

Evaluating the Toxicological Profile and Microbiome Modulatory Effects of Persimmon Vinegar: A Preclinical Study on Its Potential as a Drug

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Abstract:

Persimmon vinegar, derived from spontaneously fermented *Diospyros kaki*, has gained attention as a functional health product due to its antioxidant, anti-inflammatory, and prebiotic properties. However, scientific evidence on its safety and impact on gut microbiota remains limited. This study aims to evaluate the toxicity profile and microbiome modulation of persimmon vinegar in a preclinical setting, to assess its potential as a safe and effective natural health supplement or as a drug. Cytotoxicity studies were conducted in vitro models with Vero and HepG2 cell lines as the target. In parallel, 16S rRNA gene sequencing was performed on fermented *Diospyros kaki* to analyze microbiota composition after being made traditionally. The results revealed no significant toxicological effects in Vero and HepG2 cell lines, with IC₅₀ values recorded at 938.32 µg/mL and more than 1000 µg/mL, respectively. Microbiome analysis showed a significant increase in prebiotic beneficial bacteria, particularly like 52% of *Komaegobacter dyspori*. Persimmon vinegar demonstrates a favorable safety profile and positively

have prebiotic microbiota, supporting its potential application as a functional health product. Further clinical studies are warranted to confirm its efficacy and safety in humans.

Keywords:

Persimmon vinegar, Toxicity, Microbiome.