

## ABSTRAK

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**Latar belakang:** Teh putih merupakan sumber polifenol terutama katekin, yang memiliki aktivitas antioksidan tinggi. Namun bioavailabilitasnya rendah akibat stabilitas gastrointestinal yang terbatas. Teknologi ultrasonikasi berpotensi meningkatkan pelepasan dan penyerapan senyawa bioaktif dalam teh putih.

**Metode:** Penelitian menggunakan Rancangan Acak Lengkap (RAL) dengan variasi suhu (30°C, 40°C, 50°C) dan waktu ultrasonikasi (1–10 menit). Analisis meliputi pengukuran total fenol sebelum dan setelah simulasi pencernaan *in vitro* (fase lambung, usus, dan supernatan), serta evaluasi sensori melalui *Quantitative Descriptive Analysis* (QDA). Data dianalisis menggunakan uji Kruskal-Wallis, post-hoc Mann-Whitney ( $p < 0,05$ ), dan *Principal Component Analysis* (PCA) untuk karakteristik sensori.

**Hasil:** Ultrasonikasi pada 30°C selama 6 menit menghasilkan bioavailabilitas fenol tertinggi (29,18%), secara signifikan lebih tinggi dibandingkan seduhan daun (14,99%) dan serbuk (13,60%). Analisis GC-MS mengidentifikasi 32 senyawa volatil, dengan *nano white tea* yang didominasi oleh asam oleat (74,86%), yang menghasilkan profil rasa *creamy* dan *mild*. Seduhan daun dan serbuk menampilkan komposisi asam lemak dengan evaluasi sensori menunjukkan profil *floral* dan manis. Evaluasi sensori menunjukkan *nano white tea* memiliki rasa lebih lembut dan aroma herbal halus.

**Kesimpulan:** *Nano white tea* yang diproses dengan ultrasonikasi menunjukkan bioavailabilitas fenol yang lebih tinggi dibandingkan seduhan teh putih. Meskipun komposisi volatil tidak berbeda signifikan, evaluasi sensori menunjukkan seduhan konvensional memiliki rasa *floral* kuat, sementara *nano white tea* lebih lembut dan cerah. Ultrasonikasi berpotensi menciptakan profil rasa teh yang lebih seimbang dan diterima oleh konsumen.

**Kata kunci:** *Nano white tea*, ultrasonikasi, bioavailabilitas polifenol, karakteristik sensori, teh putih konvensional

## **ABSTRACT**

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**Background:** *White tea is a source of polyphenols, especially catechins, which have high antioxidant activity. However, its bioavailability is low due to limited gastrointestinal stability. Ultrasonication technology has the potential to increase the release and absorption of bioactive compounds in white tea.*

**Methods:** *The study used a completely randomized design (CRD) with variations in temperature (30°C, 40°C, 50°C) and ultrasonication time (1-10 min). Analysis included measurement of total phenolics before and after simulated in vitro digestion (gastric, intestinal, and supernatant phases), and sensory evaluation through Quantitative Descriptive Analysis (QDA). Data were analyzed using Kruskal-Wallis test, post-hoc Mann-Whitney ( $p < 0.05$ ), and Principal Component Analysis (PCA) for sensory characteristics.*

**Results:** *Digestion simulation showed that ultrasonication at 30°C-6 minutes Ultrasonication at 30°C-6 min resulted in the highest phenol bioavailability (29.18%), significantly higher than leaf steeping (14.99%) and powder (13.60%). GC-MS analysis identified 32 volatile compounds, with nano white tea dominated by oleic acid (74.86%), which resulted in a creamy and mild flavor profile. Leaf and powder brews displayed fatty acid compositions and sensory evaluation showed floral and sweet profiles. Sensory evaluation showed nano white tea had a milder flavor and subtle herbal aroma.*

**Conclusion:** *Nano white tea processed with ultrasonication showed higher phenol bioavailability compared to white tea infusion. Although volatile composition did not differ significantly, sensory evaluation showed that conventional infusion had a strong floral taste, while nano white tea was softer and brighter. Ultrasonication has the potential to create a more balanced flavor profile that is well-accepted by consumers.*

**Keywords:** *Nano white tea, ultrasonication, polyphenol bioavailability, sensory characteristics, conventional white tea.*