Pineapple and its varieties

Food & Diet

Pineapples (Ananas comosus (L.) Merr.) belongs to Bromeliaceae family. It is considered as a tropical fruit and planted in over 82 countries mostly in tropical region with warm and humid climate. Malaysia was ranked 18th in the world production of pineapple; reached about 391, 714 tonnes in 2016 and became the 8th Malaysian commodities (FAOSTAT, 2018). Pineapples can be taken in many ways either served fresh, cooked, juiced and also can be traded as canned fruit (Hossain, 2016).

There are many varieties of pineapples exists in Malaysian market such as Moris, N36, Sarawak, Moris Gajah, Gandul, Yankee, Josapine, Masapine and also MD2 which became a popular variety for cultivation (Amar et al., 2015) and Malaysian Pineapple Industry Board (MPIB) decided to promote MD2 for industrial planting. Initially, MD2 was produced by Pineapple Research Institute of Hawaii (Bartholomew et al., 2012). According to Amar et al. (2012), MD2 has a few good qualities in comparison with others such as sweeter taste, higher Vitamin C content, lower acidity, longer shelf life etc.

However, despite the advantages mentioned earlier, MD2 varieties are not missed and are susceptible to pineapple diseases especially heart rot disease caused by bacteria named Erwinia chrysanthemi (Banful et al., 2011; Ramachandran et al., 2015) which can decrease the production rate. In Malaysia itself, crop losses can reach up to 40% if infected by the heart rot disease. Bacterial heart rot is commonly observed in young pineapple tree where damages of leaves can be seen obviously. The diseases have the potential to damage the pineapple industry. Thus, to make sure the crop is suitable as a valuable source of economy, discovering new variety of MD2 which is tolerant to the disease might be an option to overcome the problem.

There are many techniques that can be used to create new variety to get the desired characteristics ranging from simple technique such as joining two different seeds to complicated techniques such as molecular breeding to get a new desired variety. Generally, the aim of those techniques is to alter plant’s genetic at DNA level. Among technique that commonly used by breeders is plant mutation breeding using gamma ray as a physical mutagen (chronic or acute irradiation) that causes point mutation which has been successfully applied to create new variety for many types of plant species. Plant mutation breeding can be applied with all types of planting materials, e. g. whole plants, usually seedlings, and in vitro cultured cells. Plant mutation breeding can be combined with plant biotechnology (in vitro culture) to speed up the process. This technique can improve crop development by generating and utilizing genetic variability through the application of mutagenic agents (Oladosu et al. 2016).

To start a mutation breeding program, dose response test or radiosensitivity test procedure must be done to obtain lethal dose 50 (LD50) and optimal doses for mutation induction. LD50 means 50% of the irradiated samples die because of irradiation (Albokari et al, 2012). Normally, LD50 can be calculated from linear regression of survival rate against treatment dose and this value is considered where high frequency of mutation occurred.