Electrophoretic studies in induced mutants of diploid mulberry genotype S₁₃

P M Muniswamy Reddy* and Munirajappa
Moriculture Laboratory, Department of Studies in Sericulture
Bangalore University, Bangalore 560 056, India

Received 10 December 2003; revised 17 June 2004; accepted 25 June 2004

Electrophoretic leaf protein profiles of Morus alba variety S₁₃, irradiated with different dosages of gamma radiation, revealed proteins (polypeptides) of both high and low molecular weights; 44 kDa was the major protein component. Gamma irradiation influenced the quantitative differences in the minor components and low molecular weight proteins present in trace amounts. Significant decrease in the quantity of 55 kDa protein was observed with the increase in dosage from 7 kR to 10 kR. thus, necessitating to limit the dosage of gamma irradiation to 6 kR.

Keywords: leaf protein profiles, mulberry, silver staining

IPC Code: Int. Cl.7 C25 B7/00: C07K1/26

Mulberry has immense economic importance in silk industry due to its foliage, which constitutes the chief food for the silkworm, Bombyx mori L. Improvement in food value, which has been a breeding objective in mulberry, is mainly determined by the protein quantity and quality¹,². Mutation breeding employing radiation is in use to explore the feasibility of developing new varieties and it has been proved useful in creating new variability in the existing gene pool.³-¹¹ Mutation breeding employing radiation is in use to explore the feasibility of developing new varieties and it has been proved useful in creating new variability in the existing gene pool.¹²--service. The large subunit of the native enzyme has a molecular weight of 55 kDa¹³. Rubisco is the most abundant protein on the earth, which captures CO₂ in the first reaction of photosynthesis. It is a large molecule having a molecular mass of about 560 kDa, consisting of eight copies of two types of subunits within this holoenzyme. The rbcL gene of chloroplast encodes the 55 kDa large subunits, each of which contain an α/β barrel active site for photosynthetic CO₂ fixation. The 15 kDa small subunits are coded by family of nuclear rbcS genes.

Rubisco (ribulose-1, 5-biphosphate carboxylase/oxygenase) is a major soluble chloroplast protein, which can account for up to 50% of total protein in mulberry leaf⁴. The large subunit of the native enzyme has a molecular weight of 55 kDa¹³. Rubisco is the most abundant protein on the earth, which captures CO₂ in the first reaction of photosynthesis. It is a large molecule having a molecular mass of about 560 kDa, consisting of eight copies of two types of subunits within this holoenzyme. The rbcL gene of chloroplast encodes the 55 kDa large subunits, each of which contain an α/β barrel active site for photosynthetic CO₂ fixation. The 15 kDa small subunits are coded by family of nuclear rbcS genes.

Within the chloroplast, the rubisco holoenzyme catalyses the reaction between CO₂ and RuBP (ribulose-1, 5-bisphosphate) and is directly responsible for plant productivity¹⁴. Morphological, physiological and biochemical gradients which occur

---

*Author for correspondence:
Tel: 91-80-23214001 extn 262; Fax: 91-80-23219295
E-mail: reddyseri@indiainfo.com
in plant systems seem to be related to a gradient in the ploidy level as suggested by Kraus et al.\textsuperscript{15}

The gradual decrease in the concentration with the increase in dosage of irradiation above 6 kR indicates that the \textit{rbcl} genes responsible for coding 55 kDa subunit of rubisco enzyme are inhibited. The dosages above 6 kR also resulted in stunted growth of mulberry variety \textit{S}_{13}\textsuperscript{16}. Therefore, the variety \textit{S}_{13} seems to be sensitive for gamma ray irradiation above 6 kR and the decline in quantitative parameters of productivity can be directly correlated to the photosynthetic productivity.

\textbf{References}


