Detection of Endosperm Specific Gene Expression in Ferritin Rich Transgenic Rice Seeds

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Iron deficiency is a serious nutritional problem that is encountered by around 30% of the world population, especially in developing countries like Sri Lanka. Rice which is the staple food of Sri Lanka is deficient in iron. Increasing the iron content in food staples by genetic engineering may help to alleviate this problem. Ferritin is a major iron storage protein in both animals and plants which can store up to 4,500 iron atoms in its central cavity. Transgenic rice seeds with increased ferritin content have been prepared by transforming soybean ferritin gene along with a seed specific globulin promoter into rice seeds. The objective of this study is to detect the endosperm specific expression of ferritin in this ferritin rich transgenic rice seeds. Total RNA was isolated from ferritin rich transgenic seed and leaf samples from same plant of both BG94-1 and BG 300 rice varieties. Complementary DNA (cDNA) was prepared by using random primers and it was used as a template for gene/ferritin specific PCR. The expression of ferritin was confirmed by agarose gel electrophoresis, comparing with the ladder and the positive control. The presence of a band at 750 bp indicated that ferritin has been expressed in both varieties of BG94-1 and BG 300 while the leaf samples did not give a band due to endosperm specific expression of ferritin. This ferritin rich transgenic rice seeds express endosperm specific ferritin. Further studies will have to be carried out for several generations of transgenic plants and number of field trials will be needed before commercialization of the final ferritin rich rice seeds.

Keywords: Ferritin, cDNA, Transgenic rice, BG94-1, BG 300