

Effect of Gamma Irradiation on the Quality of Wheat Grains under Heat Stress

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Abstract—Heat stress is one of the major problems in wheat growth and yield. Wheat, being one of the most important staple food grain crops, is highly sensitive to the heat stress, especially during reproductive and grain-filling stages. HS causes denaturation and aggregation of key enzymes involved in different pathways and affects the quantity and quality of the grains. Ionizing radiations have been widely used for crop improvement through induced mutagenesis. Here, we analyzed the grain quality related biochemical parameters in different mutant lines developed by BARC, Mumbai for thermo tolerance. Endospermic tissue of 11 *Triticum aestivum* mutants (TAM) were taken for assessing the activities of starch biosynthesis enzyme (soluble starch synthase) and starch degrading enzyme (Amylase) during grain-filling stage. TAM26 showed very high activity of SSS and amylase, as compared with other mutants. Similarly, SSS and amylase activities were observed very low in TAM34 and TAM11. We observed significant variations in the activities of both the enzyme during milky-ripe sub-stage of grain-filling, which may be the reason behind the formation of intact grain with proper filling of starch. To conclude, even slight turmoil in the activities of biosynthesis and degradation enzymes of starch biosynthesis pathway in wheat endosperm leads to drastic changes in the quality of the grain, which is reflected in terms of the flour quality. There is a need to further characterize and improve TAM26 using different breeding and genetic engineering tools in order to use it as ‘climate-smart’ crop.

Keywords: Wheat, TAM, Mutation, Thermo tolerance, SSS, Amylases.