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Breeding of High Amylose Rice with the Editing of *OsLAq6* Using CRISPR/Cas9

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[Introduction]

Starch is a major component in rice endosperm and is a main factor that determines the taste of eating rice. Starch is usually divided into amylose and amylopectin. Rice varieties with low amylose content generally contain a large proportion of rapidly digestible starch (RDS). It shows a rapid increase in blood glucose levels after consumption and then a quick decrease. Conversely high-amylose starches are generally digested slowly into glucose which may provide health benefits such as increased satiety and reduced risk of diabetes, cardiovascular disease, and colorectal cancer.

[Materials and Methods]

In this research a *OsLAq6* genome-editing rice (*OsLAq6-G*) was bred by editing the function of *OsLAq6* (detected on chromosome 6 in rice) in Ilmi using the CRISPR/Cas9. After selecting lines in which the T-DNA region was segregated in *OsLAq6-G* lines by advanced generation, amylose, protein, and moisture content were analyzed to Ilmi and *OsLAq6-G* rice. And investigated the alkali digestion value, starch-iodine tests, and major agricultural traits.

[Results and Discussion]

OsLAq6-G had higher amylose content than Ilmi. The content of protein was the equal or lower than Ilmi, and the content of moisture was the equal or higher than Ilmi. And the alkali digestion of *OsLAq6-G* lines was higher than Ilmi. *OsLAq6-G* lines were stained dark purple than Ilmi by starch-iodine test. As a result, *OsLAq6-G* can be used as a breeding resource for improving diabetes and cardiovascular disease.

[Acknowledgement]

This work was supported by a grant from the New breeding technologies development Program (Project No. PJ016531012023), Rural Development Administration, Republic of Korea.

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