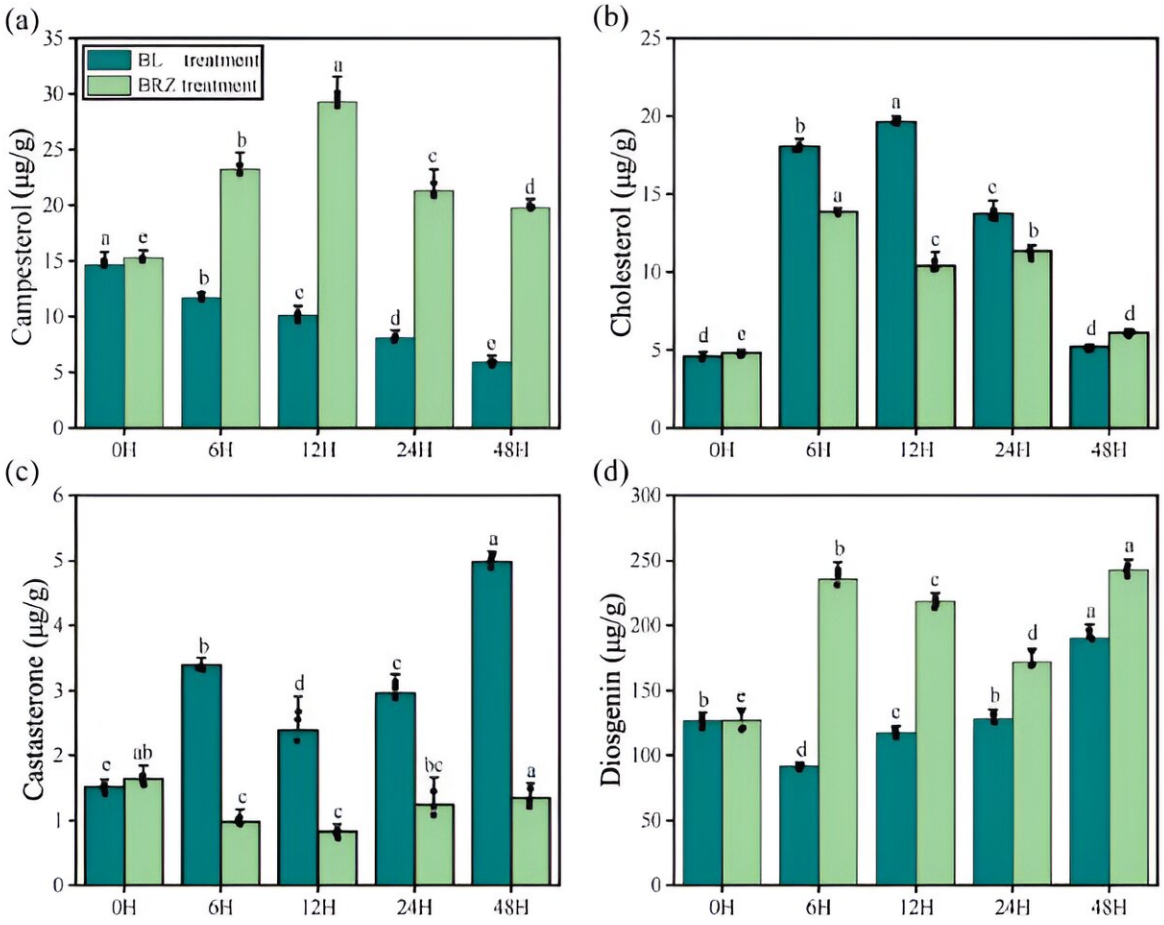
Team reports on relationship between contents of diosgenin and brassinosteroids in Dioscorea zingiberensis

April 24 2024



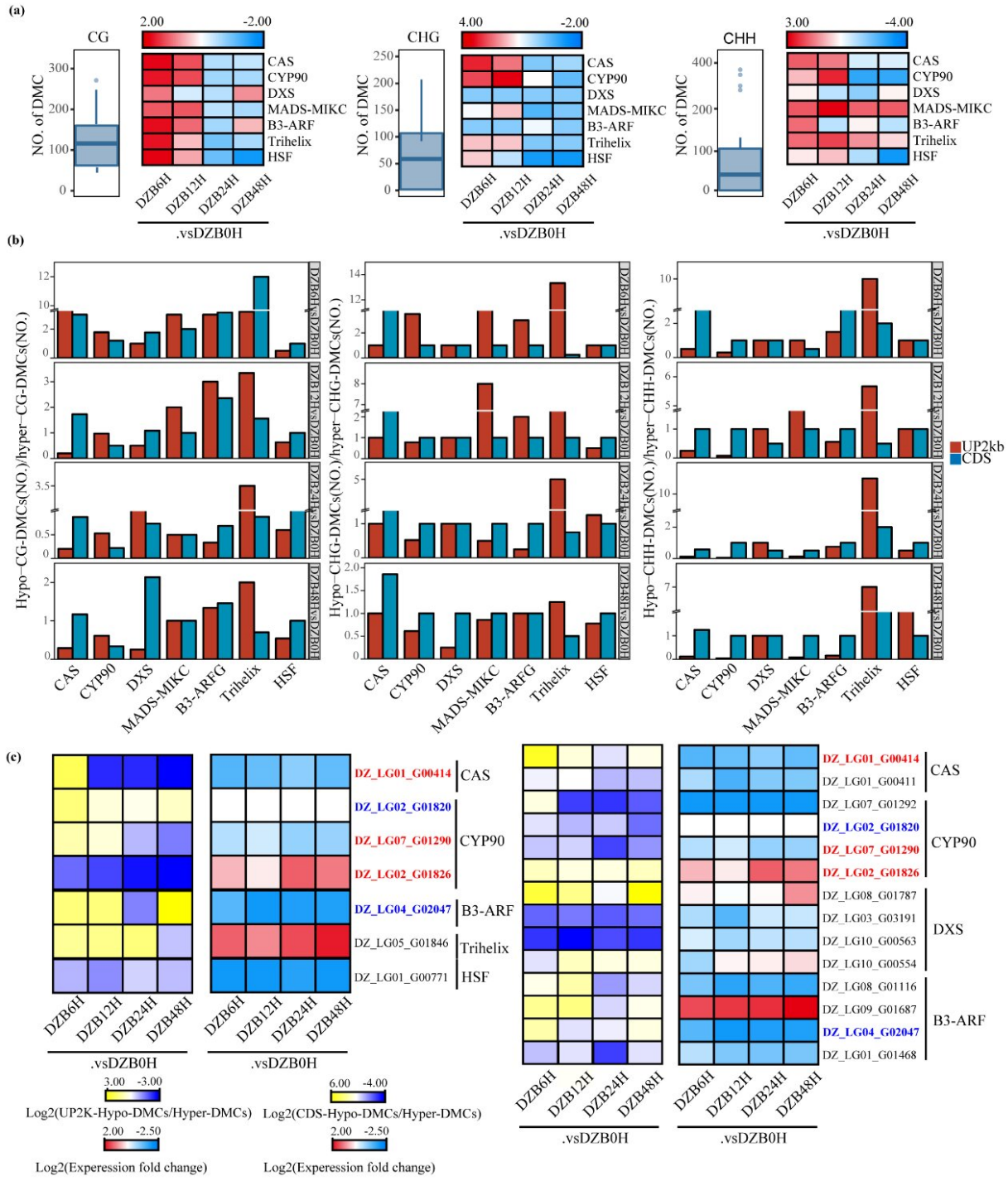
The column chart shows changes incharacteristic metabolites after BL/BRZ treatment. Credit: *Horticulture Research* (2024). DOI: 10.1093/hr/uhae056

Diosgenin, a secondary metabolite isolated from the Dioscorea spp. plant family, is an irreplaceable and ideal starting material for the synthesis of steroid hormone drugs. Dioscorea zingiberensis is the world's most desirable and important plant source of steroid hormone drugs.

Brassinosteroids are an important class of phytohormones found in all plants. Diosgenin and brassinosteroids share similar structures and biosynthetic pathways, yet the regulatory networks of diosgenin and brassinosteroids biosynthesis and metabolism in plants are distinct, necessitating further elucidation of their relationship.

A research group has analyzed the changes in the contents of cholesterol, campesterol, diosgenin and brassinosteroids in Dioscorea zingiberensis by mass spectrometry detection. The results indicated that there was a certain equilibrium relationship between the contents of diosgenin and brassinosteroids after treatment with brassinolide and brassinazole, respectively. The work is published in the journal *Horticulture Research*.

Through an association analysis of genome-wide methylation, transcriptome and characteristic metabolite data of Dioscorea zingiberensis, the team was able to identify a number of genes and transcription factors that appear to be involved in the balance process of diosgenin and brassinosteroids including CAS, CYP90s and B3-ARFs.



Inverse correlation between CG methylation levels and gene expression. Credit: *Horticulture Research* (2024). DOI: 10.1093/hr/uhae056

The findings suggest that CAS and CYP90s may be subject to hypomethylation, which appears to be closely related to their high transcription. It was demonstrated that CAS and CYP90s play a pivotal role in the sterol homeostasis of diosgenin and brassinosteroids. The findings of this study provide compelling evidence for the balance between diosgenin and brassinosteroids.

This work offers a new perspective on the regulatory network of diosgenin and brassinosteroids biosynthesis and metabolism, as well as a new insight into the function of secondary metabolites.

More information: Zihao Li et al, Genome-wide methylation, transcriptome and characteristic metabolites reveal the balance between diosgenin and brassinosteroids in Dioscorea zingiberensis, *Horticulture Research* (2024). DOI: 10.1093/hr/uhae056

Provided by NanJing Agricultural University