

ABSTRACT

Soybean is one of the legumes and the world's main protein and edible oil source. In Indonesia, increased production can be achieved using superior varieties, one of which is through breeding mutation. Gamma irradiation is a physical mutagen that is widely used to increase genetic diversity. This research aimed to determine the effect of gamma irradiation on the diversity of morphological and agronomic characters of soybean line M.1.1.3 in the M₁ generation. The mutation induction was carried out by treating various doses of gamma irradiation, namely 0 Gy (G0 = control), 150 Gy (G1), 250 Gy (G2), and 350 Gy (G3). Gamma irradiation was conducted at the Radiation Process Technology Research Center, Organization for Nuclear Energy Research, BRIN, Pasar Jumat, Jakarta. Field research was conducted at Gle Madat Village, Dewantara District, North Aceh Regency and Agroecotechnology Laboratory, Faculty of Agriculture, Universitas Malikussaleh. This research was conducted from October 2023 to February 2024. The total population of each treatment was 150 plants. The total plant population was 600 plants. Data analysis used the t test (paired test). Analysis was carried out using Minitab 14 software with a level of 1%. The research showed that gamma irradiation affected morphological and agronomic characters in the M.1.1.3 line. Variations in morphological characters are seen in leaf shape, leaf size, stem shape, and sterility. Agronomic diversity in the M.1.1.3 line is due to gamma irradiation treatment in the M₁ generation. The higher dose of gamma irradiation reduced germination percentage, plant height, number of productive branches, number of pods, percentage of empty pods, 100 seed weight per plant, dry seed weight per plant, seed weight per plot, and production. However, it retarded flowering and harvesting age.

Keywords: agronomy, morphology, M₁ generation, mutation induction, variation