vegetative tissues. This assumption is logically supported by NUE (NupE and NutE). The nitrogen uptake efficiency (NupE) was significantly higher in FW-LMC groups, whereas the nitrogen utilization efficiency (NutE) was significantly lower in those groups. Therefore, the agronomic nitrogen use efficiency (ANUE) showed a tendency of decrease in the groups applied with organic composts. From our result, we suggest that an excess application of organic composts could result in the relatively lower NUE despite of the increase in yield of rice.

\*Corresponding author: E-mail, jksung73@chungbuk.ac.kr Tel. +82-43-261-2512