

**Abstract 42 – Paper ID: 069****From Traditional Remedy to Therapeutics: Integrated GC-MS/HPTLC Quantification of Methyl Salicylate as the Novel Anti-Inflammatory Lead in *Gaultheria fragrantissima* Essential Oil from Meghalaya**

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**Abstract**

The search for novel, natural anti-inflammatory agents is a keystone of pharmacological research. *Gaultheria fragrantissima*, also known as Indian wintergreen, is indigenous and found abundantly in the Khasi Hills of Meghalaya. Traditionally it is used for its potent pain-relieving properties and is prescribed to treat sciatica, rheumatic arthritis, neuralgia and menstrual pain. The local healers use this plant as proprietary balm, liniments or ointments, tender leaves are chewed to cure headaches, muscle ache and sore throats. With modern techniques and scientific validation this plant reveals a wide range of pharmacological activities, including analgesic, anti-oxidant, antibacterial, anti-diabetic, anticancer, diuretic, hypothermic, and antiepileptic properties.

This study explores the chemical profile and anti-inflammatory potential of *G. fragrantissima* essential oil, collected from East Khasi Hills. The oil was extracted from leaves by hydrodistillation using a Clevenger apparatus with a yield of 0.8–1.5% v/w. It was then subjected to gas chromatography–mass spectrometry (GC-MS) analysis, which revealed methyl salicylate (MeSA) as a major compound (>95%). MeSA was also effectively identified and quantified by high-performance thin-layer chromatography (HPTLC), using hexane–acetone (30:2 v/v) as mobile phase and silica gel 60 F<sub>254</sub> as stationary phase, with the R<sub>f</sub> value of MeSA being 0.64. Egg albumin denaturation assay was used to assess the anti-inflammatory effectiveness, and compared to the usual reference medication diclofenac sodium, the essential oil showed a notable reduction of protein denaturation. The findings clearly show that the presence of MeSA can be responsible for the notable anti-inflammatory activity. This study supports the traditional use of this plant and demonstrates its essential oil, particularly MeSA, as a viable option for natural therapeutics.

**Keywords:** *Gaultheria fragrantissima*, Methyl salicylate, Anti-inflammatory, GC-MS, HPTLC, Indian wintergreen