Gas Chromatographic – Mass Spectroscopic Analysis of *Citrus reticulata* Fruit Peel, *Zingiber officinale* Rhizome and *Sesamum indicum* Seed Ethanolic Extracts Possessing Antioxidant Activity and Lipid Profile Effects

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Abstract

Statement of problem: Cardiovascular diseases play a central role in mortality and morbidity rates around the world. Dyslipidemia and oxidative stress are considered modifiable risk factors of cardiac diseases. Pharmacologic activities of the plants' extracts were demonstrated in previous researches.

The purpose of this study is to analyze extracts using GC-MS to identify active principles and percentages of their occurrence in analytes.

Methodology: Analysis of the crude 96% ethanolic extracts was performed using (GS-MS QP) type Schimadzu 2010 with capillary column RTX-50 (restec), (length 30mm, diameter 0.25mm, and thickness 0.25mm). Helium used as carrier gas, temperature programmed at 200°C for 5 minutes at rate of 15ml/minute, extracts were injected using split injection mode. Identification of different components was from their mass Spectra and retention time, compared with those on NIST library.

Findings: revealed presence of 80 compounds in extract of locally grown *C.reticulata*, abundant in monoterpenoid compounds including Limonene (3.03%), Alpha & Gamma - terpinenes (2.61%), Linalool (1.38%), Citral (1.72%) having anti-oxidant effects. Sesquiterpenoids; Humulene (0.26%) and Caryophyllene (1.97%) were identified.

Locally grown *S. indicum* oil and water soluble portions of extract revealed presence of 64 compounds with high percentage of monounsaturated fatty acid ester methyl oleate (66.99%), methyl stearate (9.35%) and palmitate (15.71%) in oil portion, whereas, plant sterols; Gamma-sitosterol (13.5%), fucosterol (2.11%), stigmasterol (1.95%) and gamma-tocopherol (1.16%) occurred in water-soluble portion.

Z. officinale rhizome analysis revealed presence of 93 compounds, including alpha-zingeberine (16.5%), gingerol (9.25%), alpha-sesquiphellandrene (8.3%), zingerone (6.78%), beta-bisabolene (4.19%), alpha-farnesene (3.56%), ar-curcumene (3.29%), gamma-elemene (1.25%) and other compounds.

Conclusion and significance: The study demonstrated presence of compounds having antioxidant activity, effects on intestinal cholesterol absorption and regulation of serum cholesterol levels which reflects activities of extracts.

Evaluation of the extracts' pharmacologic activities at individual compound level is required to assess their potential as prospective therapeutic agents.

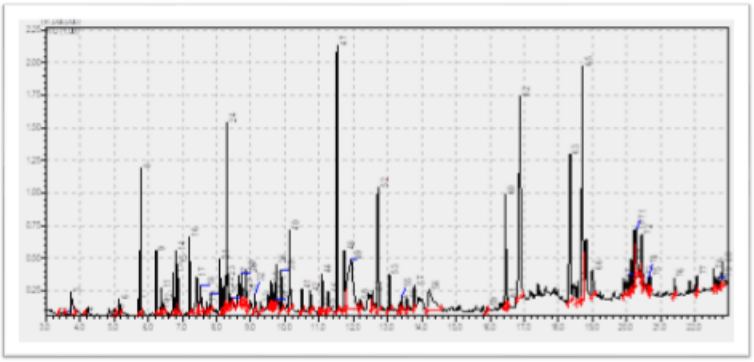


Fig. 3.17 Gas Chromatogram of *Citrus reticulata* fruit peel 96% ethanolic extract.

Recent Publications

1. Banerjee S, Mullick H, Banerjee J, GHOSH A. Zingiber officinale:'a natural gold'. International Journal of Pharmaceutical and Bio-Sciences. 2011 2(3):283-94.
2. Dar AA, Arumugam N. Lignans of sesame: Purification methods, biological activities and biosynthesis–a review. Bioorganic chemistry. 2013; 50(1):1-10.
3. Qidwai W, Jahan F, Nanji K. Role of Complementary and Alternative Medicine in Controlling Dyslipidemia. Evidence-Based Complementary and Alternative Medicine. 2014; 14(2):1-2.
4. Suja KP, Jayalekshmy A, Arumughan C. Free radical scavenging behavior of antioxidant compounds of sesame (Sesamum indicum L.) in DPPH system. Journal of Agricultural and Food Chemistry. 2004; 52(4):912-5.
5. Tomar A, Mall M, Rai P. Pharmacological importance of citrus fruits. International Journal of Pharmaceutical Sciences and Research. 2013; 4(1):156-60.



Biography

Samar Saadeldin has her passion in improving the health and wellbeing in Sudan. Her research was based on the evaluation of the pharmacologic properties of locally grown and imported plants and analysis of the active constituents of these plants. The research which she conducted won the university prize as the best one held in faculty of pharmacy at the year of her graduation at 2015, where she graduated as student with best academic performance, since then she conducted her national country service at the National Medicines and Poisons Board. She wishes to continue her studies in attaining master's degree and further development in the field of pharmaceutical sciences.

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