

Jureeporn Srimai 2011: Induction of Genetic Variation in *Curcuma xanthorrhiza* Roxb. by Polypoidy and Mutagenesis. Master of Science (Agricultural Biotechnology), Major Field : Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Sontichai Chanprame, Ph.D. 59 pages.

Induction of genetic variation in *Curcuma xanthorrhiza* Roxb. was carried out. *C. xanthorrhiza* Roxb. was cultured *in vitro* on solid MS medium supplemented with 5 mg/l BA. The cultures were subjected to acute irradiation with gamma rays at 0, 1, 2, 3, 4, 5, 6, 7 and 8 krad. It was found that LD_(50,60d) was 5.13 krad. The irradiated plants were then transferred to pots. At 3 krad of irradiation, the color of leaf sheath of 2 plants turn to red color. In the experiment of colchicine treatment, the plants were treated with 0.1 or 0.2 % colchicine for 24 or 48 hr. It was found that the average number of stomata per unit area were 8.56, 7.00, 6.56, 6.56 and 6.56 for 0, 0.1 or 0.2 % colchicine for 24 hr and 0.1 or 0.2 % colchicine for 48 hr, respectively. The stomatal size of colchicine treated plants was also larger than the normal plant. Then, nuclear content was measured by flow cytometry technique, it revealed that some plants were diploid and some were mixoploid. To determine genetic variation induced by irradiation and colchicine treatment, AFLP technique with 10 primer pairs was applied. The total of 122 DNA bands were amplified. The most polymorphic of 29 DNA bands were received from 2 krad-plant. The least polymorphic of 12 DNA bands were received from 6 krad-plant. Whereas the plants treated with colchicine showed no polymorphism. It was indicated that colchicine treatment could not induce genetic variation in *C. xanthorrhiza*. To determine secondary metabolite from one-year-old rhizomes of irradiation and colchicine treated plants, HPLC technique was used. It was found that the amount of substance was increased except the 6 and 7 krad and 0.2 % colchicines for 24 hr treated plant which possessed lower amount of the substance than that of the control. The highest average amount of substance was obtained from 3 krad-plant.

Student's signature

Thesis Advisor's signature