

## **Development of liquid enhancer for germination of drought-stressed *Oryza sativa* subsp. *indica* Seed cv. MR284**

### **ABSTRACT**

**Aim:** This study was conducted to develop liquid enhancer containing KCl, TU, GA, and SA for germination of drought-stressed *Oryza sativa* subsp. *indica* cv. MR284 seed.

**Study Design:** All experiments were conducted in a completely randomized design. Two steps were involved in the development process which are to select an ideal concentration for each KCl, TU, GA, and SA, and to find an ideal combination of chemicals from the selection of ideal concentrations acquired in step 1 to form liquid enhancer. There were 20 treatments for step 1 and 9 treatments for step 2. All of these treatments with 6 replicates.

**Place and Duration of Study:** Department of Biology, Faculty of Science, University Putra Malaysia, between June 2018 and December 2018.

**Methodology:** The sterilized rice seed cv. MR284 was stressed in the -1.2 Mpa PEG 6000 solution for three days and germinated in the KCl, TU, GA, and SA solution in a series of concentration for 10 days, in a controlled room. Seed germination was observed daily.

**Results:** In the first step, drought-stressed rice seed showed the best germination performance in the 30 mM of KCl, 2.0 mM of TU, 0.24 mM GA, and 0.5 mM SA. Meanwhile, in the second step, the drought-stressed rice seed showed the best germination performance in the combination of 30 mM KCl + 2.0 mM TU + 0.24 mM GA + 0.5 mM SA. The best germination performance was evaluated by the highest germination percentage (%), germination index, seed vigor, leaf length, root length and biomass.

**Conclusion:** Therefore, the combination treatments of 30 mM KCl + 2.0 mM TU + 0.5 mM SA was found to be the most effective and simplest liquid enhancer formula that has an ability to enhance seed germination of drought-stressed rice cv. MR284 seed.

**Keyword:** Liquid enhancer; Drought-stressed seed; Germination; Seed vigor; *Oryza sativa* subsp; *Indica* cv; MR284