

**Determination of Effective Dosage of Gamma
Irradiation for Seeds of the *Lycopersicon esculentum*
Miller (Tomato) Variety 'Katugastota Wilt Resistant'**

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ABSTRACT

Bacterial wilt disease caused by *Ralstonia solanacearum* is a major threat that causes significant yield losses in *Lycopersicon esculentum* Miller (tomato) growing areas of Sri Lanka. Katugastota Wilt Resistant (KWR) is a tomato variety that is field tolerant to bacterial wilt disease. However, KWR is not preferred by farmers for commercial cultivation as it does not possess desirable fruit quality traits that are appealing to the customer. Therefore, this study was carried out as the basic step of mutation breeding program to identify the effective dosage that create maximum genetic variation of different traits with the aim of improving the fruit traits of KWR. Seeds of KWR was subjected to irradiation by exposing the seeds to five doses of gamma rays (100, 200, 300, 400 and > 400 Gy) with Cobalt-60 gamma source and a control with untreated seeds were used. Some traits of M₁ plants such as germination percentage, days taken for germination of 50% of seeds, days taken for leaf initiation of 50% of seedlings, plant length (cm), shoot and root length(cm), number of leaves, number of roots, shoot and root fresh weight (g), shoot to root ratio, days take for 50% flowering, number of days to maturity, were studied first to observe any genetic variation created in the population initially. The experimental results revealed that gamma doses had different responses for different traits studied. Significant differences were observed for days taken for germination of 50% of seeds, plant length, root length, shoot fresh weight, root fresh weight, number of roots, days taken for 50% flowering and number of days to maturity of fruits while other traits did not show significant differences. Effective dosages to create maximum genetic variation, based on LD₅₀ value of plant length and root length, were determined as a range between 375 Gy and 425 Gy. The gamma rays have a significant effect in creating genetic variation among some traits of tomato variety KWR.

Key Words: Katugastota Wilt Resistant, Effective dosage, Irradiation, Gamma rays, *Ralstonia solanacearum*