

Grain Quality Characteristics and Related Gene Analysis (GBSSI and SSIIa) of Endemic Wild Rice Species (*Oryza rhizomatis* Vaughan) in Sri Lanka

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Oryza rhizomatis is a perennial rice species with a rhizome, endemic to Sri Lanka, and consists of very important characteristics. Here, the grain quality characteristics at maturity, and related genes were analyzed in six accessions of *O. rhizomatis*, compared with improved varieties (Bg352 and Bg358) and wild rice species *Oryza nivara* and *Oryza rufipogon*. Physical properties of paddy and brown rice were calculated using length, width, and length-to-width ratio. Physicochemical properties such as amylose content (AC), gelatinization temperature (GT), and antioxidant activity (AOA) were also analyzed. Rice kernel endosperm and starch granule morphology were examined by scanning electron microscopy (SEM). Responsible genes of starch properties (GBSSI and SSIIa) were accessed bioinformatically using existing genomic data. Results indicated that all the wild rice species have a red pericarp layer, short or medium grain size, and medium grain shape while the improved varieties have white pericarp, short to medium size grains, and either bold or medium shapes. According to the SEM images, the morphology and distribution of the starch granules, the shape of endosperm cells, also the size and distribution of protein bodies in the kernel of wild species were similar to the improved rice varieties. However, the existence of pinholes indicated that *O. rhizomatis* might possess potential benefits for starch processing while the distinctive sub-aleurone layer indicates the possibility of high protein content. All samples belonged to the high AC category in the range of 30.27-34.17% without significant difference ($P>0.05$). All *O. rhizomatis* accessions were high GT category except INRC22 while others were in either low or intermediate GT category. Additionally, AOA of *O. rhizomatis* was significantly higher ($P<0.05$) than the improved varieties. According to the available sequencing data, there were no clear variations in the exons of two genes. However further analysis is needed for the identification of accession level differences.

Keywords: AACC, Alkali spreading value, DPPH, Iodine colorimetric procedure, Rough rice

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