

## Differences in GC–MS Profiles and Ethanol–Methanol Content of Persimmon Vinegar Products with Different Fermentation Times

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### Abstract:

Persimmon vinegar, derived from the fermentation of *Diospyros kaki*, has been used as a health product due to its antioxidant, antihyperlipidemic, and prebiotic properties. Development into a health supplement requires standardization and safety of contaminants such as methanol and ethanol from products with different fermentation periods. This study aimed to evaluate the GC–MS profile of volatile compounds and ethanol–methanol content using GC–FID. The results showed that 15 and 16 volatile compounds were identified in products with 1 and 2 years of fermentation, respectively. A total of 4 major compounds were detected (% area): ethyl acetate (47.69–48.90), ethanol (23.45–37.80), acetic acid methyl ester (4.33–6.13), and acetaldehyde (2.12–3.39). Content analysis showed that the ethanol content ( $r=0.999$ ) in the 1-year fermentation product was higher than the 2-year fermentation product,

at 0.6319+0.3294% and 0.4620+0.2851%, respectively. Meanwhile, methanol ( $r=0.998$ ) was not detected either, indicating the product's safety due to its methanol content. There was a significant difference in ethanol content between the products with 1 and 2 years of fermentation ( $p<0.05$ ). Further studies are needed to confirm the efficacy of persimmon vinegar products in various pharmacological activities.

#### **Keywords:**

Persimmon Vinegar, GC-MS Profile, GC-FID Ethanol-Methanol Content, Fermentation Time.