

Biostimulant effects of brown seaweed extract (*Sargassum polycystum*) on the growth and yield of pigmented upland rice (*Oryza sativa* cv Tadong)

ABSTRACT

Seaweed and its derivatives serve as natural sources of bioactive compounds widely used as biostimulants in agricultural practices to augment plant growth and boost productivity. Tadong rice, a pigmented upland rice variety, is becoming increasingly favoured by consumers in Malaysia, attributed to its perceived health benefits. However, limited commercialization of Tadong rice is attributed to its low grain yield. The present work aimed to address these concerns by utilizing plant biostimulants derived from seaweed, which represents a more environmentally friendly alternative. Seaweed extract (SE) of a brown seaweed species (*Sargassum polycystum*) was applied to Tadong rice plants at different concentrations (20, 40, 60, and 80%) via foliar application, along with the recommended dose of fertilizer (RDF) in an insectproof net house. Additionally, one commercial liquid biofertilizer and one control treatment (distilled water) were tested for comparison. The growth and yield of Tadong rice were evaluated along with numerous variables. The results demonstrated that *S. polycystum* at a 20% concentration had a favorable impact on several growth and yield parameters of Tadong rice. The treatment increased plant height, flag leaf length, flag leaf width, tiller number, panicle number/plant, 1000-grain weight, and yield/plant of Tadong rice (5.73 to 44.11% higher) compared to the control treatment. This study demonstrates that applying SE through foliar applications can boost the growth and yield of pigmented upland rice, providing advantages for upland rice farmers and making a positive contribution to sustainable agriculture and food security. The use of the 20% concentration of SE is particularly notable from an economic perspective, as it achieves these benefits with a lower amount of material compared to higher concentration.