Anna Pick Kiong LING, Ying Chian UNG, Sobri HUSSEIN, Abdul Rahim HARUN,Atsushi TANAKA, Hase YOSHIHIRO, 2013. Morphological and biochemical responses of *Oryza sativa* L. (cultivar MR219) to ion beam irradiation. *Journal of Zhejiang University-Science B (Biomedicine & Biotechnology*), 14(12):1132-1143. [doi:10.1631/jzus.B1200126]

Morphological and biochemical responses of *Oryza sativa* L. (cultivar MR219) to ion beam irradiation

Key words: In vitro mutagenesis, Ion beam irradiation, Total chlorophyll content, Total soluble protein content, Mutation breeding

- Heavy ion beam, which has emerged as a new mutagen in the mutation breeding of crops and ornamental plants, is expected to result in the induction of novel mutations.

- This study investigates the morphological and biochemical responses of *Oryza sativa* toward different doses of carbon ion beam irradiation.

- In this study, the dry seeds of *O. sativa* were irradiated at 0, 20, 40, 60, 80, 100, and 120 Gy, followed by in-vitro germination under controlled conditions.

- Morphological and biochemical studies were conducted to investigate the morphological and physiological responses of *O. sativa* towards ion beam irradiation

- The study demonstrated that low doses (10 Gy) of ion beam have a stimulating effect on the height, root length, and fresh weight of the plantlets but not on the number of leaves.

- The highest total soluble protein content was observed in plantlets irradiated at 20 Gy.

- All irradiated plantlets were found to have 0.85% to 58.32% higher specific activity of peroxidase as compared to the control samples.

- Low doses of ion beam (10 and 20 Gy) had negligible effect on the total chlorophyll content of *O. sativa* plantlets while 40 Gy had a stimulating effect on the chlorophyll content.

- This study concludes that carbon ion beam irradiation administered at low to moderate doses of 10 to 40 Gy may induce *O. sativa* mutants with superior characteristics.