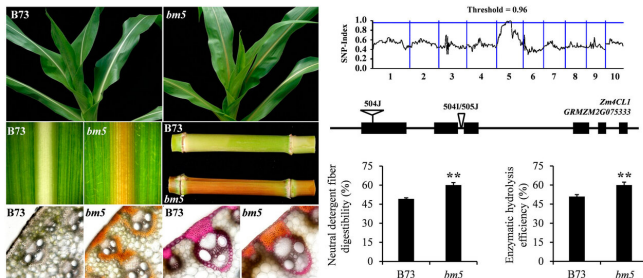


# Scientists identify a novel target for corn straw utilization

22 April 2019



Identification and characterization of maize bm5 gene.  
Credit: WU Zhenying

Plant cell walls, as repositories of fixed carbon, are an important source of biomass, which is mainly composed of cellulose, hemicellulose, and lignin. However, the complex lignin structure makes it a rather inefficient biomass source. Thorough understanding of lignin biosynthesis will improve the efficiency of biomass conversion into biofuels and increase the quality of forage and silage.

Maize brown midrib (bm) mutants, with reddish-brown pigmentation accumulated in the leaf midrib and reduced [lignin](#) content, are a significant germplasm. To date, at least six independent maize bm mutants (bm1-6) have been identified, among which genes controlling the bm1-4 mutants have already been recognized. However, [genes](#) controlling bm5 and bm6 had previously been unidentified. In a new study published in *Biotechnology for Biofuels*, a team of scientists led by Prof. Fu Chunxiang from the Qingdao Institute of Bioenergy and Bioprocess Technology (QIBEBT), Chinese Academy of Sciences, completed the identification of a bm5 mutant. This was the first time that the locus of a maize bm5 mutant had been identified.

Scientists found that the lignin gene Zm4CL1 was the locus for the bm5 mutant through gene

mapping, enzyme activity assay, and metabolite profiling methods.

The comprehensive effects of Zm4CL1 mutation on total lignin content, composition and soluble phenolic acid accumulation were also elucidated in the study. The forage digestibility and cell wall saccharification efficiency were increased by 22.0% and 17.6%, respectively, in bm5 [mutant](#) compared to the control.

This study fills a key gap in knowledge about [maize](#) bm mutants. Also, it provides a novel target for molecular breeding of economic crops with highly efficient straw utilization.

**More information:** Wangdan Xiong et al, Mutation of 4-coumarate: coenzyme A ligase 1 gene affects lignin biosynthesis and increases the cell wall digestibility in maize brown midrib5 mutants, *Biotechnology for Biofuels* (2019). [DOI: 10.1186/s13068-019-1421-z](https://doi.org/10.1186/s13068-019-1421-z)

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