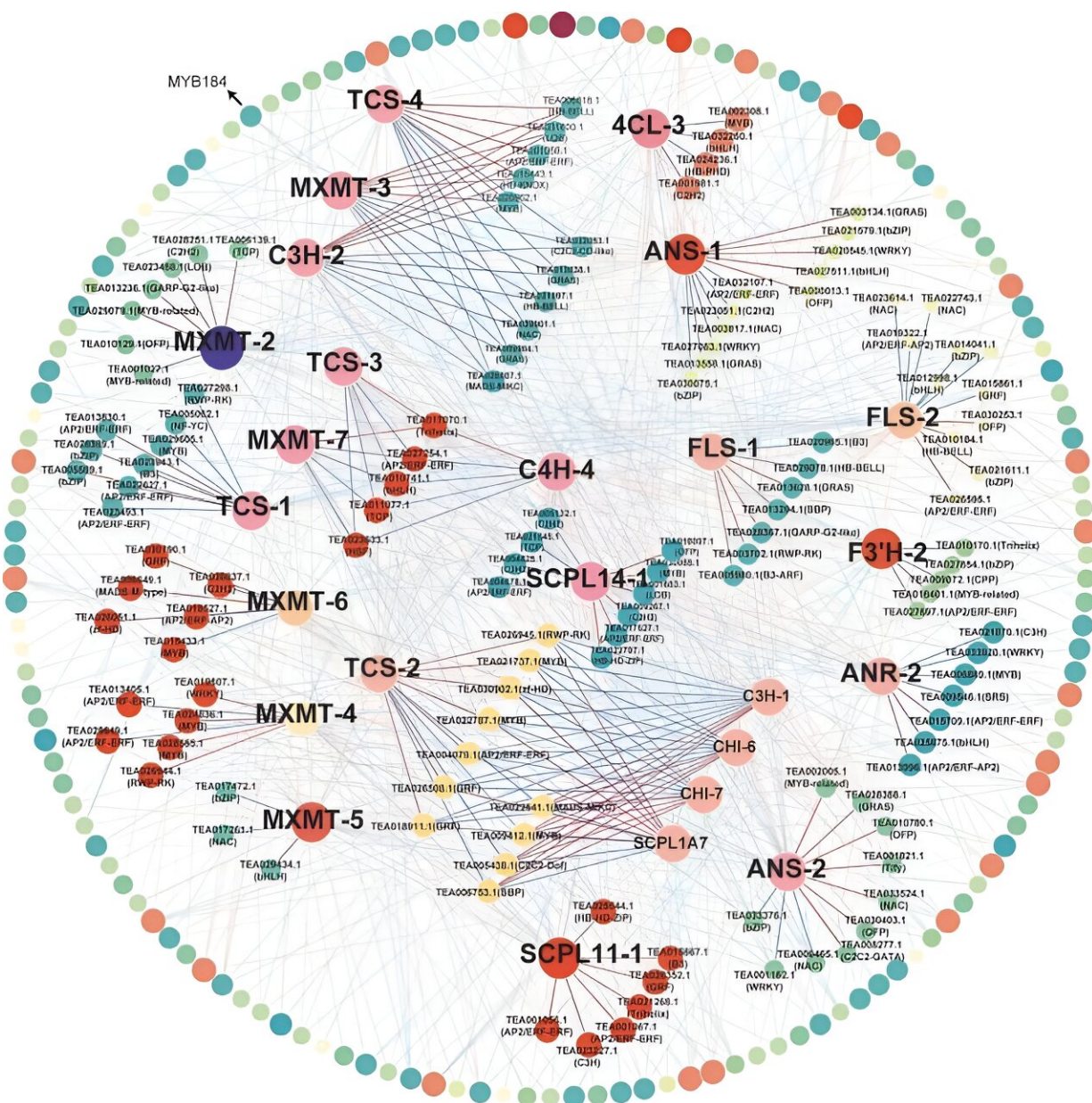


Novel study reveals the accumulation mechanisms of purine alkaloids and catechins in theobromine-rich tea

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Coexpression network between TFs and purine alkaloid and catechin biosynthesis genes. Credit: Beverage Plant Research

Camellia ptilophylla, a low-caffeine or decaffeinated tea, is increasingly being recognized for its potential health benefits. However, there is intraspecific diversity in purine alkaloid and catechins components in *C. ptilophylla* populations. Analyzing the mechanisms behind the accumulation of these metabolites is important for improving tea quality.

Beverage Plant Research published online a paper by Associate Professor Binmei Sun and Shaoqun Liu's team at South China Agricultural University titled "[Differential accumulation mechanisms of purine alkaloids and catechins in *Camellia ptilophylla*, a natural theobromine-rich tea](#)" on 27 June 2023.

In this study, researchers first analyzed the accumulation of purine alkaloids in *C. ptilophylla* populations (32 plants) and showed that theobromine (TB) was the sole alkaloid in 26 individual plants, while the other six *C. ptilophylla* plants had higher caffeine and lower TB.

Next, RNA-seq analysis of two *C. ptilophylla* plants with contrasting purine alkaloid contents showed that the expression of xanthine synthesis genes TCS-2, TCS-3 and MXMTs were up-regulated, while the genes of the purine alkaloids degradation pathway were significantly down-regulated in TB-rich plant. In addition, the expression pattern of catechin biosynthesis pathway genes was altered in TB-rich plants.

These up-regulated catechin biosynthesis pathway genes were associated with phenylpropanoid and flavonoid biosynthesis, which are essential for

the production of gallocatechin gallate (GCG). The co-expression networks constructed with 327 [transcription factors](#) identified by RNA-seq, purine alkaloids and catechin biosynthesis genes elucidated the potential regulatory mechanisms of gene expression in *C. ptilophylla* populations.

In conclusion, this study uncovers different accumulation mechanisms of purine alkaloids and catechins in *C. ptilophylla* populations. These insights will facilitate the breeding of low-caffeine or high GCG tea tree varieties to meet the different needs of consumers and lead to healthier consumption options.

More information: Chentao Ying et al, Differential accumulation mechanisms of purine alkaloids and catechins in *Camellia ptilophylla*, a natural theobromine-rich tea, *Beverage Plant Research* (2023). [DOI: 10.48130/BPR-2023-0015](#)

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