

Studies on the effectiveness of acute gamma and ion beam irradiation in generating flower colour mutation for *Chrysanthemum morifolium*

ABSTRACT

Chrysanthemum morifolium is an important temperate cut flower and potted plant for Malaysian local market and exporter. Considering chrysanthemum as a popular vegetatively propagated ornamental plant, induce mutations for breeding purposes are more beneficial. Several of physical mutagens have been used in mutation breeding including x-rays, gamma rays and ion beams. Gamma rays and ion beams are from two different linear energy transfer (LET) which are low and high, respectively. The objective of this study was to compare the effectiveness of acute gamma and ion beam irradiation in generating flower colour mutations on nodal explants of *Chrysanthemum morifolium* cv. Reagan Red. The nodal explants were irradiated with acute gamma (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110 and 120 Gy) and ion beam (0, 0.5, 1.0, 2.0, 3.0, 5.0, 8.0, 10, 15, 20 and 30 Gy). The optimal dose for in vitro shoot regeneration using acute gamma was in the range of 10 to 15.0Gy and for ion beam was between 3.5 to 4.0Gy. Relative biological effectiveness for ion beam was found 3.75 higher than the acute gamma. The regenerated plantlets were planted in the greenhouse at MARDI, Cameron Highland for morphological screening. The highest frequency of flower colour mutation for acute gamma was 77.8% whilst for ion beam were between 42.3 to 58.3%.

Keyword: Acute gamma; *Chrysanthemum*; Flower colour mutation; Ion beam; Nodal explants; Shoot regeneration