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## A Comparative Study Of Physicochemical, Phyto Chemical And FTIR Analysis Of Clove Oils.

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### ABSTRACT

This research is carried out to evaluate different physicochemical parameters and phyto-chemical components for a comparative study of different samples of clove oils, in terms of pH, viscosity, density, amount of Sodium, Potassium, Calcium, Copper and Magnesium. In this study, it has been found that there are only slight differences between three samples. This study focused on analysis of different parameters like, Density (1.34, 1.56, 1.01), Viscosity (300, 150, 600), Specific Gravity (0.95, 0.96, 0.91), In phyto-chemical study all these samples contain Carbohydrates, Cardiac glycosides, Quinones, Tannins, Terpenoids and Anthraquinones, Phenols, Glycosides, Coumarins, Steroids and phytosteroids, Flavonoids are absent. In the analysis of mineral composition the amount of Sodium found (5.31, 4.45, 3.28), amount of Potassium (12.87, 18.43, 15.85), amount of Calcium (8.54, 10.56, 7.34), amount of Copper (0.087, 1.34, 1.03), amount of Zinc (0.023, 0.045, 0.32), and amount of Magnesium (5.25, 4.45, 3.65) in three types of samples.

**Keywords:** Clove oils, Physico-chemical analysis, phyto chemical screening, Functional study, Metal composition.

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## INTRODUCTION

Cloves have been used historically to treat many ailments. They have antiseptic, antibacterial, antifungal, antispasmodic, antiviral, ant parasitic, analgesic, and simulative properties making them a great overall healer. They can be used to stimulate the mind as well as prevent nausea, diarrhoea, ease coughs, aid in digestion, and even treat conditions.

**Table 1: Importance of minerals**

Minerals	Benefits
Potassium	Essential to your cells' ability to function, helping them to produce energy
Calcium	Maintaining your skeleton It helps in bound, teeth and muscle growth. It protects against cancer. It treats of high blood pressure.
Iron	Iron is an essential part of hemoglobin; that transports oxygen through our bodies. It responsible for producing energy. It protects renal failure.
Zinc	Acts as an antioxidant, building up the body's immune system It helps stimulate the activity of at least 100 different enzymes. It plays a major role in growth and development of human body. It supports the action of the immune system.
Magnesium	Helping to create essential enzymes for building bones. It regulates the heartbeat and prevents its flocculation. It protects against weak bound. Enhances body immunity and increases its ability to resist disease.
Copper	Essential for healthy blood, bones and brains.
Sodium	<b>Water balance:</b> it helps to regulate fluid levels in the human body. Channels are what pump water into the cell and regulate the amount of extra cellular fluid in the body. <b>Brain function:</b> the brain is very sensitive to change in sodium levels of the body. Eliminates excess carbon dioxide: sodium removes any excess carbon dioxide. Regulate glucose absorption: it helps in transportation of nutrients in the body cell membranes.

### Medicinal importance of Clove oils:

1. **Skin Care:** Clove oil is often recommended for skin care, especially to acne patients.
2. **Stress:** Clove oil serves as an excellent stress reliever it has a stimulating effect on the mind and removes exhaustion and when taken internally, amounts, it refreshes the mind. Clove oil also induces sleep and is helpful to insomnia patients.
3. **Headaches:** Clove oil when mixed with salt, and applied gives cooling effect and helps in getting relief from headache.
4. **Earache:** Know as a good remedy for earaches.
5. **Indigestion:** Clove oil is effective in stomach related problems such as hiccups, indigestion, and motion sickness and hence, clove one of the important spices added in Indian dishes.

## MATERIALS AND METHODS

**Analyses of Physicochemical Properties:** The analyses involves the estimation of-density, viscosity, Specific gravity, Smell and Appearance of the oil were carried out in the present study.

**Analyses of Phytochemical components:** Involves the screening of Flavonoids, Phenol, Tannins, Saponins, Phlobatannins, Alkaloids, Steroids, Terpenoids, Glycosides, and Anthraquinones.

**Determination of Mineral Elements:** The elements were extracted from the oil by the wet digest method. The digested sample was analyzed for the elemental composition using Atomic Absorption Spectrophotometer

(AAS) and Flame Emission Spectrophotometer (FES). Zn, Fe, Mg, Cu, Mg, Na, K and Ca were determined and the concentrations of the elements were presented in mg/L.

**RESULT AND DISCUSSION**

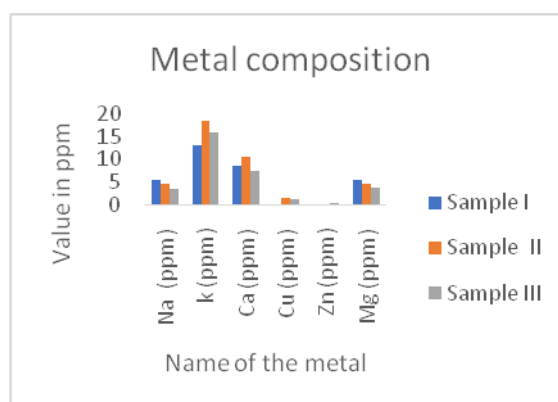
The results of the phytochemical components are presented in table 2, Physicochemical Properties & Mineral Composition are presented in Table 3, and functional components are in table 4 and 5 respectively.

**Table 2: Phyto chemical components**

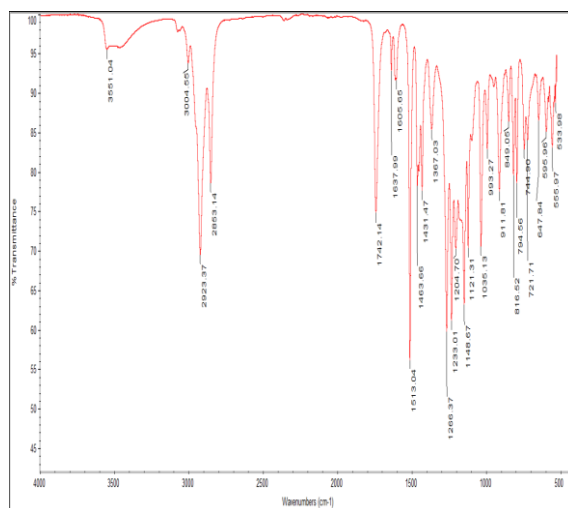
Phyto chemical constituent	Type of sample		
	(I)	(II)	(III)
Carbohydrates	+	+	+
Cardiac glycosides	+	+	+
Quinones	+	+	+
Tannins	+	+	+
Anthraquinones	-	-	-
Phenols	-	-	-
Glycosides	-	-	-
Coumarins	-	-	-
Steroids and phytosteroids	-	-	-
Flavonoids	-	-	-
Phlobatannins	-	-	-
Terpenoids	+	+	+

**Table 3: Physico chemical components**

Parameter	Type of sample		
	(I)	(II)	(III)
Density (g/l)	1.34	1.56	1.01
Viscosity (mpas)	300	150	600
Specific Gravity	0.95	0.96	0.91
Na (ppm)	5.31	4.45	3.28
K (ppm)	12.87	18.43	15.85
Ca (ppm)	8.54	10.56	7.34
Cu (ppm)	0.087	1.34	1.03
Zn (ppm)	0.023	0.045	0.32
Mg (ppm)	5.25	4.45	3.65



**Figure: Metal composition (ppm)**

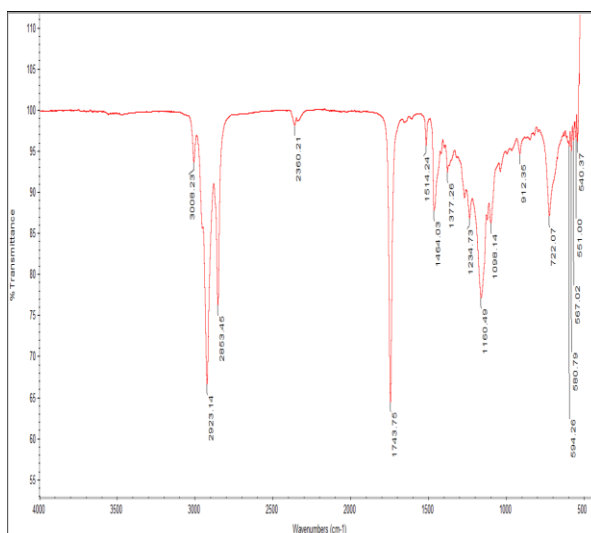


**Table 4: Functional study-Sample-I**

Transmittance (%) vs. Wave numbers (cm <sup>-1</sup> )	Functional group
3008.23	Alkene (=C-H)
2923.14	Alcohol (C-H)
2853.45	Alkane (C-H)
2360.21	Alkane (-C-H)
1743.75	Acid (C=O)
1514.24	Carbonyl (C=O)
1377.26	Alkane (C-H)
1234.73	Amine (C-N)
1160.49	Amine (C-N)
1098.14	Amine (C-N)
722.07	Alkylhalide

**Table 5: Functional study-Sample-II**

Transmittance (%) vs. Wave numbers (cm <sup>-1</sup> )	Functional group
3551.04	Alcohol (OH)
3004.55	Alcohol (OH)
2923.37	Alkane (H-C)
2853.14	Alkane (H-C)
1742.14	Aldehyde (C=O)
1637.99	Amide (C=O)
1513.04	Amide (-NH-)
1463.66	Alcohol (-C-H-)
1367.03	Alcohol (-C-H-)
1035.13	Alcohol (-C-H-)
647.84	Alkylhalide (-C-Cl)



**Author’s contribution statement:** Gopala Krishna Devisetty Planned entire study, designed the analysis and wrote the paper, RaithaSuliaman Al-zakwani, Suaad Said al-mayahy, Ruqayayhaya al- Abri collected the data and performed the analysis.

**Statistical analysis:** The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different studies. The analysis of variance revealed at significance of  $P < 0.05$  level is mentioned wherever required.

### CONCLUSION

Phytochemicals and secondary metabolites play a very crucial role as anti- diabetic and anti-cancer activity. The current studies on different varieties of clove oils has clearly indicated the presence of various phytochemicals. The other tests for pertaining to FTIR analysis has indicated the presence of bioactive functional groups. The physico-chemical parameters were found to be well within this standard limits.

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### REFERENCES

- [1] Muszyński J., *Farmakognozja*, PZWL Warszawa 1957.
- [2] *Encyklopediazielarstwaiziołolecznictwa*, pod red. H. Strzeleckiej J. Kowalskiego, PWN, Warszawa, 2000..
- [3] Jaroniewski W., *Goździki (Caryophylli) – Azjatyckisurowiecleczniczyiprzyprawaaromatyczna*, *FarmacjaPolska*, 1983, 39(12), 719-722.
- [4] Rutkowski A., Gwiazda S., Dąbrowska K., *Kompendiumdodatków do żywności*, Hormitex, Konin 2003.
- [5] Pourgholami M.H., Kamalinejad M., Javadi M., Majzoob S., Sayyah M., Evaluation of the anticonvulsant activity of the essential oil of *Eugenia caryophyllata* in male mice, *Journal of Ethnopharmacology*,1999, 64, 167–171.
- [6] Wenqiang G., Shufen L., Ruixiang, T.Shaokun Y., Q., Comparison of essential oils of clove buds extracted with supercritical carbon dioxide and other three extraction metods, *Ford Chemistry*, 2007, 101. 1575-1581.
- [7] Neumüller, O.A., *RömpfsChemie-Lexikon*, Stuttgart 1972.
- [8] Rodrigues, V. M., Sousa, E. M. B. D., Monteiro, A. R., Chiavone-Filho, O., Marques, M. O. M., &Meireles, M. A. A. (2002). Determination of the solubility of extracts from vegetable material in pressurized CO<sub>2</sub>: a pseudo-ternary system mixture formed by cellulosic structure + solute + solvent. *Journal of Supercritical Fluids*, 22, 21–36.



- [9] Scalia, S. L., &Giuffreda, P. P. (1999). Analytical and preparative supercritical fluid extraction of Chamomile flowers and its comparison with conventional methods. *Journal of Pharmaceutical and Biomedical Analysis*, 21, 549–558.
- [10] Smith-Palmer, A., Stewart, J., & Fyfe, L. (1998). Antimicrobial properties of plant essential oils and essences against five important foodborne pathogens. *Letters in Applied Microbiology*, 26, 118–122