Pengaruh radiasi sinar gama terhadap keragaman genetik sorgum manis (srghum bicolor L.)

Muhammad Imam Surya, author

Abstrak

ABSTRAK
Sweet sorghum is a kind of sorghum that contains high content of sugar in its stem. Sweet sorghum has a big potential to be developed in Indonesia owing to its wide adaptation and the fact that it can be used as raw material for liquid sugar, syrup, ethanol, and also as animal feed. Sweet sorghum has not been developed in Indonesia because of lack of a sweet sorghum variety. Improvement of available sweet sorghum genotype can be done among others through plant breeding program. First step on the plant breeding program is to increase the plant genetic variability. This might be done by introduction of varieties or by breeding to create new varieties. Induced mutation using Gamma irradiation can be used to increase the genetic variability of sweet sorghum. Mutation breeding using Gamma irradiation in sweet sorghum was aimed at improving the yield and quality of sweet sorghum. This research was conducted to study the effect of Gamma irradiation on sweet sorghum growth in the M1 generation, and to estimate the optimal dose range suitably for the breeding program. Beside, the objective of this research was to evaluate the genetic variability for the purpose of plant selection in the M2 generation. Plant materials consisted of 2 sweet sorghum lines introduced from ICRISAT namely line No. 79 and No. 83. Non-saccharin sorghum of local variety Higari was used as a control. The doses of Gamma irradiation treatment were 0, 100, 200, 300, 400, 500, 600, 700, 800, 900, and 1000 Gy. The M1 plants were sown in greenhouse at PATIR-BATAN Jakarta, and then were transplanted in the experimental field at Balitbiogen, Bogor. The M2 plants were grown in the experimental field at Lubang Buaya, Jakarta. Important agronomic traits such as plant height, spike length, stem diameter, and grain weight/spike were observed. The results indicated that sorghum lines gave different response to Gamma irradiation, and all measured variables were significantly affected. Irradiation gave morphology and physiology damages on sorghum like abnormality, sterility, and lethality in the M1 generation. The increase of irradiation doses increased physiological damage. Effective doses of Gamma irradiation for sweet sorghum was to be around 400?500 Gy, and the lethal doses 50% of sweet sorghum was around 800?1000 Gy. Putative mutation sometimes could be observed in the M2 generation. The treatment of Gamma increased genetic variability of plant height, spike length, stem diameter, and grain weight/spike. The highest genetic variability was found in the dose treatment of 200?300 Gy. Within this interval dose, there might be high probability to find desirable mutants for further breeding purpose. A number of 38 plants had been selected from the M2 population as putative mutants.
<hr>