



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**
'A Bridge Between Laboratory and Reader'

www.ijbpas.com

**PHYTOCHEMICALS SCREENING OF *Nigella sativa* L. SEEDS FOR HYPOTHYROID
TREATMENT**

BHARADWAJ N^{1*} AND SIDDIQUI N²

¹Dean, Faculty of Science, Dr. C.V. Raman University, Kota, Bilaspur (CG)

²Ph.D. Scholar, Dept. of Chemistry, Dr. C.V. Raman University, Kota, Bilaspur (CG)

***Corresponding Author: E Mail: nbnillsweet@gmail.com**

Received 9th Dec. 2019; Revised 6th Jan. 2020; Accepted 8th Feb. 2020; Available online 1st Aug. 2020

<https://doi.org/10.31032/IJBPAS/2020/9.8.5151>

ABSTRACT

Medicinal plants are the richest bio-resources of drugs for traditional system of medicine. The present study deals with the phytochemical screening of *Nigella sativa* L. seeds which can be used in hypothyroid treatment. Hypothyroid is also called underactive thyroid or low thyroid. It is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone. *Nigella sativa* L. seeds, commonly known as black cumin seeds, are a remedy for everything but death may provide an ideal treatment for autoimmune thyroid condition. It also has anti-thyroid activities.

The extraction of seed oil was done by Soxhlet apparatus, using methanol as solvent and after extraction, its phytochemical screening is done followed by qualitative analysis of phytochemicals i.e. test of Alkaloids, Flavonoids, Terpenoids, Steroids, Phenols, Tannins, Saponins and Cardiac Glycosides, by using the standard methods of Harborne. Quantitative analyses were also done to determine the amount of such phytochemical, by using the standard methods.

Phytochemicals, alkaloids, flavonoids, terpenoids, steroids and cardiac glycosides are present in varying amounts which can be used in future for preparation of herbal medicine of hypothyroidism.

Keywords: *Nigella sativa*, Soxhlet apparatus, Cardiac Glycosides, Terpenoids, Flavonoids

INTRODUCTION

The thyroid is a small butterfly – shaped gland is located in front of neck, just below the voice box (larynx). This gland plays a very important role in controlling our body metabolism i.e. the rate at which our body uses energy and it does this by producing thyroid hormones like thyroxin or T₄ and Triiodothyronine or T₃, chemicals that travel through our blood to every parts of our body. It produces chemicals that help the body to control metabolism. Thyroid hormone is normally produced in response to another hormone released by the pituitary gland [1]. Generally, thyroid problem are grouped in to two main categories i.e. hyperthyroidism (too much thyroid hormone), and hypothyroidism, (too little thyroid hormone) here we discuss about hypothyroidism, the most common symptoms of hypothyroidism includes fatigue, depression, constipation, weight gain, slow heart rate etc. *Nigella sativa* Linn (Kalaunji) seeds are extensively used for medicinal purpose in Asia, Middle East and Far East countries for a long time. *Nigella sativa* may have antithyroid properties. *Nigella sativa* is a local annual dicotyledonous herb of Ranunculaceae family, maximum height of this plant is about 60 cm. There are different names of *Nigella sativa* in different languages in

different region of the world e.g., Kalaunji (Urdu), black cumin (English), shone (Persian), kalajira (Bengali) [2]. The seeds of *Nigella sativa* are known as black cumin seeds and they are very important in many pharmacological studies for its immune modulatory and therapeutic properties [3]. The most important compounds are due to which medicinal value of these seed increased are saponins flavonoids, volatile oils and trace elements [4]. Seeds of *Nigella sativa* are being used for thousands of years as remedies for number of traditional diseases [5]. *Nigella sativa* in traditional medicines as well as in recent years has been used for the treatment of microbial disease. In Egypt from a long time oil of *Nigella sativa* has been used for severe cough and asthma [6]. It is observed that many pharmacological activities such as antithyroid, antioxidants, anticancer, anti-inflammatory and anti asthmatic activities are also shown by this miraculous medicinal plant [7]. Black cumin seeds decrease the absorption of lipids which can lower the cholesterol and triglyceride level which can help in weight loss [8].

EXPERIMENTAL

Chemical and reagents

Mayer's reagent, Wagner reagent, Hager's reagent, Ferric chloride (FeCl₃), chloroform (CHCl₃), Conc. H₂SO₄, methanol, sodium hydroxide, lead acetate solution, copper acetate, dil HCl, sodium bicarbonate, Ammonia solution, alpha naphthol, acetic anhydride.

Phytochemical analysis

Different chemical tests were carried out for identification of different phytochemical constituents found in methanol extract of *Nigella sativa* seeds only standard methods were used for phytochemical analysis.

Preparation of reagents

- A) Mayer's reagent- Potassium mercuric iodide
- B) Wagner's reagent-Iodine in potassium Iodide
- C) Hager's reagent-saturated solution of picric acid.

MATERIAL & METHODS

Seeds of *Nigella sativa* were collected from local market of Bilaspur district of Chhattisgarh and pulverized by using household electric grinder. Solvent extractions were performed to extract oil from seeds using Soxhlet apparatus using methanol as solvent.

Qualitative Analysis [9]

Qualitative test of phytochemicals present in active extract of *Nigella sativa* was done by standard method of Harborn.

Quantitative Analysis

Determination of alkaloids

Quantitative analysis of alkaloids was according to the methodology by Harborne, exactly 200ml of 10% acetic acid in ethanol was added to 250ml of sample. And Beaker is allowed to stand for 4hrs. The extract was concentrated on a water bath to the quarter of the original volume followed by addition of 15 drops of concentrated Ammonium Hydroxide drop wise to the extract until the precipitation was complete immediately after filtrations. After 3hrs of mixture sedimentation precipitate were washed with 20 ml of 0.1 M of ammonium hydroxide and then filtered. After filtrations residue was dried in an oven and the % of alkaloid is expressed by this formula- -

$$\% \text{ of alkaloid} = \frac{\text{weight of alkaloid}}{\text{weight of sample}} \times 100$$

Determination of terpenoids

Two ml of sample was mixed in 25 ml of ethanol and placed overnight. It was filtered and mixed in ether (50 -60 deg centigrade) then dried and then % is calculated.

$$\% \text{ of terpenoids} = \frac{\text{weight of terpenoids}}{\text{weight of sample}} \times 100$$

Determination of flavonoids

One gram of seed sample was extracted with repeatedly extracted with 100ml of 80% aqueous methanol at room temperature .the mixture was filtered through a what man No.1 filter paper in to a pre weighted 250ml beaker. The filtrate was transferred in to a water bath and allowed to evaporate to dryness and weighted.

$$\% \text{ of Flavonoid} = \text{Weight of Flavonoid/Weight of sample} \times 100$$

Determination of saponins

The seed sample was ground and 20gm of sample is put in to conical flask and 100ml of 20% ethyl alcohol is added to sample. The sample is heated over a hot plate for 4 hrs with continuous stirring at about 55degree centigrade. The mixture is then filtered and the residue is re extracted with another 200ml of 20% ethyl alcohol. The combined extract is reduced to 40ml over a water bath at about 90 degree centigrade. The concentrated is then transferred into 250ml separating funnel and 20ml of $(\text{CH}_3 \text{CH}_2)_2 \text{O}$ is added to the extract and vigorously shaken. The layer is recovered while the $(\text{CH}_3\text{CH}_2) \text{O}$ is discarded and purification process is repeated. 60 ml of N-butane is added and combined N butane extract is washed twice with 10ml of 5% NaCl The remaining solution is then heated in a water bath and after evaporation, the

sample are dried in the oven to a constant weight [10].

$$\% \text{ of saponins} = \text{weight of saponins / weights of sample} \times 100$$

Determination of total phenols

The sample was boiled with 50 ml of ever for the extraction of the phenolic component for 15 min . Five ml of the extract was pipette out in to 50ml flask then 10 ml of distilled water was added. Two ml of NH_4OH solution and 5ml of concentrated amyl alcohol were also added. The samples were made up to mark and left to reach for 30 min. for color development this was read at 505 nm [11].

RESULT AND DISCUSSION

In the present study qualitative phytochemical analysis of methanol extract of *Nigella sativa* shows the presence of alkaloids , Terpenoids, steroids, phenols, flavonoids, saponins, diterpenes, carboxylic acid, coumarins , carbohydrates while Emodol was not found in methanolic extract of *Nigella sativa*.

Quantitative analysis of *Nigella sativa* shows the quantity of alkaloids 0.239mg, flavonoids 0.040mg, saponins 0.37mg, phenols 0.89mg, terpenoids 0.043mg. Due to presence of these phytochemicals the importance of *Nigella sativa* in medicinal fields has been increasing day by day. It is observed that many

pharmacological activities such as antioxidants, anticancer, anti-inflammatory, anti thyroid activities are shown by this miracle seeds.

Table 1: Phytochemical constituents of methanolic extract of *Nigella sativa* seeds

Alkaloids	Mayer's test	+
	Wagner's test	+
	Hager's test	+
Terpenoids	Salkowski test	+
Phenols	Ferric chloride	+
Steroids	Acetic anhydride+H ₂ SO ₄	+
Flavonoids	Alkaline reagent test	+
Saponins	Froth test	+
Diterpenes	Copper acetate	+
Coumarine	Sodium hydroxide	+
Carbohydrate	Molish test	+
Emodol	25% NH ₃ solution	-

(+) Detected, (-) Not detected

Table 2: Quantitative study of *N. Sativa*

Alkaloids	0.239 mg
Flavonoids	0.040 mg
Saponins	0.37 mg
Phenols	0.89 mg
Terpenoids	0.043mg

CONCLUSION

It is observed that black cumin seeds decreased the absorption of lipids which can lower the cholesterol and triglycerides level, which help in reducing body weight and constipation, which is the major symptoms of hypothyroidism [12]. Due to the presence of such phytochemicals in *Nigella sativa* seeds the medicinal value of this seeds is increased. It can be used in future for preparation of herbal drugs and the advantage of this herbal drug is that it can be used for life longtime without any side effects

Acknowledgement

I would like to acknowledge Dr C. V. Raman University Kota Bilaspur for providing laboratory facility.

REFERENCES

- [1] Dr. Ram Kumar Hypo therapist in Delhi. [www.psychicsolutionindia.com]
- [2] Khan, M .A (1999), chemical composition and medicinal properties of *Nigella sativa* Linn. *Inflammopharmacology* 7 (1); 15-35.
- [3] M .L. (2005) immunomodulatory and therapeutic properties of the *Nigella sativa* L. seeds. *International immunopharmacology* 5(13), 1749-1770.
- [4] Salih B., Sipahi, T and Donmez, E.O., (2009). Ancient *Nigella* seeds from Boyali Hoyuk in north-central Turkey, *J. ethnopharmacology* 124 (3); 416-420.

- [5] Toncer, O and kijizil, S., (2004), efficacy of seed rate on agronomic and technologic characters of *Nigella sativa* L. International journal of agriculture and Biology 6(3); 529-532.
- [6] Zawahry, M., (1963), Isolation of a new hypotensive fraction from *N. Sativa* seeds Konger pharmaceutical wise vortr origenatitt 23,193-203.
- [7] Sahib, S.H, Desai S., Das K.K. and Haeena S., (2016). Effect of *Nigella sativa* Seeds on streptozoto'cin, induced diabetic renotoxicity; histological observation int. J, Anat, Res 4(3), 2566-70.
- [8] Tiwari *et al.* (2011), Phytochemical screening and extraction; a review; International pharmaceutical sciences 1(1), 98-106.
- [9] Harborne J. B, Phytochemical method- A Guide to Modern Techniques of Plant Analysis (1973). Chapman and Hall Ltd, London, Pp. 279.
- [10] Kumar S.R, Venkateshwar C., Samuel and Gangadhar R. S., (2013), phytochemical Screening of some compounds from leaf extracts of *Holoptellia integrifellia* (planch). International Journal of Engineering science international 2; 65-70.
- [11] Nasir U. and Irsha, S. (2015), evaluation of the antimicrobial activity of aquous ethanolic and methanolic extracts of *Nigella sativa* (Kalaunji) against gram positive and gram negative bacterial isolates pak J. Biochem. Biol.48; 92-96.
- [12] Farhangi, M. A., Dehghan, P., Tajmiri, S., & Abbasi, M. M. (2016). The effects of *Nigella sativa* on thyroid function, serum Vascular Endothelial Growth Factor (VEGF) - 1, Nesfatin-1 and anthropometric features in patients with Hashimoto's thyroiditis: a randomized controlled trial. *BMC complementary and alternative medicine*, 16(1), 471. <https://doi.org/10.1186/s12906-016-1432-2>.