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Increase Propolis extraction via High hydrostatic-assisted ultrasonic Extraction

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Propolis is a natural substance known for its potential health and medical benefits. Derived from bees, it has been the focus of extensive research due to its antimicrobial, anti-inflammatory, and antioxidant properties. In this study, we have explored the effectiveness of using high hydrostatic pressure to assist ultrasonic extraction of bee gel, through the changes in extraction rate, total phenol, ketone content, antibacterial activity, survival rate and anti-inflammatory activity of cancer cells. The research results show that the extraction rate of bee gel increased with the increase in pressure time during high pressure treatment, and the best effect was $71.16 \pm 1.05\%$ in 600MPa treatment for 30 minutes, while the non-high-pressure treatment was $42.89 \pm 1.11\%$. The content measured by high static water pressure combined ultrasonic treatment at 300MPa for 20 minutes (23.29 ± 0.04 mg of GAE/g, 17.09 ± 0.79 mg of QEAC/g) was the best, and the single-purpose one was purified. Ultrasonic treatment was (14.36 ± 0.09 mg of QEAC/g, 11.26 ± 0.18 mg of QEAC/g). In the analysis of antibacterial activity and anti-inflammatory activity, the antibacterial and anti-inflammatory ability of high static water pressure treatment and high static water pressure combined with ultrasonic treatment did not significantly reduce or improve, and the effect remained unchanged, indicating that high static water pressure technology has not been effective for bedevil. The ingredients cause damage and the biological activity remains stable during the treatment process. The above results show that high static water pressure assists ultrasonic extraction of bee gel, which can provide higher extraction efficiency than traditional extraction. The application of high static water pressure technology can help improve production and active materials such as polyphenols and ketones in the extraction of bee gel products.