MUTATION BREEDING TO INCREASE GENETIC DIVERSITY IN MANGOSTEEN

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ABSTRACT

Mangosteen, a popular tropical fruit crop, is unusual in that the flowers do not produce viable pollen. There is only one cultivar of mangosteen available in Thailand, and increased genetic diversity is desirable. Traditional hybridization breeding through cross pollination is not possible so this research used mutation breeding. Mangosteen seeds were treated with 8 concentrations of the chemical mutagen ethyl methane sulfonate (EMS) and 4 concentrations of the spindle fiber inhibitor colchicine. Surviving seedlings that sprouted were grown in pots filled with planting mixture under shade. Morphological abnormalities observed included irregularly shaped leaves, asymmetrical leaves, new branches arising from the base of stem or near the top, multiple branches from one part of the stem rather than pairs, asymmetrical branching, curved stem, and recumbent growth habit. Some of the abnormalities were transient and did not persist as the plants grew new sets of leaves or branches. The maximum percentage of leaf abnormalities recorded was 50% in the EMS 0.75% group, compared to 20% in the control. The maximum percentage of unusual branching patterns recorded was 50% in the EMS 0.5% group, compared to 20% in the control. In many cases these abnormalities may not have been mutations but may have been caused by environmental conditions such as insect damage, sunburn, and crowding. For the colchicine treatment groups, 1.8% of the 0.1% colchicine group, 4.9% of the 0.25% colchicine group, 22.9% of the 0.5% colchicine group, and 15.2% of the colchicine 75% group had thick, misshapen leaves with prominent midribs, compared to 0% of the control. Ten of the thick-leaved plants had stomata guard cells that were larger than the control. Six were shown by flow cytometry to have a greater amount of DNA per cell than the control. They will be grown to maturity to observe their horticultural traits.

Keywords: apomixis, colchicine, ethyl methane sulphonate, *Garcinia mangostana*, genetic diversity, morphology, mutagen, polyploid