Semi-Pilot Scale Extraction of Pinocembrin and Galangin from *Populus alba* L. × *berolinensis* K. Koch via Enzymatic Pretreatment and Ultrasonication

Ru Zhao, Xiaoli Li, Yazhou Bao, Wenjun Xu, Chen Xu, Rongrong Wang, Tianlan Xia, Tingli Liu* and Ailing Ben*

Nanjing Engineering Research Center for Peanut Genetic Engineering Breeding and Industrialization, School of Food Science, Nanjing Xiaozhuang University, Nanjing 211171, China

* Corresponding author E-mail: liutingli@njxzc.edu.cn; benailing@njxzc.edu.cn

2.4. Enzymatic Pretreatment–Ultrasonic-Assisted Strategy

2.4.1. Laboratory-Scale Process

The laboratory-scale extraction process was performed via a KQ-250DB ultrasonic bath coupled with a constant-temperature oscillating water bath. The EP-UAS diagram showing the stages of the entire process is presented Figure S1. Specifically, 0.5 g of powder was weighed into a 25 mL conical centrifuge tube, followed by the addition of a predetermined volume of cellulase solution. The enzymatic hydrolysis was conducted under controlled temperature and duration conditions, with intermittent ultrasonication applied at specified duty cycles. Following hydrolysis, the reaction mixture was immediately filtered, and the filtrate volume was recorded. The residual solid material was subsequently subjected to ethanol extraction, where absolute ethanol was added to achieve the desired final concentration. Ultrasonic-assisted extraction was then performed for a predetermined time period. The combined extracts were homogenized, filtered, and stored at 4 °C for the quantification of pinocembrin and galangin.

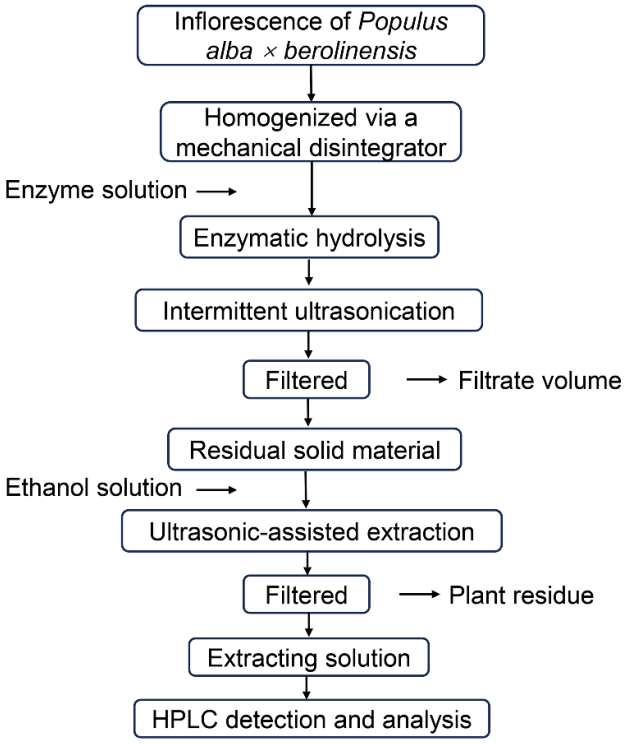


Figure S1. Diagram of the enzymatic pretreatment–ultrasonic-assisted strategy.