

## Effect of Nano-CuO and Nano-ZnO Micronutrient Fertilizers on Physiological Parameters of selected Rice (*Oryza sativa* L.) Varieties

Sandanayake C.L.T.<sup>1</sup>, Weerakoon S.<sup>1\*</sup>, Somaratne S.<sup>1</sup>, Karthikayan N.<sup>2</sup>

<sup>1</sup>Department of Botany, The Open University of Sri Lanka, Nawala, Nugegoda

<sup>2</sup>Department of Physics, The Open University of Sri Lanka, Nawala, Nugegoda

Rice (*Oryza sativa* L.) is the second most important staple food in the world. The expected rice yield should be increased to feed the increasing population under changing climate. Nanotechnology can play a potential role in the food security by strengthening agricultural sustainability and provide an alternative for conventional fertilizers. The proposed research was carried out to examine selected physiological parameters (plant height, number of tillers, number of leaves and chlorophyll content) of rice varieties Bg360, BW364, *Kaluheenati* and *Kuruluthuda* under Nano-CuO, Nano-ZnO and composite of Nano ZnO-CuO micronutrient fertilizers. Nano-micronutrient fertilizers were synthesized by the Sol-gel method and thermal decomposition method and applied as a foliar spray at concentrations of 30mg L<sup>-1</sup> (T1), 60mg L<sup>-1</sup> (T2), and 120mg L<sup>-1</sup> (T3) and double deionized water served as control (T0). These nano-fertilizers were applied during the bearing stage [at 48-58 days after sowing (DAS)] and filling stage of grains [100-105DAS]. Physiological parameters were recorded at 30DAS, 60DAS and 90DAS. The experimental design was a complete randomized block design (CRDB) with three blocks and five replicates in each block. Data were subjected to descriptive analysis-mean, standard deviation and a MANOVA to assess the significance between the treatments. Data analysis was performed using SPSS v.20. The physiological parameters of the selected rice varieties significantly ( $p \leq 0.05$ ) increased with application of nano-fertilizers. The most effective concentrations for all four parameters were Nano-ZnO 60 mg L<sup>-1</sup>, Nano CuO 120 mg L<sup>-1</sup> and Nano Composite (ZnO-CuO) 60 mg L<sup>-1</sup>. However, depending on each rice variety, the most effective concentration of Nano-ZnO Nano-CuO and Nano-ZnO-CuO differ. The interactions between the nano-fertilizer treatments and the rice varieties clearly showed a significant ( $p \leq 0.05$ ) effect on number of tillers and chlorophyll content. Yield parameters are also important to evaluate the complete effect of Nano-CuO and Nano-ZnO micronutrient fertilizers on growth and yield of rice varieties.

**Key words:** Rice, SMART- Nano micronutrient-fertilizers, *Oryza sativa*

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\*Corresponding author: srwee@ou.ac.lk