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Determination of Phytochemicals of *Illicium verum hook* and its Antioxidant and Antimicrobial Properties of Ethanol, Methanol, Water and Chloroform Extracts

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Abstract

Illicium verum hook (Star anise), a common ingredient in traditional medicine and most commonly used spice in various cuisines due to its phytochemical content, health benefits such as antioxidant and for its aroma. Rapid increase in interest among natural antioxidant other than synthetic antioxidant lead to various investigations. Therefore a study was conducted to determine phytochemicals of *Illicium verum hook*, a widely used spice and its antioxidant and antimicrobial properties in 80% ethanol, 80% methanol, water and chloroform extracts. Concentration range of all the crude extracts were analysed in three trials. Among all the extracts ethanol extract showed highest phytochemical content and most of the phytochemicals were absent in chloroform extract. Total Phenolic content and Flavonoid content were determined using Folin–Ciocalteu method and Aluminum chloride assay. Methanol produced highest total Phenolic content and total Flavonoid content among all the extracts, which were 112.587±2.256 mg Gallic acid equivalent (GAE) per gram of dry weight of sample and 211.713±8.679 mg Rutin equivalent (RT) per gram of dry weight of sample. Ethanol extract produced more total Flavonoid content than total Phenol content. Chloroform extract produced least total Phenol content and total Flavonoid content, which were 41.2667±8.495 mg Gallic acid equivalent (GAE) per gram of dry weight of sample and 3.551±1.580 mg Rutin equivalent (RT) per gram of dry weight of sample respectively. Significance difference between total Phenolic content and total Flavonoid content of each extract was determined using regression, statistical analysis. Antioxidant scavenging activity and total antioxidant capacity (TAC) were evaluated using 1-Diphenyl-2-picrylhydrazy (DPPH) radical-scavenging activity,2,2′-azino-di-[3ethyl benzthiazoline sulfate] (ABTS) decolorisation assay, Ferric reducing antioxidant assay (FRAP) and Phosphomolybdate assay (TAC). Methanol extract of *Illicium verum hook* showed highest antioxidant scavenging activity (51.548 mg/mL) except in FRAP assay. IC 50 values of each assay for methanol extract were, 127.089 mg/mL for DPPH, 51.548 mg/mL for ABTS and 320.476 mg/mL for FRAP. Total antioxidant capacity was high in methanol extract with 39.663 mg Ascorbic acid equivalent per gram of dry weight of sample. Antimicrobial activity of *I.verum* crude extracts were evaluated against *Escherichia coli* and *Staphylococcus aureus* using agar disk diffusion method. Inhibition of bacteria growth by the extract was determined using by the diameter of "zone of inhibition". Methanol crude extract showed high antimicrobial activity against both *S.aureus* and *E.coli* through large zone of inhibition. According to this study methanol was determined as the potential solvent to extract crude oil from *I. verum.* The efficacy of antimicrobial and antioxidant capacity in I.verum crude extract leads to new source of natural antioxidant, in drug development and processed food industry.

Keywords: *Illicium verum hook*, Antimicrobial, Natural antioxidants and antioxidant scavenging