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## Pyramiding of Starch Synthase Genes *SBE3* and *GBSS1* Increased the Amylose Content and Changed Physicochemical Properties of Starch in Rice

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Rice is one of the most important cereal crops in the world. Rice starches contain two major component amylose and amylopectin which are composed by glucose polymers. Amylose biosynthesis is regulated by GBSSI (granule-bound starch synthase I) and *OsGBSSI* known as *Waxy* gene mainly controls amylose content in rice endosperm. Starch branching enzyme (SBE) forms branch points in amylopectin, three SBE isoforms were identified in rice. Among SBE isoforms, SBE3 mutants have shown increased amylose content and resistant starch in rice. In our study, physicochemical properties of rice starches were examined using four near-isogenic lines (NILs) derived from a cross between Korean elite line Hwayeong and high-amylose cultivar Dodamssal. Nucleotide sequence variations in *SBE3* and *GBSS1* of Dodamssal allele synergistically increased amylose content and change physicochemical characteristics in the Hwayeong genetic background. Microscopy analysis, X-ray diffraction, RVA, and starch digestibility analysis were performed to identify the physicochemical properties of 4 NILs starch. *SBE3* and *GBSS1* of Dodamssal allele affect starch granule structure, pasting characteristics, starch crystallinity, and digestibility. Further studies are ongoing to understand the genetic interaction between *SBE3* and *GBSS1*, and differences in amylopectin structure.

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