

**Influence of oil palm empty fruit bunch biochar on floodwater pH and yield components of rice cultivated on acid sulphate soil under rice intensification practices**

ABSTRACT

Rice has a vital role in food security but the production is limited in infertile and degraded soils. Rice is cultivated on acid sulphate soil in the coastal area of Peninsular Malaysia. Soil amendment using biological charcoal (biochar) increases the soil fertility. Thus, empty fruit bunch biochar (EFBB) was applied in a pot experiment under a controlled environment using an organic system of rice intensification (SRI) practice and its effects on the floodwater pH, acid sulphate soil properties and growth performance of rice and yield of rice MR219 were preliminarily investigated. EFBB increased grain yield by 141 to 472%. Plant growth and yield parameters in EFBB amended soils were significantly higher than in soil without biochar. The number of tillers increased significantly with the increase in biochar applied; 28 tillers were produced in the control, while up to 80 tillers were produced in the plots applied 40 t ha<sup>-1</sup> EFBB. Moreover, the decline of Al<sup>3+</sup> in flood water indicated that EFBB mitigated Al<sup>3+</sup> toxicity. Soil water pH increased from 3.5 to 6 with increasing EFBB application rates. The grain yield was linearly correlated to the application rate of EFBB. This pot study demonstrates that the application of EFBB combined with organic fertilization and intermittent irrigation has the potential to improve rice yield on acid sulphate soil. Further study in the field is warranted to determine the effect of EFBB on large scale rice production.

**Keyword:** Al<sup>3+</sup> toxicity; Biochar; Floodwater pH; Organic fertilization; Rice; System of rice intensification