IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Qualitative Phytochemical Analysis Of Nigella Sativa Mother Tincture

[1]ARUNIMA R S, [2]KRISHNA KUMARI C R

[1]PG SCHOLAR, [2] PROFESSOR AND RESEARCH GUIDE

[1] Department of Materia Medica,

[1]Sarada Krishna Homoeopathic Medical College & Hospital, Kulasekharam, India

ABSTRACT: Nigella sativa, a flowering plant indigenous to the Southwest Asian region, is commonly called black seed or black cumin. The seeds of this botanical species have been utilized extensively throughout history in traditional medicinal applications and culinary practices. This study aims to understand the major phytochemical constituents in the Nigella sativa mother tincture. The qualitative analysis was done with the homoeopathic mother tincture of Nigella sativa. Employing various analytical techniques, a spectrum of bioactive compounds was identified with the homoeopathic medicine Nigella sativa. This study presents evidence of phytochemical components such as alkaloids, tannins, steroids, and quinones. The elucidation of the medicinal compounds in the homoeopathic mother tincture of Nigella Sativa aids in a better understanding of its therapeutic properties, paving further research and development in harnessing the plant's potential for pharmaceutical application.

Keywords: Nigella Sativa, Phytochemical Analysis, Bioactive Compounds, Quinones

INTRODUCTION

Nigella sativa, a member of the Ranunculaceae family, is a widely used medicinal plant globally. This annual flowering plant, known as kalonji or black cumin, is believed to be indigenous to the Mediterranean region. However, it has been cultivated and disseminated to other parts of the world, including the Arabian Peninsula, northern Africa, and Asia. It grows to 25–30 cm tall and has linear lanceolate leaves. The fruits have large and inflated capsules containing 3-7 united follicles, each containing numerous seeds. The black-coloured seeds are flattened, oblong, and angular, with a funnel-shaped appearance and dimensions of approximately 0.2 cm in length and 0.1 cm in width. [1]

Nigella sativa seeds have wide therapeutic effects and have been reported to have significant effects against many ailments such as skin diseases, jaundice, gastrointestinal problems, anorexia, conjunctivitis, dyspepsia, rheumatism, diabetes, hypertension, intrinsic haemorrhage, paralysis, amenorrhea, anorexia, asthma, cough, bronchitis, headache, fever, influenza, and eczema. The seeds have high nutritional value and contain 40% fixed oil and 1.4% volatile oils. Most of the pharmacological properties of Nigella sativa are mainly due to quinine constituents, of which thymoquinone is the most abundant. [2] Nigella sativa exhibits antioxidant, anti-inflammatory, and immunomodulatory properties. The Nigella Sativa is an inexpensive, accessible herb with many pharmacological components and a wide spectrum of medicinal properties. [3]

OBJECTIVES

The study objective was to identify the phytochemical components in the Nigella sativa homoeopathic mother tincture.

MATERIALS & METHODS

The drug for the study, mother tincture of homoeopathic medicine Nigella sativa was purchased from St. George's Homoeopathic Pharmacy (GMP certified).

Qualitative analysis was done for Nigella Sativa homoeopathic mother tincture to identify the presence of the following phytochemical constituents such as alkaloids, flavonoids, tannins, phenol, terpenoids, glycoside, saponin, steroids, and quinones by standard procedures.

TEST FOR ALKALOIDS

MAYER'S TEST: The extract was evaporated in a test tube. To the residue, dilute HCL was added, shaken well and filtered. To the 2-3 ml of filtrate Mayer's reagent was added. The formation of a yellow precipitate showed the presence of alkaloids. [4]

TEST FOR FLAVONOIDS

ALKALINE REAGENT TEST: 2 ml of 2.0% NaOH was mixed with extract; a concentrated yellow colour was produced. This result showed the presence of flavonoids. [5]

TEST FOR TANNINS

LEAD ACETATE TEST: On addition of lead acetate solution to the extract white precipitate appeared. [6]

TEST FOR SAPONINS

FOAM TEST: Crude extract was mixed with 5ml of distilled water in a test tube and shaken vigorously. The formation of stable foam was taken as an indication of the presence of saponins. [7]

TEST FOR TERPENOIDS

To the test solution, 2ml chloroform was added with a few drops of concentrated sulphuric acid (3ml) at the side of the test tube. An interface with a reddish-brown colouration is formed if terpenoids are present. [8]

TEST FOR GLYCOSIDES

KELLER-KILIANI TEST: To 2 ml of the extract, glacial acetic acid, one drop of 5% FeCl3 and concentrated sulphuric acid were added. A reddish brown colour appeared at the junction of two liquid layers and the upper layer turned bluish green indicating the presence of glycosides. [4]

TEST FOR PHENOL

IODINE TEST: 1 ml aqueous extract is mixed with a few drops of diluted iodine solution and a transient red colour indicates a positive response. [9]

TEST FOR STEROIDS

SALKOWSKI TEST: To 2 ml of sample, 2 ml of chloroform and 2 ml of conc. H2SO4 was added. The solution was shaken well. As a result, the chloroform layer turned red and the acid layer showed greenish-yellow fluorescence. [10]

TEST FOR QUINONES

ALCOHOLIC POTASSIUM HYDROXIDE (KOH) TEST: To 1ml of extract, alcoholic KOH is added. The presence of red, blue or deep purple colour indicates the presence of quinones. [11]

RESULTS & DISCUSSIONS

The phytochemical constituent analysis of homoeopathic mother tincture Nigella sativa was done and the results are shown in Figure 1 and tabulated in Table 1. The results revealed that the sample contains important bioactive compounds such as alkaloids, flavonoids, tannins, phenol, terpenoids, glycosides, steroids, and quinones. The sample is devoid of any traces of saponins.

Figure 1: Results of qualitative analysis of Nigella sativa mother tincture

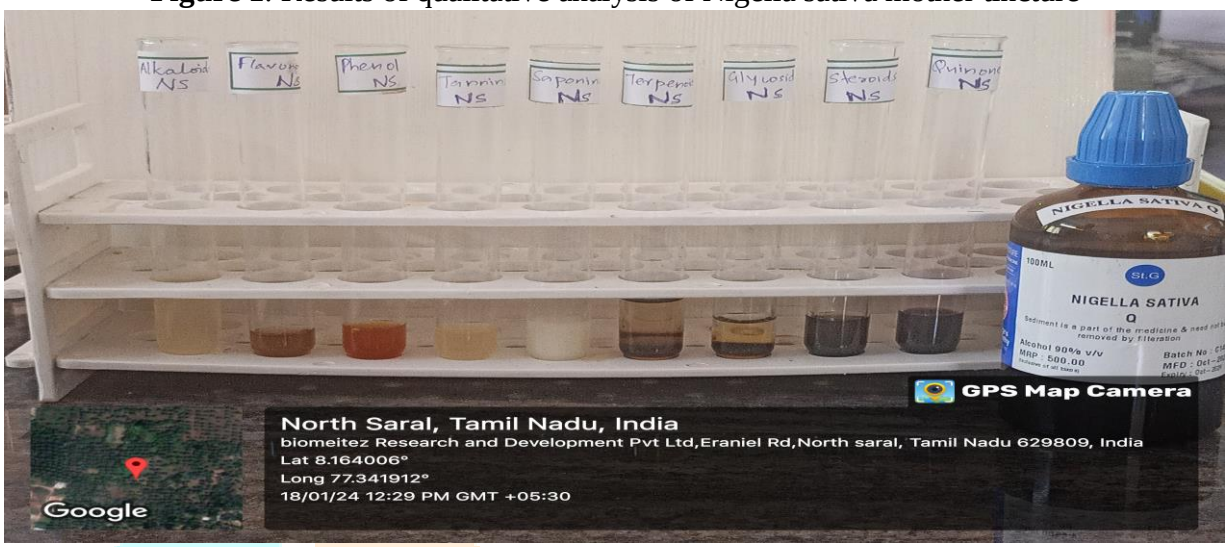

Table 1: Phytochemical Screening of Nigella sativa mother tincture

Phytochemicals	Tests	Observations	Nigella sativa (Inference)
Alkaloids	Mayer's test	Yellow precipitate	+
Flavonoids	Alkaline reagent test	Concentrated yellow colour	+
Tannins	Lead acetate test	White precipitate	+
Saponins	Foam test	No formation of foam	-
Terpenoids	Salkowski test	Reddish brown colour	+
Glycosides	Keller-kiliani test	Reddish brown at the interface	+
Phenols	Iodine test	Transient red colour	+
Steroids	Salkowski test	Red colour	+
Quinones	Alcoholic KOH test	Deep purple colour	+

The different phytochemicals in the Nigella sativa mother tincture have anti-inflammatory, anti-allergic, anti-cancer, hypoglycemic, antioxidant, hypotensive, hypolipidemic, and immunomodulating properties. They also have nephroprotective, diuretic, anti-ulcer, and hepatoprotective effects. Nigella sativa additionally shows a neuroprotective effect in Alzheimer's and Parkinson's diseases, depression, and epilepsy. [12] The most abundant bioactive component of the black cumin seeds is thymoquinone, a type of quinone known to have anti-diabetic and anti-cancerous properties. [13]

CONCLUSION

The Homoeopathic mother tincture preparation of Nigella sativa shows the presence of important bioactive compounds available in its crude form of black cumin seeds. Nigella sativa has been historically known as a miracle herb. The findings of this phytochemical qualitative analysis show a positive indication of active phytoconstituents such as alkaloids, flavonoids, tannins, glycosides, phenol, terpenoids, steroids and quinones in commercially purchased samples of homoeopathic medicine Nigella sativa mother tincture. This study gives insights into phytoconstituents that contribute to the different pharmacological properties and the curative action of the homoeopathic medicine Nigella sativa. Further studies such as quantitative analysis and chromatographic techniques like HPLC and UPLC would be required to understand the purity, potency and drug metabolites.

ACKNOWLEDGEMENT

I am profoundly grateful to my guide Dr. C.R KRISHNAKUMARI AMMA, M.D (Hom.), Professor and Research Guide, Sarada Krishna Homoeopathic Medical College for her expertise and support in fulfilling this work.

REFERENCES

1."NIGELLA SATIVA MEDICINE FOR TREATMENT OF MALIGNANT GROWTH", International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN:2349-5162, Vol.5, Issue 2, page no.1058-1063, February-2018.

2. Gupta VK, Mathur M. Immunomodulatory effects of homoeopathic medicines: A review of pre-clinical studies. Indian J Res Homoeopathy 2018; 12:90-4

3. Murphy R. Lotus Materia Medica. New Delhi, India: B Jain; 2021.pg No:1233

4. Ansari, S. H. 2006. Essentials of pharmacognosy, 1st edition, Birla publications, New Delhi. pp. 357-359, 588-590.

5. Gul R, Jan SU, Syed F, Sherani F, Nusrat Jahan. Preliminary Phytochemical Screening, Quantitative Analysis of Alkaloids, and Antioxidant Activity of Crude Plant Extracts from Ephedra intermedia Indigenous to Balochistan. The Scientific World Journal, 2017, 1-7.

6. Mukherjee, P. K. 2002. Quality control of herbal drugs, business horizons pharmaceutical publishers, New Delhi. 356 - 358.

7. Sanjay R. Biradar, Bhagyashri D. Rachetti and Suryawanshi V.S. (2013). Phytoconstituents of a Valuable Ayurvedic Medicinal Herb Centella asiatica (L.) URB. Trends in Biotechnology Research, 2(1): 12-16

8. Horbone, J.B., In: Phytochemical methods, 2nd edition. Chapman and Hall, New York,1984.

9. Singh V, Kumar R. Study of Phytochemical Analysis and Antioxidant Activity of Allium sativum of Bundelkhand Region. International Journal of Life Sciences Scientific Research. 2017; 3(6):1451-1458.

10. Indian Pharmacopoeia (IP). 1996. Govt. of India, Ministry of Health and Family Welfare Published by the Controller of Publications, New Delhi, A-47, A-53, A-54.

11. Balamurugan V, Fatima MA, Velurajan S (2019). A Guide to Phytochemical Analysis, International Journal of Advance Research and Innovative Ideas, 5(1): 2395-4396.

12. Zielińska M, Dereń K, Polak-Szczybyło E, Stępień AE. The Role of Bioactive Compounds of Nigella sativa in Rheumatoid Arthritis Therapy-Current Reports. Nutrients [Internet]. 2021 Sep 25;13(10):3369.

13. Yuan T, Nahar P, Sharma M, Liu K, Slitt A, Aisa HA, et al. Indazole-Type Alkaloids from Nigella sativa Seeds Exhibit Antihyperglycemic Effects via AMPK Activation in Vitro. Journal of Natural Products. 2014 Oct 9;77(10):2316–20.