

## Quality and antioxidant activity of rice grown on alluvial soil amended with Zn, Cu and Mo

### ABSTRACT

Insufficient micronutrients are a common phenomenon in Malaysian soils derived from riverine alluvium, which affect the growth and quality of rice. A study was conducted on such soils at Kelantan, Malaysia to evaluate the effects of applying Zn (5kg ha<sup>-1</sup>), Cu (4kg ha<sup>-1</sup>) and Mo (0.5kg ha<sup>-1</sup>) along with the recommended N, P, K and S at 120, 30, 50, 10kg ha<sup>-1</sup>, respectively on rice plant growth, grain yield, quality and antioxidant activity. Any single micronutrient or in combination with macronutrients had positive effects on the growth, chlorophyll contents, grain quality, and protein content of rice. Application of micronutrients increased phenolic compound by 40% and flavonoid content by 71.54% in rice grain compared to the control, particularly, Zn and Cu had positive effects on grain protein percentage. Furthermore, the application of micronutrients increased Zn, Mo, and Cu content in grain and straw. Higher values of antioxidant activities were found in the de-husked grain compared to those of the milled rice in micronutrient applied treatments. The application of the micronutrients to the riverine alluvium soil enhanced rice yield by 18% via uptake of nutrients, attributed to increased physiological performance, leading to higher harvest index and grain quality.

**Keyword:** Amylose; Antioxidant activities; Flavonoid; Phenolic; Protein; Grain quality