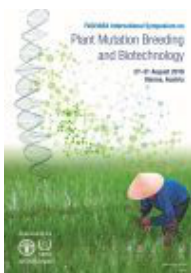


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BAKING QUALITY IMPROVEMENT IN WHEAT FLOUR BY PHYSICAL MUTAGENESIS

About 13 million acres of wheat are cultivated in Iran. Wheat is one of the most important cereals for human nutrition and this is mostly related to physical and chemical properties of gluten in wheat seed. Wheat baking quality is under the control of genetic and environmental factors. Genetic factors can be improved through breeding. A significant barrier in plant breeding is the availability of useful genetic variation, and mutation induction can provide this. Seeds of wheat cultivars Roshan and Omid were exposed to a cobalt-60 gamma irradiation at a dose of 200Gy. Selected mutant lines were subsequently cultivated for seven years to produce genetic purity. Seeds from these mutant lines have been evaluated through rheological and proteomics methods. Some mutant lines showed significant improvement in chemical properties as well as flour strength and stability of the dough. Furthermore, the expression of some proteins such as: vicilin, avenin and gamma-gliadin, known as gluten proteins, were increased in the mutant lines which have improved baking quality traits. Down regulation of some proteins including globulin-1 S allele, globulin-3A, monomeric alpha-amylase inhibitor and glyceraldehyde-3-phosphate dehydrogenase was also observed. These were identified by mass spectrometry as water-soluble proteins which decreases baking quality. Globulin-3A protein is known as a potential allergen and increases the risk of developing type I diabetes in human; it is present in the parental lines, but absent in some of the selected mutant lines. The results of this study showed that nutritional qualitative traits of wheat can be improved by applying physical mutation.

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Track Classification: Mutation breeding for adaptation to climate change in seed propagated crops