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POTENTIAL USE OF TRIGONELLA FOENUMNGREAEUM L., CANNABIS SATIVA L. AND ALLIUM CEPA OIL IN ALOPECIA.

[1]Shivam*, [2]Shivam Thakur, [3]Vikas, [4]Aftab Poswal, [5]Kumari Varsha, [6]Sunil Kumar

[1] Student, [2] Student, [3] Student, [4]Student, [5] Assistant Professor,[6] Assistant Professor

Gautam College of Pharmacy, Hamirpur, Himachal Pradesh, 177001

Abstract

Hair is a crucial aspect of identity, contributing to self-worth and confidence. It is a modified epithelial structure formed through keratinization of germinative cells, growing as outgrowths of skin follicles. Factors like infections, autoimmune disorders, chemicals, medications, diabetes, trauma, poor circulation, diet, and malnutrition can lead to hair loss. Symptoms include breakage, gradual loss, especially at the crown. Fenugreek, rich in vitamins and nutrients, nourishes hair follicles and boosts blood flow to the scalp, aiding hair growth and reducing hormonal imbalance-induced hair loss. Hemp, with cannabinoids like CBD, stimulates hair follicle cells and enhances effects of treatments like finasteride. Onion oil, high in sulphur, strengthens hair and prevents loss by promoting collagen production. These herbs have beneficial chemical qualities for hair growth and scalp health maintenance when combined into an oil.

Keywords: Hair, Hair re-growth, Scalp, Hair fall, Oil, Fenugreek, Cannabis, Onion.

Introduction

Hair is the essential part of the human personality and a leading essential for self confidence and self-esteem. To guard against its loss has ever been an important aspect. Alopecia is common problem in youngsters specially these days [1]. Hair loss is a common and distressing disorder that involves genetic, dietary, medical, and environmental variables. Androgenic alopecia, or male-pattern baldness, is the most prevalent cause of hair loss in males, whereas medical diseases including hypothyroidism, oral contraceptives, and nutritional deficiencies cause hair loss in women [2, 3]. Humans are born with roughly 100,000 terminal hair follicles on the scalp, which are predisposed to generate long and thick hair [4]. Hair grows in a precise cycle with three unique and concurrent phases: anagen (3 to 5 years), catagen (2 to 3 weeks), and telogen (3 to 4 months), followed by shedding. During the telogen or resting phase, hair is liberated and lost, and the following cycle begins at any moment [4-7]. Ninety percent of the hair on a healthy scalp is growing, with less than 1% experiencing involution and the remainder resting (5% to 10%) [8]. It is considered typical to shed 100 hairs from the head per day. However, a greater rate of physiological loss is a serious worry across the world because, if it continues to be excessive, it may develop in male or female pattern alopecia, which causes

further psychological suffering. Approximately 50% of women experience obvious hair loss by the age of sixty, whilst males typically lose hair by the age of fifty [9-12].

Hair

Hair is defined as a "modified epithelial structure formed as a result of keratinization of germinative cells." Hairs are outgrowths of follicles found on the skin. These follicles are located on the dermis, the second layer of skin, and extend to the epidermis, the skin's outermost layer. Hair develops through these follicles. Hair is made up of keratin, which contains chemical elements such as Carbon (C), Hydrogen (H), Nitrogen (N), Sulphur (S), and Oxygen. Hair growth varies from person to person, but on average, it grows between 5 and 10 millimetres every month. Maximum hair growth occurs between the ages of 15 and 30. It is also observed that hair growth is greater in summers compared to winters [13]. There are around 1,000,000-2,000,000 hair follicles on the scalp alone. Hair follicles may be found all over the body, with the exception of the palms, soles, and lips. The presence of hair in unusual places has a negative impact, although hair on the head contributes to the overall attractiveness and beauty of a person. From an evolutionary standpoint, human hair is similar to fur on our animal counterparts. Both covers evolved to offer warmth. The scalp (skin on the head) is made up of seven components. These include the hair papilla, hair shaft, follicle mouth, stratum granulosum, sebaceous gland, and oil duct [14].

Reasons for Hair loss:

There are various reasons that cause hair loss; some of the primary ones are listed below:

- Acute illnesses and autoimmune diseases.
- Chemicals, including hair dyes and chemotherapeutic agents/drugs.
- Diabetes; Hair loss after childbirth; Hair styling products and techniques; High iron deficiency; Nutritional deficits.
- Other Fungal Infections.
- Physical damage to the scalp
- Poison exposure
- Poor blood circulation
- Diet or malnutrition
- Prescription medications
- Psychological. Symptoms may include radiation exposure, ringworm, skin illness, stress, sudden weight loss, surgery, and thyroid condition.

Signs and Symptoms of Hair Loss Basically, hair loss symptoms include:

- Broken or easily removed hairs.
- Gradual thinning of hair, particularly on the top of the head [15].

Fenugreek

The annual plant Trigonella foenum graecum is a member of the Leguminosae family. It is the well-known spice used in human cuisine. Fenugreek has long been employed in medicine and food preparation; its green leaves and seeds are utilised for both purposes. It has been used to improve the colour and flavour of food ingredients as well as change their texture. Fenugreek seed has several therapeutic uses, including lowering cholesterol, helping with breastfeeding, fighting bacteria, stimulating the stomach, treating anorexia, acting as an antidiabetic, galactogogue, hepatoprotective, and having anticancer effects. Fenugreek's physiological benefits, such as its antidiabetic and hypocholesterolemic properties, are mostly attributed to its intrinsic dietary fibre content, which has shown promise as a nutraceutical[16]. Its fibre, gum, various chemical components, and volatile substances are well recognised. Fenugreek seed contains around 25% dietary fibre, which modifies food texture. Because of its high fibre, protein, and gum content, it is utilised as an emulsifying agent, glue, and food stabiliser these days. It is discovered that fenugreek protein is more soluble at alkaline pH levels [17].

Fenugreek seeds

Chemical constituent

Steroid sapogenins are among the several chemical components found in fenugreek. The oily fenugreek embryo has been shown to have a diosgenin component. Fenugreek is known to include two furastanol glycosides, which are also known as hederagin glycosides and F-ring opening precursors of diosgenin. Stem contains alkaloids including trigocoumarin, trimethyl coumarin, trigonelline, and nicotinic acid. One particularly notable component of the seeds is their mucilage [18]. Approximately 28% of the stem is made up of mucilage, a volatile oil, two alkaloids, such as choline and trigonelline, 5% of a stronger-smelling, bitter fixed oil, 22% proteins, and a yellow colouring material. Fenugreek comprises around 25% dietary fibre, 6-7% fat, 23-26% protein, and 58% carbs [19] . Fenugreek is also a rich source of iron, containing 33 mg/100 g dry weight [20].

- **Leaves**

  Seven saponins called graecunins are found in the leaves. These substances are diosgenin glycosides. About 86.1% moisture, 4.4% protein, 0.9% fat, 1.5% minerals, 1.1% fibre, and 6% carbs are found in leaves. Vitamin C, calcium, zinc, iron, phosphorus, riboflavin, carotene, thiamine, and niacin are among the minerals and vitamins found in leaves [21]. Discovered that there is around 220.97 mg of ascorbic acid and 19 mg of β-carotene in 100 g of fresh fenugreek leaves. Conversely, it was discovered that fenugreek leaves that were sun-dried and oven-dried had lower levels of ascorbic acid by 84.94% and 83.79%, respectively. In the diets, fresh leaves are eaten as vegetables. It was discovered that the fenugreek leaves retained more of their nutrients [22].

- **Seeds**

  The seeds of fenugreek are noted for being pleasantly bitter and mildly sweet. The centre of a fenugreek seed is a firm, yellow embryo, surrounded by a rather thick coating of white, semi-transparent endosperm [23]. A list of the chemical components is displayed in the table below.

Table 1 chemical constituent of fenugreek [24-26]

Sr. No.	Classification of the constituents	Chemical constituents present inf Fenugreek
1.	Alkaloids	Trimethylamine, Neurin, Trigonelline, Choline, Gentianine, Carpaine and Betain
2.	Amino Acids	Isoleucine, 4-Hydroxyisoleucine, Histidine, Leucine, lysine, L-tryptophan, Arginine
3.	Saponins	Graecunins, fenugrin B, fenugreekine, trigofoenosides A–G

4.	Steroidals	Yamogenin, diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin,
5.	Sapinogens	Gitogenin, neogitogenin, yuccagenin, saponaretin
6.	Flavonoids	Quercetin, rutin, vitexin, isovitexin
7.	Fibers	Gum, neutral detergent fiber
8.	Lipids	Triacylglycerols, diacylglycerols, monoacylglycerols, phosphatidylcholine phosphatidylethanolamine, phosphatidylinositol, free fatty acids.
9.	Other	Coumarin, lipids, vitamins, minerals. 28% mucilage; 22% proteins; 5% of a stronger-swelling, bitter fixed oil.

According to the studies, Fenugreek contains about 35% alkaloids, mainly trigonelline. Fenugreek seeds also contain more than 10 mg of flavonoid per gram of seed, as well as a minor amount of volatile and fixed oils. [8]. The oils were rich in linoleic acid (42.71–42.80%), linolenic acid (26.03–26.15%), and oleic acid (14.24–14.40%). Fenugreek essential oil from the seeds (>5%) is rich in neryl acetate (17.3%), camphor (16.3%), β-Pinene (15.05%), β-caryophyllene (14.63%), and 2,5-dimethylpyrazine (6.14%) [25, 27].

Traditional use

Fenugreek seeds have been used medicinally for centuries; Ayurvedic literature and Greek and Latin pharmacopoeia all mention this. Although this herb's sexual properties are praised in Ayurvedic scriptures, contemporary Vaidya's tend to use it mainly for respiratory and digestive issues resulting from an excess of vat (wind) and kaph (phlegm). Methi was used to ease labour and boost milk flow in ancient Egypt. Egyptian women are still using methi today to help menstruation cramps and make hilba tea to relieve different types of stomach discomfort. It is also used to relieve stomach discomfort and is known by the Chinese as hu lu ba. Although most regions of the world cultivate this cool-season crop [28].Fenugreek has been used for centuries in European cookery and is still a common component in pickles, curry powders, and spice blends in Bangladesh, India, Pakistan, and other Asian nations. Traditional medicine has utilised fenugreek to cure TB, boils, and cellulitis. One important component of a 19th-century patent treatment for postmenopausal and dysmenorrheal symptoms was fenugreek. It's been said to encourage lactation as well. Fenugreek seed extracts have been shown to decrease blood glucose levels, and the seeds themselves have been used orally as an insulin alternative for blood glucose reduction [29].

Pharmacological activities

- **Lactation aid**

  Sweat glands are modified in the breasts, and fenugreek contains hormone precursors that have been shown to boost sweat output and milk creation. According to certain scientific reports, fenugreek can boost a nursing mother's milk production 24–72 hours after she first takes the plant [30]. Fenugreek seed's impact on milk production and fat % was investigated in published research. A considerably larger daily supply of milk and fat % was seen in the subjects which consumed fenugreek seeds, according to that study [31].

- **Hypoglycemic effect**

  Fenugreek's dietary fibre lowers blood sugar levels after meals. The gum in fenugreek seeds is made up of galactose and mannose, and the seeds themselves contain 45.4% dietary fibre (32% insoluble and 13.3% soluble). The latter substances have a glycemic impact that is lowered. Fenugreek has been shown to have a hypoglycemic impact in both humans and animals with type 1 and type 2 diabetes mellitus [32].

- **Immunological activity**
  An immunomodulator is a substance that either increases or decreases the immune responses; this type of action is referred to as an immunomodulatory effect. This study examined the effects of fenugreek on stimulatory immunomodulatory effect (as demonstrated by body weight, relative thymus weight, hemagglutination titer, quantitative hemolysis assay, phagocytosis, cellularity of body lymphoid organs, late type of hypersensitivity response, plaque forming cell assay, lymph proliferation, and a significant increase in phagocytic index and phagocytic capacity of macrophages). which revealed that fenugreek was a potent immunomodulatory stimulant [17].
- **Hypocholesterolemic**
  Hypocholesterolemic problems are defined as abnormally low blood cholesterol levels and are treated with methanolic and aqueous extracts of seeds taken orally. The primary components of gum are galactose and mannose, which are found in considerable quantities in fenugreek seeds. Reductions in cholesterolemia are linked to the latter substances.
  and it was discovered that the fenugreek extract-treated individuals had greater HDL, lower total cholesterol, and lower triglycerides [32-34].
- **Antioxidant activity**
  Radical scavenging action is exhibited by the fenugreek seed extract that contains methanol, ethanol, dichloromethane, acetone, hexane, and ethyl acetate. Fenugreek has also been shown to have a protective impact on lipid peroxidation and enzymatic antioxidants [35, 36]. According to a different study, the maximum protein and saponin concentration was found in the proximate composition of fenugreek seeds, husk, and cotyledons. Husk, on the other hand, had more total polyphenols. By scavenging free radicals, fenugreek seed, husk, and endosperm extracts demonstrated antioxidant properties, in that order [37].
- **Antibacterial and antifungal effect**
  A recent study found that different plant portions of fenugreek were extracted aqueously and that the extracts were tested against fungal strains using methanol, petroleum ether, and ethyl acetate fractions of the aerial parts. It was discovered that the antifungal potential of the fenugreek plant was present in all sections, with the degree of impact differing depending on the fungus type and plant components. One argument for fenugreek's significance as a source of physiologically active substances is that they can be used to create more effective and innovative antifungal medications [38]. It was discovered that fenugreek seed extract worked pretty well against several bacterial strains [39].
- **Fenugreek benefits digestion**
  Spices in the diet improved pancreatic digestive enzymes. It was shown that Fenugreek significantly increased pancreatic lipase activity. Non-starchy polysaccharides provide bulk to the food and improve bowl movement. Non-starchy polysaccharides also aid in easy digestion, while fenugreek's high fiber content aids in the relief of constipation [40].

Fenugreek and Hair growth: [41]

- **Role in hair follicle stimulation:**
  Fenugreek seeds are said to promote hair development by feeding the hair follicles and improving blood flow to the scalp. The proteins included in fenugreek seeds are thought to strengthen the hair shaft, preventing hair loss and encouraging the development of new, healthy hairs.

- **Fenugreek as natural DTH blockers:**
  The theorized mechanism of action is that the numerous plant components in fenugreek may interact with a substance in the body called dihydrotestosterone (DHT). If DHT adheres to your hair follicles, it will eventually cause hair loss. Fenugreek may reduce the capacity of DHT to adhere to your hair follicles.

- **Reducing Hair Loss:**
  Fenugreek seeds contain hormone-regulating chemicals that may aid in the reduction of hormonal imbalance-induced hair loss. Furthermore, the seeds include antibacterial characteristics that may help protect the scalp from infections and reduce the risk of hair loss caused by scalp diseases.

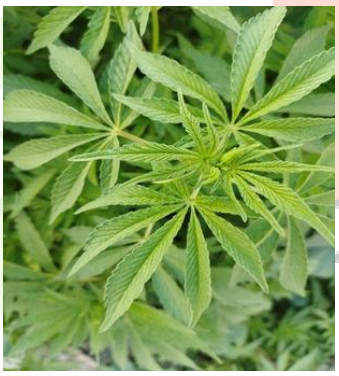
- **Reviving Hair damage:**
  Fenugreek seeds have conditioning qualities that assist to reduce dryness and frizz. Regular usage of fenugreek seeds as a hair mask or rinse can make your hair silky, smooth, and manageable. They also hydrate the scalp, making it less flaky and itchy.

- **Dandruff control:**
  Fenugreek seeds' antifungal and antibacterial activities may account for their anti-dandruff benefits. Regular use of fenugreek seed paste or oil may help decrease scalp irritation, itching, and flaking caused by dandruff.

- **Scalp health and Inflammation health:**
  Fenugreek's anti-inflammatory qualities may aid to decrease scalp inflammation and soothe itchy, red, or irritated skin. This may help to improve overall scalp health and stimulate healthy hair growth. There are medical diseases that can impact your hair and scalp, resulting in scalp problems and hair loss.

Cannabis sativa L.

Hemp, also known as Cannabis sativa L., is an oleaginous plant that has been grown for medical benefits and non-edible fiber content since ancient times [42]. The letter "L" stands for Linnaeus, in acknowledgment of the accomplishments of the father of modern taxonomy, Carolus Linnaeus, who originally identified the species Cannabis sativa. This plant is well-known as a key source of cannabinoids such as cannabidiol (CBD), tetrahydrocannabinol (THC), cannabichromene (CBC), cannabigerol (CBG), and cannabinol. Cannabinoids have demonstrated considerable restorative potential for inflammation, depression, nausea, epilepsy, and other clinically relevant effects [43-45]. Hemp is classified as Cannabinaceae, which comprises three subspecies: Sativa, Indica, and Ruderalis. The key variations between these three subspecies are the plant's general structure, uses, and the best climate for growing. The split of cannabis strains into hemp and marijuana is merely an incorrect terminology that is completely misconceived with a larger taxonomy of cannabis [46, 47].



Cannabis sativa L.

Since the discovery of the molecular structure of its main active ingredient, Δ9-tetrahydrocannabinol (Δ9-THC), cannabinoids have been the subject of intense scientific and biological research for almost 50 years. Cannabinoids, particularly Δ9-THC, found in the plant's leaves and flower buds, are responsible for its behavioral and psychoactive effects. In addition to Δ9-THC, non-psychoactive cannabinoids having medical activities include CBD, CBC, and CBG. Other non-cannabinoid elements come from several natural product groups. Today, more than 560 components have been found in cannabis. The recent discovery of the medicinal properties of cannabis and cannabinoids, as well as their potential applications in the treatment of a variety of serious illnesses such as glaucoma, depression, neuralgia, multiple sclerosis, Alzheimer's, and the relief of HIV/AIDS and cancer symptoms, has fueled the quest to learn more about the plant's chemistry, biology, and medicinal properties [48].

Phytoconstituents:

The resin of Indian hemp, found in glandular trichomes, contains the active euphoric component 1-3-4 trans tetra-hyrocannabinol, also known as Δ1 THC. It includes volatile oil, trigonelline, and choline. The resin also includes cannabinol, cannabidiol, cannabidiol acid, cannabichromene, and cannabigerol. Indian hemp has 20% fixed oil [49].

Cannabis inflorescence contains cannabinoids (15.77-20.37%), terpenoids (1.28-2.14%), and flavonoids (0.07-0.14%), while the leaf contains cannabinoids (1.10-2.10%), terpenoids (0.13-0.28%), and flavonoids (0.34-0.44%), stem barks contain sterols (0.07-0.08%) and triterpenoids (0.05-0.15%), and roots contain sterols (0.06-0.09%) and triterpenoids (0.13-0.24%) [50].

Uses:

It's a narcotic, sedative, and analgesic. It possesses psychotic effects, similar to tetrahydrocannabinol. Currently, it is seldom utilized as a medication. It induces drunkenness, exhilaration, and subsequently mental distress [49].

Cannabis and Hair:

Cannabidiol and Androgenetic alopecia:

With the growing acceptability of Cannabis sativa-based medicines, cannabidiol (CBD) has been proposed as a potentially effective, safe, and low-cost non-prescription topical AGA therapy. CBD acts on the body's endocannabinoid system (ECS) and has new effects on hair follicle elongation and hair matrix keratinocytes that are triggered via ECS receptors in hair follicle cells. As a result, the therapeutic benefits of CBD would supplement the physiological effects of minoxidil, finasteride, and antiandrogen therapy [51].

Endocannabinoid System, Cannabidiol and Hair follicles:

The Endocannabinoid system (ECS) was first found in the 1990s. In essence, it is a mechanism that maintains cellular homeostasis in the face of excessive oxidative stress. It inhibits the harmful inflammatory response while promoting regeneration processes. It consists of two receptors, cannabinoid receptors 1 and 2 (CB1 and CB2), and two messenger molecules known as endocannabinoids, anandamide (AEA) and 2-arachidonylglycerol (2-AG). The ECS is engaged in several processes, including thermoregulation inside the skin. There are several CB1 and CB2 receptors on diverse cell lines in the skin [52]. CB1 receptors are highly expressed in hair follicle cells. Stimulation of the CB1 receptor with endocannabinoids reduces hair shaft elongation [53]. TRPV1 controls the hair follicle cycle (anagen, catagen, and telogen phases). TRPV1 receptors are located on hair matrix keratinocytes. Studies have revealed that stimulation causes hair follicle regression (catagen) and hair matrix keratinocyte apoptosis (cell death) via reducing hair shaft elongation. TRPV1 receptors are activated by endocannabinoids and cannabis-derived Phyto cannabinoids like THC and CBD. CBD is thought to have therapeutic benefits via TRPV1 receptors because excessive activation causes the receptors to become desensitized [54].

Tetrahydrocannabinol (THC) is a CB1 receptor agonist that has been demonstrated to impede hair shaft elongation, reduce hair matrix keratinocyte proliferation, promote intraepithelial apoptosis, and cause premature hair follicle regression (catagen). A specific CB1 antagonist attenuated these THC-induced effects [53, 54]. According to extant research, THC and other CB1 agonists can be used to control undesirable hair growth, whereas CB1 antagonists such as CBD, tetrahydrocannabivarin (THCV), and cannabidivarin (CBDV) can be used to increase hair development. CBD is a CB1 antagonist that likely exerts its effects through negative allosteric regulation of the CB1 receptor [53, 55, 56].

A recent work on human hair follicle cultured cells found that using lower dosages of CBD resulted in hair shaft elongation, most likely due to CB1 antagonism. However, considerably greater dosages resulted in premature entrance into the catagen phase, most likely via a different receptor, the vanilloid receptor-4 (TRPV4). As a result, the dose of topical CBD must be examined in order to achieve favourable hair regrowth [51, 57].

Onion

A versatile food plant, onion is utilized as a traditional spice in Indian cuisine. It has been taken for generations due to its purported nutritional and health advantages, and it has considerable health importance. The onion, or Allium cepa L., is a member of the Liliaceae family of flowers [58]. This fragrant, easily digested vegetable is utilized all across the world. It is also referred to as Bulbus Allii Cepae, common onion, garden onion, and white onion. Pyaj is the name given to it in Hindi. It is the Allium species that is

most often grown. Onion cultivators grow both annual and biennial types for vegetable usage. Plant grows to a height of 15–45 cm (6–18 inches), with flattened, fan-shaped, yellowish-green leaves. Onion plants have globular umbel-shaped inflorescences that contain white blooms with six parts each. The seeds have a triangular cross shape and are shiny black [59]. All around the world, onions are grown and utilized, for vegetable usage, its two crops are produced in India and other subtropical nations. The bulb's outer layers grow dry and brittle as the foliage fades in the fall. Onions are ready for use or storage after being picked and dried, along with the winter and post-summer harvests. They are often consumed cooked, either as a vegetable or as a component of a prepared savory cuisine, although they can also be consumed raw or used to produce chutneys or pickles. When cut, they release a strong scent, and some of the chemicals cause eye irritation. Phenolics and flavonoids found in onions may have antioxidant, anti-inflammatory, anti-cholesterol, and anti-cancer effects. Asia's central and southeast regions are home to the key crop species A. cepa [60]. Allium asarense (R.M. Fritsch and Matin) from Iran and Allium vavilovii (Popov and Vved.) are two more similar species of onions that are cultivated [61]. Other species in the genus Allium that are grown for food and are also referred to as onions include the Egyptian onion (Allium proliferum), Canadian onion (Allium canadense), and Japanese bunching onion (Allium fistulosum) [62]. Many Allium species are referred to as "wild onions," yet A. cepa is only known via cultivation; its original wild form is unknown, however it is cultivated in some areas [61].

Allium cepa L.

Phytochemical properties

Vitamins, minerals, sulphur amino acids, and a range of secondary metabolites, including flavonoids (especially flavonols and anthocyanins), phytosterols, and saponins, are all present in A. cepa. Furthermore, it is abundant in sulphur compounds (allicin), phenolic acids, and other biological phytomolecules such glycosides, anthocyanins, kaempferol, and thiosulfinates [63, 64]. Two classes of flavonoids are found in onions: (1) the anthocyanins, which give certain types their red or purple colour, and (2) flavanols, such as Qt and its derivatives, which give some varieties their yellow colour and brown skin. The flavour precursors, or alk(en)yl cysteine sulfoxides (ACSOs), are another category of chemicals present in onions. The enzyme alliinase breaks down ACSOs, giving onions their unique flavour and aroma. Other phytochemicals found in onions are called fructooligosaccharides, and they mostly consist of inulin, kestose, nystose, and fructofuranosyl nystose [65]. Polyphenolic substances: p-coumaric, ferulic, protocatechuic, and catechol are examples of phenolic compounds found in onions [66]. Benzoic acid or cinnamic acid are the sources of onion phenolic acids. These phenolic acids contribute to the plant products' bitterness and fragrance[67]. Onions are rich in flavonoids, including flavanones, flavanonols, flavonols, anthocyanidins, catechins (flavan-3-ols), and leucoanthocyanidins (flavan-3,4-diols). Onions are mostly composed of the flavonoid Qt, which can be found both in bound and free forms and has antioxidant action when combined with glycosides [68]. Onions also contain luteolin and kaempferol, two more flavonoids [69]. The highest amount of flavonols is found in red onion, for red anthocyanins in the form of glycosides cyanidin, peonidine, and pelargonidine. Ascorbic acid: A range of fruits and vegetables contain varying quantities of ascorbic acid, often known as vitamin C. For the whole redox system, this water-soluble vitamin is reversible [70, 71]. Onions' other active ingredients, known as isothiocyanates, together with vitamin C, have anti-inflammatory

properties[72]. Compounds containing sulphur: Onions contain a variety of organic compounds, one of which is sulphur, which gives onions their disagreeable smell. Some animals find propylene-L-cysteine sulfoxide, the primary element in onion flavour, to be bothersome. S-substituted cysteines, γ-glutamyl peptides, and cycloaline are additional sulphur compounds found in onions that are non-volatile and do not affect the flavour of the onion [73].

The study also revealed 12 distinct fatty acids in the outer scale of onion peel, half of which were saturated and the other half unsaturated. The fatty acid profile consisted of lauric acid (0.94%), myristic acid (1.28%), palmitic acid (9.80%), palmitoleic acid (2.84%), stearic acid (8.81%), oleic acid (17.57%), linoleic acid (52.87%), linolenic acid (2.88%), arachidic acid (0.59%), behenic acid (1.23%), erucic acid (0.63%), and lignoceric acid (0.54%). The total saturated fatty acids were 21.42%, while the total unsaturated fatty acids were 76.79% [74, 75].

Traditional uses:

The versatile onion is utilised as a traditional spice in Indian cuisine and is very beneficial to health [58]. It is extensively utilised in the production of ayurvedic formulations for wound healing, as well as in the management of hyperglycemia, stomach cancer, and cardiovascular disorders. Its topical formulations have been employed to mitigate surgical scarring[76]. An onion is recommended for constipation, erections, migraines, coughing, snakebite, and hair loss. Topical onion extract gels are often administered three times a day for scarring. It is used to guard against presternal hypertrophic scarring [77]. Large consumption of plants high in allium lowers the incidence of prostate and stomach cancer [78]. Raw and green onions are commonly used as a remedy for headaches, coughs, and hair loss [61].

Pharmacological activity:

- **Anti-diabetic activity:**

  Diabetes and its associated problems are treated with onions. It has anti-obesity properties [79-81]. Controlling Type 2 diabetes mellitus and other lifestyle disorders is accomplished with onion soup [82]. Its extract treats diabetic neuropathy, controls postprandial blood glucose rises in Sprague-Dawley, and recovers intestinal α-glucosidases activities [83, 84]. Insulin resistance and hyperglycemia are improved by it. Onion red in diabetic individuals, A. cepa (red onion) has hypoglycemic effects. It reduces renal oxidative stress, normalises blood glucose levels, and improves glucose transport [85, 86].

- **Anticancer activity:**

  Organosulfur compounds found in A. cepa inhibit the growth of six different tumor cell types [87]. The flavonoid quercetin, which is present in allium, is thought to have good anticancer properties. It has the power to stop different cancer cells from growing [88]. Consuming allium vegetables, particularly garlic, is linked to a lower risk of prostate cancer. One of onions' main flavonoid compounds, quercetin, has been demonstrated to have a variety of pharmacological qualities, including anticancer effects. Through the suppression of MMP-2/-9 and NF-κB signaling pathways, quercetin prevents the migration and invasion of SAS human oral cancer cells [89]. Belonging to the flavonoid family, quercetin has been demonstrated to possess an array of anticancer properties in the past [90]. Quercetin inhibits the growth of cancer cells and induces cell cycle arrest and death. Specifically, it causes human malignant pleural mesothelioma cells to undergo programmed cell death [91].

- **Antiparasitic activity:**

  It has been shown that A. cepa oil is quite helpful for worm infections [92].

- **Antihyperlipidemic activity:**

  Sulphur compounds produced from onions, such as allylpropyl disulfide and S-methyl cysteine sulfoxide, shown hypolipidemic effects. These have been shown to mitigate the effects of diet-induced atherosclerosis, preserve hypolipidemic action, and have inhibitory effects on platelet production in rats and rabbits. These substances are abundant in raw onions and have antithrombotic properties [93, 94].

- **Anti-inflammatory action:**

  Scale extract from red onions (A. cepa Linn.) exhibits immunomodulatory effects on atypical prostatic hyperplasia that is generated experimentally. Onion demonstrated the ability to scavenge radicals and inhibit

hyaluronidase [95, 96]. Rutin had a comparable protective effect against acute ischemia-reperfusion gastric mucosal lesions [97].

- **Analgesic effect:**
  By inhibiting the production of lachrymatory factor synthase, onions are used as an antidepressant (LFS). The powdered onion has antidepressant properties. Onion juice that has been freshly squeezed has the power to reduce inflammation and both acute and chronic pain, with the effect on inflammation being stronger [98-101].

Onion oil and Hair benefits: [102]

- Amino acids, which are parts of proteins, include sulphur. Strong hair growth requires proteins, particularly keratin, which is known to be sulphur-rich.
- Onion juice can supply more sulphur to the hair and scalp to maintain thick, strong hair, hence reducing hair loss and encouraging hair development.
- Onions' sulphur may also aid in encouraging the formation of collagen. In turn, collagen promotes the formation of healthy skin cells and hair.
- Onions are also thought to improve circulation. Hair follicles receive more blood when onion juice is applied to the scalp and hair, which promotes hair growth.

Conclusion

The rational suggests that onion oil can supply more sulphur to maintain thick, strong hair, which will encourage hair development and stop hair loss. Additionally, cannabis hemp extract showed an increase in hair regrowth. Hemp extract has unique effects on hair follicle elongation and hair matrix keratinocytes triggered by ECS receptors in the hair follicle cell. It acts on the body's endocannabinoid system (ECS). Furthermore, although germination seeds include pyridoxine, calcium pantothenate, biotin, and ascorbic acid, fenugreek seeds are rich in vitamins A, B1, B2, C, niacin, and nicotinic acid. They all are beneficial for hair development and have excellent chemical properties. Further studies are needed to be done to understand the mechanism of hair regrowth.

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