Comparative Study of Phytochemical Analysis of Nigella Sativa and Flax Seeds Used in Hypothyroid Treatment

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ABSTRACT
The medicinal importance of a plant is due to the presence of some special substances like alkaloids, glycosides, resins, volatile oil,gum, and tannins etc. Considering all these facts the present study is designed to investigate the presence of various phytochemical in two medicinal seeds out of which one is Flax seeds and the other one is Nigella Sativa seeds. Both the seeds are rich source of healthy fat, antioxidant and fibre. The nutrient in both the seeds help lower may risk of diabetes, cancer, heart disease and thyroid. and they have antioxidants, anticancer, anti-inflammatory and anti-thyroid activities. The present study deals with qualitative analysis which is done by (using standard method of Harborn) phytochemicals test of Alkaloids, Flavonoids, Terpenoids, Steroids, Phenols, Tannins, Saponins and Cardiac Glycosides followed by extraction of oil by Sohxlet apparatus .Quantitative analyses were also done to determine the amount of such phytochemical by using standard method of Harborn 1973. Phytochemicals, alkaloids, Flavonoids, Terpenoids, steroids and cardiac glycosides are present in varying amounts which may be used in future for preparation of herbal medicine

***Key words**:* Nigella sativa, Soxhlet apparatus, Cardiac Glycosides, Terpenoids, Tannins

I 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 Triode thyronine 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]** **G**enerally, 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**[2]**

In the plant kingdom there is remedy for every disease. About last few decades there were few or no synthetic drugs for the treatment of diseases. The plants were the main source of drugs from ancient time. Today medicinal plants have provided a source of drugs compounds to human health and well beings. Medicinal plants are the richest biosource of drugs for traditional system of medicine. World Health Organisation (WHO) has suggested that medicinal plant would be the good source to obtain variety of drugs. Since the use of medicinal plant based drugs contain least or no side effects. It can be considered to be great importance to the health of individuals and communities. Plant product derived from various part of the plants like seeds, fruits, bark, and flower. Leaf and roots. Various bioactive constituents of plant known as phytochemical are present in different parts of the plants. These phytochemical components are Alkaloids, Terpenoids, Carbohydrates, Tannins, Steroids and Phenolic compounds. In the present study we deals about two miracle seeds ie. Black cumin seeds (Nigella Sativa.L) is a miracle herb due to its wonderful power of healing. And the other one is flax seeds (Linum Usitassimum) which also have many medicinal values. Nigella sativa is commonly known as black cumin seeds or black caraway. Nigella sativa (a member of family Ranunculaceae) is an annual flowering plant with finely divided leaves and 20- 90 cm in heigh. The delicate flower s has 5-10 have 5-10 petals [3]

The seeds of Nigella sativa are known as black cumin seeds and they are very important in many pharmalogical studies for its immune modulatory and therapeutic properties **[4]** The most important compounds is due to which medicinal value of these seed increased are Saponins Flavonoids, volatile oils and trace elements**[5]** Seeds of Nigella sativa are being used for thousands of years as remedies for number of traditional diseases **[6]**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 **[7].**It is observed that many pharmalogical activities such as antithyroid, antioxidants, anticancer, anti-inflammatory and anti asthmatic activities are also shown by this miraculous medicinal plant.**[8,].**Black cumin seeds decrease the absorption of lipids which can lower the cholesterol and triglyceride level which can help in weight loss **[9]**. Similarly flax seeds are another miracle herb. Flax seeds is one of the oldest crops of family Linaceae, having been cultivated since the beginning of civilization **(10).** The Latin name of the flax seed is Linum usitatissimum, which means very useful. Flax seed is one of the richest plant source of omega -3 fatty acids.i.e. alpha

linolinic acid and liganans (phytoestrogens) (11)The important flax seeds growing countries are Canada ,China, U.S, India and Ethiopia. Flax seeds has potential health benefits besides the nutrition , due to mainly three reason ; Firstly due to its high content of omega -3-linolenic acid .Secondly being rich in dietary soluble and insoluble fibres and third ,due to its high contents of lignin, acting as antioxidants, phytoestrogens. The health benefits of all omega- 3 fatty acids have been widely reported for several conditions including cardiovascular diseases, hypertension, atherosclerosis, diabetes cancer, arthritis, osteoporosis, autoimmune and neurological disorder and anti-inflammatory (12).

II MATERIAL COLLECTION AND PROCESSING

(a) **Collection of seeds -** Seeds of Nigella sativa and flax seeds were collected from local market of Bilaspur district of Chhattisgarh and pulverized by using house hold electric grinder. Solvent extractions were performed to extract oil from seeds using sohxlet apparatus using methanol as solvent.

(b) **Methods of extraction by sohxlet apparatus-** 50gms of powdered sample seeds was filled in thimble and extracted exhaustively by sohxlet apparatus (6hr) using methanol as solvent at 60 degree. The extract obtained was collected and passed through Wattmann No.1 filter paper to remove all debris and unextracted matter. Filtered extract was concentrated using rotatary evaporator at 40 degree centigrade to obtain concentrated extract of seeds.

(c) **Phytochemical screening of seeds --** Phytochemical screening of both the seeds were performed by using standard method of Harborne (1973) and many phytochemicals such as Alkaloids, Terpenoids, phenols, Saponins , Flavonoids Steroids and Carbohydrates were detected from the extract of both the seeds.

III QUANTITATIVE ANALYSIS

Quantitative analysis of both the seeds were performed by using standard method of Harborn(1973).

(a) **Determination of Alkaloids -** Exactly200ml of 10% acetic acid in ethanol was added to 250mg of seeds 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

%of alkaloid =weight of alkaloid/ weight of sample X 100

(b) **Determination of Flavonoids -** 100 mg. 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.**[13}**

%of flavonoid= Weight of flavonoid/Weight of sample X100

(c) **Determination of Saponins -** The seed sample was ground and 500mg. 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 250mlseperating funnel and 20ml of (CH_3 CH_2)2O is added to the extract and vigorously shaken. The layer is recovered while the (CH_3CH_2) 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.

% of Saponins= weight of Saponins / weights of sample x100 **.**

(d) **Determination of total phenols -** The 200mg. of seeds sample was boiled with 50ml 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**.** [14]

(e) **Determination of Carbohydrates –**sample was hydrolysed in a boiling tube with 5ml of 2.5 N HCL in a boiling water bath for a period of 3 hrs. It was cooled at room temp and solid carbonate was added until effervescence ceases. The content was centrifuged and supernatant was made to 100ml by using distilled water. 0.2 ml of sample was pipette out and made up the volume to one ml with distilled water , then 1ml of phenol reagent was added and followed by 5.o ml of sulphuric acid ,the test tube were kept at 25-30 deg. Cen. For 20min The absorbance was read at 490 .

IV RESULT AND DISCUSSION

In the present study quantitative phytochemical analysis of methanol extract of Nigella Sativa shows the presence of alkaloids , Terpenoids, steroids, phenols, Flavonoids , Saponins , Diterpenes, carboxylic acid, Coumarins , Carbohydrates while E - medol was not found in Methanolic extract of Nigella sativa, and flax seeds.

Table -1
Phytochemical constituents of methanolic extract of nigella sativa and flax seeds

Phytochemical contituents	phytochemical test	Nigella sativa seeds	Flax seeds
Alkaloids	Mayer's test	+	+
	Wagner's test	+	+
	Hager's test	+	+
Terpenoids	Salkowski test	+	+
Phenols	Ferric chloride	+	+
Steroids	Acetic anhydride+H_2SO_4	+	+
Flavonoids	Alkaline reagent test	+	+
Saponins	Froth test	+	+
Diterpenes	Copper acetate	+	+
Coumarine	Sodium hydroxide	+	-
Carbohydrate	Benedicts test	+	+
E modol	25% NH_3 solution	-	_

(+) detected, Not detected (-)

Table -2
Quantitative study of N.Sativa and Flax seeds

Phytochemicals	Nigella Sativa Seeds	Flax seeds
Alkaloids	0.239 mg	0.16 mg
Flavonoids	0.040 mg	0.17 mg
Saponins	0.37 mg	0.41 mg
Phenols	0.043mg	0.23 mg
Carbohydrate	o.47 mg	0.49mg

Similarly quantitative analysis of Nigella sativa and flax seeds shows alkaloids 0.239mg 0.16mg, flavonoids 0.040 0.17mg, saponins 0,37 mg,0.41 mg phenols 0.043mg, 0.23mg and carbohydrate o.47mg, 0.49mg . From the quantitative analysis of both the seeds we have seen that the amount of alkaloids ,saponins, phenols, and carbohydrates are almost same but the amount of Flavonoids is more in flax seeds than Nigella Sativa seeds. Flavonoids are most commonly known for their antioxidant activity and act as transformers which modify the body s reactions to carcinogens, viruses and allergens. They possess anti-cancerous, anti-inflammatory, anti-microbial and anti-allergic activity **[15]** Due to presence of these phytochemical the importance of Nigella saliva seeds and flax seeds in medicinal field increasing day by day. It is observed that many pharmacological activities such as anticancer, antithyroid, antidiabetic are shown by these seeds.[9],[10].

V CONCLUSION

In the present study 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 **[9].** Similarly flax seeds is a rich source of essential fatty acids, Especially in the form of Omega -3- fatty acids. These fatty acids help to promote healthy hormone production and act as anti-inflammatory agents, flax seeds is most often used for constipation because of its content in Omega -3 fatty acids. They are important for normal function of the thyroid gland [12].

The medicinal value of this seeds in increased due to the presence of such phytochemical in Nigella Sativa seeds and flax seeds. It is used in future in pharmaceuticals company for preparation of herbal drugs and the advantage of this herbal drugs is that it can be used for life longtime without any side effects.

Conflict of Interest: There is no conflict of interest in this research work.

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