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Review Article

Phytochemical and Ethnopharmacological Review of Till Safeed (*Sesamum indicum Linn.*)

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Abstract

Within the management of health care, the traditional system of medicine remains indispensable. The Unani system of medicine treats a variety of illnesses with a range of medications derived from plants. Historically, people have utilized sesamum indicum seeds as a medicinal ingredient. Various parts of the plant have been used by traditional physicians. However, the dried seed and oil are commonly used as Till in Unani Medicine. The plant has a very long history of use as a medicinal herb. It can be used on its own or in compound pharmacopeial compositions with other medications. Till Safeed is an annual plant of family *Pedaliaceae* and this review article aims to describe morphological characteristics, phytochemistry, ethnobotanical uses and therapeutic properties of Till Safeed. So that subsequent study on any novel therapeutic activity based on phytochemistry can be conducted with greater simplicity and to support the revalidation of the drug's scientifically claimed actions as mentioned in classical literatures. We systematically searched classical Unani literature, online data sources (PubMed, Google scholar, Elsevier, Science Direct and Research Gate) and offline encyclopaedia and books on medicinal plants for the relevant data on Till Safeed. Polyunsaturated fatty acids, phytosterols, tocopherols, essential minerals, and a special class of phenylpropanoid chemicals called lignans—which include sesamin, sesamol, and sesamolin—are among the bioactive ingredients found in till seeds. The pharmacological characteristics of sesame lignans include. Antioxidant, antibacterial, antiproliferative, cholesterol-lowering, hepatic fatty acid oxidation enzyme-increasing, and anti-hypertensive properties.

Keywords: *Sesamum indicum,* Unani Medicine, phytochemistry, sesamin, sesamolin.

Introduction

Nature has been a wonderful source for medicine, and plants have played a vital role in providing nutrition and also significance in preserving health. According to a World Health Organization report, 80% of individuals in underdeveloped nations receive their basic medical care from alternative medicines. In traditional and contemporary medicine, plants play multiple roles as they provide food and act as a source of medicinal agents and raw materials[1]. Unani system has described a large number of such medicines based on plants or plant products and the determination of their morphological and pharmacological or pharmacognostical characters can provide a better understanding of their active principles and mode of action. Despite the emergence of new chemical drugs in contemporary medicine, the application of herbal remedies has not yet been declined[2]. Till Safeed is one such plant species used for treatment of various ailments. *Sesamum indicum* L. (Pedaliaceae) is an annual plant, which has been cultivated for well over 5000 years. Being one of the oldest oilseed crops known, it is sometimes referred to as the "Queen of oilseed crops" and is frequently grown for its seeds. The genus *Sesamum* L. consists of 30 accepted species distributed worldwide, belonging to Pedaliaceae's flowering plant family. *Sesamum indicum* also known as Sesame, is a widely cultivated member of the genus[1,3]. It is thought to be of African origin, with species found in countries like India, China, and Malaysia. China and India are the top Sesame producers globally and it was during the 8th century BC, the medicinal value of Sesame was discovered in these countries. A variety of sesame organs have been used for their ethnomedical purposes all over the world. For example, the aerial organs are used to treat impotence; the leaves are used to treat malaria; the seed oil and paste are used to treat burns and wounds, to treat cholera, respiratory infections, and mouth inflammation; the fruits are used as a laxative; the leaves are used to treat diabetes, diarrhoea, and mouth inflammation; the roots are used to treat asthma and hair growth. In Asia and Middle Eastern countries, the whole seeds are commonly used in cuisines, and also for garnishing of various foods like bread in North America and Europe[4]. The oil from the sesame plant is an important ingredient in Unani

remedies in India and is used in Chinese medicine to increase energy and prevent aging due to the presence of bioactive components present in the seed, including polyunsaturated fatty acids, phytosterols, tocopherols, vital minerals and unique class of phenylpropanoid compounds namely lignans such as sesamin, sesamol, and sesamolin[5]. These phytochemicals provide barrier against reactive oxygen species and helps maintaining quality of oil by inhibiting oxidative rancidity. Sesame lignans have various pharmacological properties including antibacterial, anti-proliferative, cholesterol lowering, hepatic fatty acid oxidation enzymes increasing and anti-hypertensive effects[6].

Vernacular names[6-9]		Taxonomical classification[9-11]	
Arabic	*Simsim, Samsam*	**Kingdom**	*Plantae*
Greek	*Seasamoon*	**Division**	*Tracheophyta*
Persian	*Kunjad, Kunjed, Samsak*	**Class:**	*Magnoliopsida*
Urdu	*Till*	**Order**	*Lamiales*
Hindi	*Til, Tir, Bariktel, Mitha-tel*	**Family**	*Pedaliaceae*
English	*Gingelly Seed, Seasme*	**Genus**	*Sesamum*
French	*Sesame, Benne, Jugeoline*	**Species**	*Indicum*
German	*Sesom*		
Chinese	*Hu Ma*		

Botanical description

Sesame is an annual, erect, herbaceous plant. It grows in length between 0.5 and 2.5m depending upon environment and cultivar. The leaves are hairy and vary in size and shape within the same plant and across various cultivars. The stem is branching, quadrangular obtusely, hairy, and longitudinally wrinkled. Lower leaves are ovate, opposite, light green, length 3–17 cm and width 1–7 cm, petiole 5cm in length. Upper leaves are subopposite alternate, lanceolate, dentine, petiole 2cm long. White, geniculate, big, bell-shaped, bilaterally symmetrical (zygomorphic), and with a short pedicel flowers are produced. Flowers can be found alone or in clusters of two to three. Fruit capsule is quadrilateral, highly grooved, erect, 3-5 cm long, 1-2 cm diameter, purple-brown in colour, and with a small beak. Each capsule contains anything between 100 and 200 seeds total[12].

The pear-shaped seed is 2-3 mm in length and about 1.5 mm in width, and white in colour with a smooth, slightly veined surface. The raphe runs as a line along the middle of one flat face up to the broader end, with the hilum located at the pointed end of the seed. Large planoconvex cotyledons, held together by a tiny radicle, encircle an ovoid embryo in the oily seeds with minimal endosperm. The seeds have a distinct oily smell and a sweet flavour[13].

Figure 1: Til Safeed (Plant and Seeds)

Phytochemical constituents:

Sesame contains various active biological compounds. The key functional ingredients in sesame seem to be lignans and lignan glycosides. Sesamin and sesamolin, which are present in sesame oil, are the two primary sesame lignans. Carbohydrates in sesame seeds are composed from 3.2% glucose, 2.6% fructose and 0.2% sucrose and the remaining quantities seem to be dietary fibers. Sesame is rich in Sulphur containing amino acids and limited in lysine and contains significant amounts of oxalic (2.5%) and phytic acids (5%). The phytochemical contents of sesame seeds include alkaloids, flavonoids, proteins, carbohydrates, polyphenols, phytosterols, glycosides and terpenoids. Alkaloids have been shown to have antibacterial, antispasmodic, and analgesic properties. Flavonoids are well known for their antioxidant activity. Polyphenols decrease the mutagenicity of sodium azide, hydrogen peroxide and benzopyrene. Sesamol is a potent phenolic antioxidant in sesame seeds[3].

Table 1: Isolated compounds from different parts of *S. indicum* and their biological activities[14-20]

Isolated compound	Part from which compound was isolated	Test system used	Assay/model used	Positive control	Noteworthy activity
3-Epibartogenic acid[14]	Leaves	In vitro	α-Amylase inhibition	Acarbose (IC50 value of 124 µM)	IC50 value of 146.7 µM
Epigallocatechin[14]	Leaves	In vitro	α-Amylase inhibition	Acarbose (IC50 value of 124 µM)	IC50 value of 303.9 µM
Kaempferol 3-O-[2-O-(*trans-p*-coumaroyl)-3-O-α-l-rhamno-pyranosyl]- β-d-glucopyranoside[14]	Leaves	In vitro	α-Amylase inhibition	Acarbose (IC50 value of 124 µM)	Inactive
Pinoresinol[15]	Seed	In vitro	α-Glucosidase for antidiabetic activity	Acarbose	IC50 value of 492 µM
Sesamin[15]	Seed	In vitro	α-Glucosidase for antidiabetic activity	Acarbose	IC50 value of 450 µM
Sesamin[16,17]	Seed	In vitro	DPPH and β-carotene–linoleate model system	BHT (IC50 value of 5.81 µg mL^{-1} and 97% antioxidant activity)	30% radical scavenging activity at 250 µg mL^{-1}, 68% antioxidant activity at 200 µg mL^{-1}
Sesamin[16,17]	Seed	In vitro	Agar plate	-	69, 69, and 59 % growth inhibition at 2 mg mL^{-1} concentration against *Bacillus cereus*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*, respectively
Sesamol[16,17]	Seed	In vitro	Monophenolase activity of tyrosinase	Kojic acid (IC50 value of 59.72 µM)	IC50 value of 3.2 µM (monophenolase inhibition)
Sesamol[16,17]	Seed	In vitro	DPPH and β-carotene–linoleate model system	BHT (IC50 value of 5.81 µg mL^{-1} and 97% antioxidant activity)	IC50 value of 5.44 µg mL–1 in DPPH and 78.5% antioxidant activity at 200 µg mL^{-1}
Sesamol[16,17]	Seed	In vitro	Agar plate	-	MIC of 2 mg mL^{-1} against *B. cereus* and *Staphylococcus aureus*; 80% growth

					inhibition of *P. aeruginosa* at 2 mg mL^{-1} concentration
Sesamol[18]	Seed	n vivo	Incision, excision, and dead space model	-	Significantly increased tensile strength when compared to control in normal and dexamethasone suppressed healing; significant increase in percentage normal wound contraction on day 7 when compared to control; faster wound closure when compared to control for the normal healing
Sesamol[19]	Seed	In vitro	Hydroxyl radical, superoxide anion, nitric oxide, and DPPH free radical and ABTS cation radical scavenging	Ascorbic acid (IC50 of 30.3, 36.85, 32.27, 5.85, and 6.63 μg mL^{-1}; hydroxyl radical, superoxide anion, nitric oxide, DPPH free radical, and ABTS cation radical scavenging activities, respectively)	IC50 of 31.29, 40.72, 36.36, 3.23, and 3.65 μg mL–1 (hydroxyl radical, superoxide anion, nitric oxide, DPPH free radical, and ABTS cation radical scavenging activities, respectively)
Sesamol[19]	Seed	In vitro	γ Radiation–induced DNA damage with comet assay	None	Pretreatment with 100 mg kg–1 body weight significantly decreased the percentage of tail DNA, tail length, tail moment, and Olive tail moment in the peripheral blood of whole-body irradiated mice
Sesamol[20]	Seed	In vivo	Dinitrochlorobenzene-induced model	Sulfasalazine	Significant decrease in tissue nitrite concentration, colon weight, myeloperoxidase concentration, lipid concentration, and a significant increase in α-tumor necrosis factor.
Sesamolin[15]	Seed	In vivo	α-Glucosidase for antidiabetic activity	Acarbose	IC50 value of 200 μM
Sesamolin[16,17]	Seed	In vivo	DPPH and β-carotene–linoleate model system	BHT (IC_{50} value of 5.81 μg mL–1 in DPPH and 97% antioxidant activity)	32% radical scavenging activity at 250 μg mL–1; 62.5% antioxidant activity at 200 μg mL^{-1}
Sesamolin[16,17]	Seed	In vivo	Agar plate	-	61, 62, and 53 % growth inhibition at 2 mg mL^{-1} concentration against *B. cereus*, *S. aureus*, and *P. aeruginosa*, respectively

ABTS, 2,2′-Azino-bis-(3-ethylbenzthiazoline-6-sulfonic acid); BHT, butylated hydroxytoluene; DPPH, 1,1-diphenyl-2-picryl-hydrazyl; MIC, minimum inhibitory concentration.

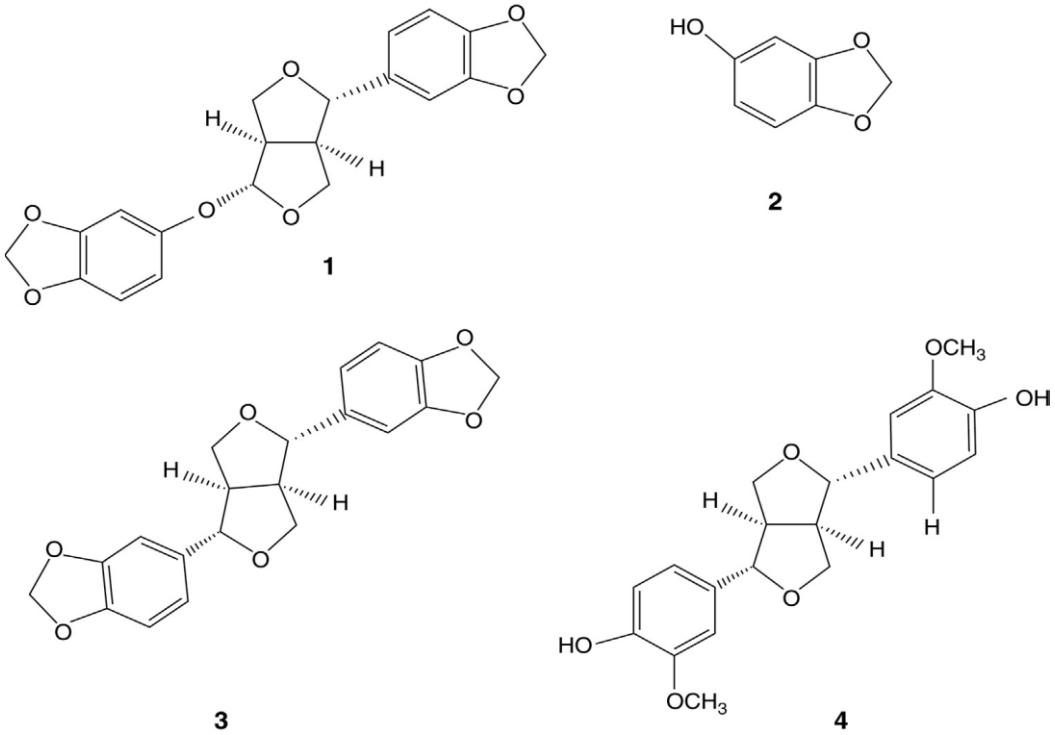

Figure 2: Chemical structures[1] of common bioactive compounds isolated from S. indicum. Sesamolin (1); sesamol (2); sesamin (3); pinoresinol (4).

Pharmacological activity

Several pharmacological investigations have shown different plant organs and seeds extracts, and seed oil of Sesame having various activities such as antidiabetic, anticancer, antioxidant, anti-inflammatory, hepatoprotective, nephroprotective, anti-ulcer & wound healing, antimicrobial, antinociceptive activity, and other pharmacological activities[1].

Antioxidant activity:

Antioxidant activity shown by sesame is due to its free radicals scavenging potential and decreases oxidative stress by regulating antioxidant enzymes and oxidative stress markers. An oral dose of 100 mg/kg b.w. of Sesame plant aerial organ's Total alcoholic extract and its *n*-butanol and petroleum fractions were administered for one week to alloxan-induced diabetes rats. Vitamin E was given as a standard drug. The blood glutathione level in Normal Control, Diabetic control, Vitamin E, Total alcoholic extract, Petroleum ether fraction, and *n*-Butanol fraction were found to be 36.4 ± 9, 23.1 ± 0.4, 36.1 ± 0.7, 35.6 ± 0.8, 31.7 ± 0.5, and 33.2 ± 0.6 mg %, respectively. Glutathione (GSH) levels that had been lowered due to alloxan were considerably raised in the groups that received the extract and its components. There have been reports of antioxidant activity for lignans, phytosterols, and phenolic substances found in the total alcoholic extract and its fractions. Sesame seeds ethanolic (80%) extract reducing potential was assessed using reducing power assay and 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assay[1].

Gastric Mucosal Cytoprotection:

Sesame seed and oil significantly decreased gastric mucosal Lipid peroxidation (LPO) and ethanol-induced gastric mucosal injury. Sesame also increases Glutathione (GSH) and nitric oxide (NO) levels in gastric mucosa. Maintaining mucosal GSH and NO levels may be involved in the sesame seed oil-associated protection against acidified ethanol-challenged rats. NO modulation of GSH homeostasis may increase GSH stores in gastric mucosa. Although its mechanism for scavenging radicals has not been clearly delineated, the ability of NO to scavenge superoxide anions has been documented both in vitro and in vivo. Sesamol may protect against long-term aspirin-induced gastric mucosal damage by inhibiting oxidative stress and inflammation in the stomach mucosa. Sesamol dramatically reduces the levels of pro-inflammatory cytokines and gastric mucosal LPO, as well as the ulceration and haemorrhage caused by aspirin. As a result, sesamol's anti-inflammatory and antioxidative qualities are essential for protecting the stomach from aspirin-induced gastrotoxicity over the long run[21].

Anticancer activity:

A range of sesame seed and leaf extracts (n-hexane, dichloromethane, ethanol, and aqueous) were tested for their in vitro cytotoxicity against human cell lines, including those of colon cancer (SW480), hepatocellular carcinoma (SMMC-7721), breast adenocarcinoma (MCF-7), myeloid leukaemia (HL-60), and lung carcinoma (A-549). Dichloromethane extract of leaves shows moderate cytotoxic activity against all the cell lines. The IC50 value of Dichloromethane extract against various cell lines SMMC-7721, HL-60, SW480, MCF-7, and A-549 was 37.82, 37.75 34.12, 34.85 and 45.34 µg/ml, respectively[22]. The impact of a diet containing whole

sesame paste (wsp) and resistant starch type 2 (rs2), either separately or in combination, on rats' colon carcinogenesis caused by 1,2-dimethylhydrazine was investigated by Prado-Silva et al. (2014). When comparing the group receiving the wsp and rs2 diet to the control diet, they found that the aberrant crypt value, aberrant crypt foci (ACF), and mucin-depleted ACF reduced from 60 to 80% and 98–100%, respectively[23].

The phytosterols (β-Sitosterol, Stigmasterol, and Stigmasterol glucoside), lignans (Sesamol, Sesamolin, Sesamin, Sesaminol triglucoside, and Sesaminol diglucoside), and tocopherols found in sesame flower and seed extracts and seed oil can all be linked to the anticancer activity of these substances[1].

Anti-inflammatory activity:

Hexane extract at all doses significantly inhibited paw edema, whereas Sesamum indicum L. ethanolic extract at 250 mg/kg significantly inhibited paw edema at the 4th hour. These findings were based on the investigation of the anti-inflammatory activity of the extracts from the seeds of the plant by carrageenan and formalin induced paw edema in Wistar rats, respectively. The percentage inhibition of edema at 4th hour of hexane extract at 250 mg/kg was comparable to Indomethacin[24]. The presence of compounds like unsaturated fatty acids (Linoleic acids, Oleic, Stearic and Palmitic) and lignans (Sesamol, Sesamolin, and Sesamin) in the Sesame can be associated with its Anti-inflammatory activity[1].

Hepatoprotective activity:

In ethanol-induced liver injury, the hepatoprotective efficacy of sesame seed aqueous extract was studied. When administered before, concurrently, and after ethanol exposure for 28 days, aqueous extract (200 mg/kg) raises the synthesis of antioxidant enzymes while lowering the levels of AST, ALT, and TG to normal ranges[25].

After a 21-day pre-treatment, an ethanolic extract of sesame seeds (400 and 700 mg/kg) demonstrated protective effects against acute paracetamol toxicity. In the pretreatment group, ethanolic extracts raise the levels of albumin and total protein and normalize the levels of AST, ALT, ALP, and ACP in the serum[26]. The hepatoprotective potential of various plant organ extracts and sesame oil can be attributed to the presence of a significant variety of phenolic derivatives, including β-Sitosterol, Stigmasterol, and Stigmasterol glucoside, as well as phytosterols like Rhamnetin, Mequelianin, Verbascoside, and Ferulic acid[1].

Nephroprotective:

Using an animal model, the ethanolic extract of sesame seeds was found to have protective effects against diabetic nephropathy. Rats that get STZ induction lose body weight as a result of increased muscle breakdown and wasting, lower serum levels of albumin, total protein, and globulin, and increases blood urea, uric acid, and creatinine. Urine protein loss and kidney injury are caused by the combination of urea, glucose, and other chemicals with changes in renal vascular structure. When given as an extract (500 mg/kg) for eight weeks, the body weight grew slightly and the levels of total protein, albumin, and globulin in the serum increased while the levels of urea, uric acid, and creatinine decreased[27].

Anti-ulcer and Wound healing:

At both high and low dosages, the ethanolic extract of Sesamum indicum seeds demonstrated a strong anti-ulcer and gastroprotective effect in rat gastric tissue. In albino rats, the extract of Sesamum indicum Linn. was evaluated on stomach ulcers caused by indomethacin. By measuring the ulcerative area and % reduction of ulcerative area, the antiulcer activity of the high dose (400 mg/kg) and low dose (200 mg/kg) of ethanolic extract of Sesamum indicum Linn. was evaluated and compared with a standard medicine, misoprostol. Ethanolic extract pretreatment, at both high and low doses, was nearly as effective as conventional Misoprostol and shown a substantial ($p<0.001$) decrease in the ulcerative region when compared to the control[28].

Another study was carried out by stress-induced ulcer model in wistar rats. The antiulcer activity of S. indicum (0.5, 1mg/kg p.o. for 7days) was compared with standard drug (pantoprazole). The low and high dose of S. indicum extract significantly reduced gastric mucosal lesion, mucin content, volume of gastric juice, gastric pH, free and total acidity when compared to positive control group[29]. Rats with wounds created artificially were used to test the healing properties of sesame oil and seeds. The effects of mixing sesame root methanolic extract with ointment and gel base were studied using the excision wound model. Compared to the usual povidone iodine ointment, it demonstrated superior action[30].

Antinociceptive activity:

Analgesic activity of ethanolic extract of *Sesamum indicum* has been tested by the acetic-induced writhing model in mice. The study concluded that the extract produced a significant writhing inhibition at the doses of 500 mg/kg, which is comparable to the standard drug Ibuprofen at dose of 50 mg/kg[31].

Anti-bacterial Activity:

It was shown that sesame oil exhibited in-vitro antibacterial action against microorganisms that cause tooth caries. It was shown that Lactobacillus acidophilus and Streptococcus mutans were moderately sensitive to the sesame oil. The outcome showed that sesame oil possesses antibacterial properties against Lactobacilli, S. mutans, and total bacteria[32]. When the antimicrobial properties of ethanolic and aqueous leaf extracts were tested against a few pathogens, the results showed that the ethanolic extract significantly suppressed the growth of *E. coli*, *K. pneumonia*, *and S. typhi*, but had no effect on the growth of *S. aureus*. The aqueous extract had no inhibition on the microorganisms tested[33].

The existence of lignans (Sesamol, Sesaminol, Sesaminol diglucoside, Sesaminol triglucoside) in the oil, leaves and seed extracts can be reason behind its antimicrobial activity[1].

Anti-Atherosclerosis Activity:

It has been discovered that sesame oil efficiently prevents the formation of atherosclerosis lesions, possibly as a result of the complementary effects of fatty acid and nonsaponifiable components[34]. An improved version of sesamol (INV-403) was tested to see how it affected atherosclerosis. By affecting IKK2 and nuclear factor-B signalling, Inv-403, a new modified lignan derivative, potently slows the progression of atherosclerosis[35].

Hypo-lipidemic Activity:

Sesame lignans have been shown in animal studies to lower cholesterol levels by reducing the synthesis of cholesterol and inhibiting its absorption. When rats on a diet rich in cholesterol were given Sesamin supplements, there was a noticeable decrease in the concentration of blood cholesterol. Furthermore, a significant decline in the activity of liver microsomal 3-hydroxy-3-methylglutaryl Coenzyme A reductase (HMG-CoA reductase), was observed. Moreover, dietary sesamin remarkably decreased mRNA of HMG-CoA reductase and LDL receptor, as well as mRNA level and protein content of SREBP-1 in rat liver[36].

Anti-hypertensive Activities:

According to a study, sesamin and its active metabolites can lower blood pressure in models of experimental animals. Sesame oil consumption significantly decreased oxidative stress while concurrently increasing the activities of GPx, superoxidase dismutase, and catalase, according to a study done on hypertension patients. Sesamin may be a helpful preventive measure for cardiovascular hypertrophy and hypertension, according to the researchers[37]. In a different study, nifedipine was compared with various edible oils among hypertension patients. Sesame seemed to be a promising treatment for high blood pressure among the groups[38].

Ethno-pharmacological Description:

It possesses *Muqawwi-e-Bah* (Aphrodisiac), *Musammin-i-Badan* (adipogenous), *Mulayyin-i-Am'a'* (Laxative), *Habis-i-Dam* (Hemostyptic), *Muhallil-i-Waram-e-Haar* (Anti-inflammatory), *Musakkin-i-Alam* (Analgesic), *Dafe-e-Sua'al* (Antitussive) and *Mugharri* properties[7, 8].

Ethno-Pharmacological Uses:

According to classical Unani literature the powdered seeds are used to relieve the inflammation of eyes and it also helps in stopping the inflammation inside the body. It also relieves shortness of breath and *Zeeq-un-Nafs* (Asthma). Its compound formulations are beneficial in diseases of chest and cough. If grinding it in water and added a little sugar, it is beneficial in relieving *Sozish* (burning) of stomach and esophagus due to accumulation of *khilt sawda'* (black bile). *Till* and *Mom* (Wax) when mixed in equal quantities and used as *Zimad* (poultice) on face helps in relieving wrinkles, provides glow to face and makes face soft & clean. This *zimad* can also be used for *Shuqaq al-Maqad* (anal fissure). When mixed with *Roghan-i-Gul* (Rose oil) it is indicated for *Suda* (headache) due to excess exposure to sun. Its oil helps in relieving the obstruction of the ear canal when used locally as ear drops. When cooked with *Roghan-i-Zaitoon* (Olive oil) and *Habb-ul-Aas* (*Myrtus communis L.*) helps in relieving itching caused due to *Balgham shor* (Phlegm) and *Gharam Khoon* (Blood). Its decoction acts as *Mudirr-i-Hayd* (emmenagogue) and is useful in *Ihtibas al-Tamth* (amenorrhoea). Seeds when roasted and used along with *Alsi* (Linum Usitatissimum) it is used for *Taqwiyat-i-Bah* (aphrodisiac). *Till* 7 grams and burnt walnut 3 grams is useful in *Bawasir* (bleeding piles)[8,9,40]. Till Safeed is a constituent of many compound pharmacopeial Unani formulations having *Zoaf-e-Baah* as their major therapeutic indication e.g. *Mufarreh Sosambari, Majoon-e-Baladur, Habb-e-Hindi Mumsik, Majoon-e-Salab*[40].

Conclusion

Till Safeed (*Sesamum indicum*) is considered as an important medicinal herb in Unani system of medicine. It has been used as a medicine since antiquity and has been reported in many classical literatures of traditional medicines like Ayurveda, Unani, Siddha, homeopathy as well as in the Chinese system of medicines for many years. Therapeutically, it is mentioned to be used as antioxidant activity, antimicrobial activity antiproliferative activity, lowering cholesterol levels increasing hepatic fatty acid oxidation enzymes, and show anti-hypertensive effects. Going through the present review of Unani literature, it was found that a large number of the therapeutic effects of *Sesamum indicum* have been mentioned. Some of the uses have been revalidated scientifically by many researchers, however, there are certain beneficial uses that are claimed by Unani scholars as its efficacy in many actions like *Muqawwi-e-Bah* (Aphrodisiac), *Dafe-e-Sua'al* (Anti-tussive), *Muhallil-i-Waram-e-Haar* (Anti-inflammatory), *Musammin-i-Badan* (adipogenous), *Muwallid-e-Mani*, *Musakkin-i-Alam* (Analgesic), *Mufattih Sudade* (deobstruent), *Muqawwi-e-Sha'ir* (hair grower), *Muqawwi-e- Gurda* (kidney tonic), that are still remained unexplored. Keeping in view of the significance of these claims, it is need of h to revalidate these important claims on a scientific basis. These pharmacological effects should be correlated to its phytochemical constituents present in the drug.

Authors Contribution Statement

All authors have contributed equally to this work.

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Conflicts of Interest

None

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