

Methyl salicylate, or wintergreen oil, is an organic ester naturally produced by the wintergreen plant group, and commonly made by the esterification of salicylic acid with methanol. Methyl salicylate is used as a rubefacient in topical analgesics, in low concentrations as a flavoring agent in chewing gum, and in chemical warfare research. In its pure form, methyl salicylate is highly toxic as it metabolizes to salicylates in the human body. A three step synthesis process was used to create methyl salicylate: first with a Grignard reaction, which yielded an oil that was analyzed using nuclear magnetic resonance (NMR); second with deprotection of ether using thiophenol and potassium carbonate yielding an alcohol and monitored with thin layer chromatography (TLC); third with synthesis of an ester from carboxylic acid using salicylic acid and methanol. In order to make this synthesis more cost efficient and environmentally sustainable, tetrahydrofuran was replaced with dioxane as a greener solvent, and a green chemistry synthesis using dimethyl carbonate was used to replace methanol in the final esterification of salicylic acid.