

Chemical Composition and Antioxidant Properties of *Aquilaria sinensis* and *Aquilaria malaccensis* Essential Oils

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Structured Abstract

Background: Agarwood is produced because of a stress response process brought on by damage from physical, microbial, and entomological activity on the *Aquilaria* trees. It has been revealed that it has bacteriostatic, antibacterial, anti-asthmatic, anti-cancer, anti-inflammatory, antidiabetic, antihistaminic, analgesic, antioxidant and antidepressant properties. Exploring the full potential of selected *Aquilaria* spp. essential oils as antioxidant alternatives should be investigated, given its demonstration of antioxidant activity. This exploration is particularly relevant in understanding the connection between free radicals, oxidative stress, and the onset of degenerative diseases and cancer.

Methods: Determination of the chemical composition of *Aquilaria sinensis* and *Aquilaria malaccensis* essential oils by Gas Chromatography-Mass Spectrophotometer (GC-MS) and the antioxidant properties were determined by Folin-Ciocalteu method, 1,1-Diphenyl-2-picrylhydrazyl (DPPH) assay, Ferric Reducing Antioxidant Power (FRAP) assay, β -Carotene/Linoleic acid bleaching assay.

Results: A total 53 compounds were identified using GC-MS chemical analysis. Valerianol (14.56%) was the most abundant compound identified in *A. sinensis* followed with β -agarofuran and γ -eudesmol with a percentage of 5.94 and 5.77, respectively. Chemical analysis of *A. malaccensis* showed α -cadinol was the most abundant compound at 22.64% followed by γ -eudesmol (9.49%) and δ -cadinene (10%). The total phenolic content of *A. sinensis* and *A. malaccensis* was 8.5 and 10.8 mg GAE/g, respectively. *A. sinensis* essential oil exhibited higher scavenging DPPH radical activity with IC_{50} value of 8.46 mg/mL compared to *A. malaccensis* with IC_{50} value of 11.49 mg/mL. The ferric reducing power activity of *A. malaccensis* showed absorbance slightly higher than *A. sinensis* at 0.165 and 0.104, respectively. The β -carotene/ linoleic acid bleaching assay revealed the IC_{50} of 6.25 mg/mL for *A. sinensis* and IC_{50} value of 3.66 mg/mL for *A. malaccensis*.

Conclusion: In conclusion, a total of 53 compounds were identified using GC-MS which sesquiterpenoid group showed the highest percentage. Essential oil of *A. malaccensis* is a better antioxidant than *A. sinensis*. *A. malaccensis* revealed higher antioxidant activities in TPC, FRAP, and β -carotene/linoleic acid bleaching assays compared to *A. sinensis*.

Keywords: Antioxidant, *Aquilaria sinensis*, *Aquilaria malaccensis*, Chemical Composition

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