Comparison of phytochemical composition and anti-hyperglycemic activity of Liubao tea from different fermentation years

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Using response surface methodologies, two Liubao tea (LBT) extracts, LBT-5 and LBT-7, were optimized for different fermentation durations. Phytochemical composition analysis assessed the chemical composition and distribution of tea pigments. Their inhibitory effects on glucose-metabolic enzymes were analysed. Furthermore, an insulin-resistant (IR) cell model was constructed to study their regulation of glucose metabolism and underlying mechanism. LBT-7, aged longer, exhibited higher polyphenols and pigments. Assessments on glucose-metabolic enzymes and IR regulation confirmed LBT's capability to enhance glucose consumption, modulate cytokines and activate the IRS-PI3K-Akt-GLUT4 pathway. Notably, LBT-7 demonstrated a stronger effect due to its higher tea pigment.

Keywords: Anti-hyperglycemic activity, enzyme inhibition, Liubao tea, phytochemical composition, PI3K-Akt pathway.

of diabetes cases, arising from impaired pancreatic beta-cell function, insulin deficiency and insulin-resistance (IR) in target organs[6]. DT has shown promise in reducing blood glucose levels by mitigating IR and influencing key glucose-related enzyme metabolism[3,7]. Specifically, LBT has been found to activate the PI3K-Akt-PPARs-GLUT2 signalling cascade, addressing metabolic disorders and IR[8]. Nevertheless, the impact of different years on LBT composition and its anti-hyperglycemic activity remains underexplored.

In this study, we investigated LBT extracts from different fermentation years and optimized their extraction process through single-factor and orthogonal experiments, analysed composition differences, and evaluated *in vitro* anti-hyperglycemic activity, laying the groundwork for LBT's rational development.

Materials and methods