

## ABSTRACT

In 2024, rice production in Indonesia will decrease by around 1.32 million tons of GKG or 2.45%. This must be balanced with a solution in the form of BIOLIK : Innovation of Nanosilica from Mangrove Litter (*Rhizophora mucronata*) by the Sol-Gel Method as Bio-Leaching of Silica Nutrients in Rice Plants (*Oryza sativa* L.). This study aims to determine the effectiveness of nanosilica as a SiO<sub>2</sub> nutrient in rice plants. The method used in this study is the quantitative descriptive data analysis method. The process of making nanosilica uses three treatments with three different levels so that 9 experimental results are obtained, namely F1 = 1:5; F2 = 2:5; and F3 = 3:5. The best bio-leaching test results on day 5 with a stable but effective decrease in the number of spores in silica extraction with a percentage of 93% and metal content of Fe 0.85 ppm, Al 0.02 ppm, Ca 0.12 ppm, and Mg 0.05 ppm. The results of SEM, FTIR, XRD tests on nanosilica show that the F3 formulation is the best formulation because the number of absorption bands is larger, has a morphology that is in accordance with the characteristics of nanosilica and the diffraction peak is found at  $2\theta = 22^\circ$  with an amorphous phase that is good for application to plants. The application of nanosilica to rice plants for 7 days can increase the physical size of the plant, as evidenced by the difference between F0 and F3, the difference in chlorophyll is 2.3 µg/ml, the root length is 1.9 cm, the stem length is 2.0 cm, the leaf length is 2.2 cm, and the plant height is 3.0 cm.

*Keywords: Nanosilica, Mangrove Litter (Rhizophora mucronata), Sol-Gel Method, Bio-Leaching.*