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A gliadin pseudogene from wheat

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In spite of being a major rice consuming country, Sri Lanka has a relatively high wheat consumption of around 900,000 kg/year. Increased wheat consumption results in increase usage of foreign exchange and heavy dependence on imports. Therefore, transgenic rice lines with improved dough functionality that could substitute or complement wheat flour for making bread, would be of immense benefit. To achieve this goal a project was initiated to develop transgenic rice containing the gliadin gene of wheat under the control of the Glutelin-B promoter (GluB-1) for expression in rice endosperm.

Gliadins are generally considered to contribute to the viscosity and extensibility of gluten that gives the high elasticity and extensity required for bread making and substantially improves loaf volumes of bread. To clone the gliadin gene, genomic DNA was extracted from wheat leaves of *Triticum monococcum*. A 861bp fragment containing the α/β gliadin gene was PCR amplified using two primers GFP, GRP flanking the coding region. The amplified product was Topocloned in pCR 2.1 sequenced and analyzed.

Analysis of the sequence for open reading frames revealed the presence of several internal stop codons, and polyglutamine stretches with variable length compared to the functional gliadin gene, suggesting that the isolated gliadin gene is a pseudogene. Further analysis of the pseudogene revealed several mutations including transition, transversion and deletion, insertion mutations. This appears to be a previously uncharacterized pseudogene which shows a high degree of homology to a previously published A-21 alpha-gliadin (gli-2) pseudogene from *Triticum monococcum*.

Currently, work is underway to develop an alternative strategy such as constructing and screening of a cDNA / genomic library for cloning of a functional gliadin gene for *Agrobacterium* mediated transfer to rice.

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