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Review Article

### FORMULATE AND EVALUATION OF HERBAL HEIGHT BOOSTER USING ASHWAGANDHA HARB

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#### Abstract:

Height is often seen as a symbol of confidence and self-esteem, with many people eager to reach their maximum growth potential. Although genetics play a significant role in determining height, there's a growing interest in whether natural remedies like Ashwagandha can impact height growth.

Increasing height is a major concern for many people today, as a good height can boost one's appearance, confidence, and self-esteem. If you are feeling depressed or facing school or emotional problems due to delays in your growth and development, Ayurveda offers natural solutions. Various Ayurvedic medicines can help you achieve the height you desire without any side effects<sup>[1][2]</sup>.

**Concept of Height:-** To understand how to grow taller using Ayurvedic remedies, it's important to know how height works. Human growth hormone (HGH) is a key factor. This hormone is produced in the front part of the pituitary gland in the brain. HGH production is highest during adolescence, which is when we grow the most. However, as we become adults, the levels of this hormone decrease, and the body stops growing taller.

Medical research shows that human height is influenced by more than just genetics; hormones play a significant role, especially in developing the 26 skeletal bones and 62 cartilaginous bones of the lower body. Stimulating the pituitary gland increases hormone production, promoting the growth of these cartilaginous bones, which can lead to increased height.

Scientific studies also indicate that many young adults can grow a few inches taller even after their lower body bones have ossified, or fused. This is because the spinal column, which makes up about 35% of our height, also contributes significantly. The spinal column contains 25 non-fusible disks that can thicken with the stimulation of growth hormone. These disks account for 25% of our total height, so if each disk thickens by just 0.25 cm, you could grow an additional 6.25 cm (2.5 inches) taller<sup>[3]</sup>.

#### Relation of Height with Age:-

People usually stop growing at a certain age: around 25 for men and 21 for women, shortly after puberty. However, it's possible to continue growing until 25 for women and 27-30 for men. This can happen with the help of Ayurvedic therapies, medicines, specific exercises, physical activities, and eating the right foods with proper nutrients and vitamins. However, it becomes harder to gain height as you get older<sup>[3]</sup>.

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## INTRODUCTION:

### The Factors that affect height growth:

Certainly! Height growth is primarily influenced by genetics, nutrition, hormonal balance, and overall health. Genetics play a major role, accounting for about 80% of an individual's height potential. However, external factors such as nutrition, hormonal balance, and overall health can also impact height growth positively or negatively. Optimal nutrition, a balanced hormonal environment, and good overall health can help maximize a person's height potential, while deficiencies or imbalances in these areas may hinder growth.

### The Role of Genetics in determining height:

Genetic factors mainly determine how tall we become. Height is controlled by many genes, with input from both parents. But remember, genetic potential can differ, and external factors can affect whether someone reaches their full height potential.

**Nutrition & diet:** Having a well-rounded diet with all the important stuff like vitamins, minerals, and proteins is super important for growing up right. It's especially crucial during childhood and teenage years to make sure you grow tall and strong.

**Exercise and physical activity:** Doing exercise regularly and staying active can help you grow taller by making your body release growth hormones. Activities like stretching, jumping, and doing exercises with weights can make your bones stronger and help you grow taller.

**Hormones and growth plate closure:** Hormones like HGH and IGF-1 are important for how tall we grow. They help our bones grow properly. But if these hormones are not balanced, it can cause issues with how tall we get. During teenage years, our growth plates close, which means we stop growing taller.

## MATERIALS & METHODS:

### 1. Ashwagandha:

**Botanical Name:-** Withania Somnifera.

Ashwagandha, also known as *Withania somnifera*, is a herb native to India and Asia, prized in Ayurvedic medicine for its adaptogenic qualities. It's famed for boosting energy, reducing anxiety, improving cognitive function, and bolstering the immune system. But the main function of Ashwagandha is boosting the height [1].



Figure 1: Ashwagandha

### Botanical Origin And History of Ashwagandha:-

Ashwagandha, also called Indian ginseng or winter cherry, is a small plant from India and North Africa. It's in the Solanaceae family and has been used in traditional Indian medicine for a really long time, like over 3,000 years [2].

### Traditional Uses in Ayurveda :-

In Ayurveda, Ashwagandha is seen as a 'rejuvenator' that helps the body handle physical and biological stress better. It's used to reduce anxiety, tiredness, and boost overall health and energy. Some also think it might help with growing taller [2].

### Active Compounds and Chemical Composition:-

Ashwagandha has different active compounds like alkaloids (isopelletierine, anaferine, and others), steroidal lactones (withanolides, withaferins), and saponins. These compounds are thought to be the reasons behind the herb's many health benefits [2].

**Parts Use:-** Roots and Orange – Red Fruit.

### Potential of Ashwagandha:-

Although there isn't much scientific research on Ashwagandha's effect on height growth, some studies indicate it could be helpful. It's thought that Ashwagandha might work on the growth plates, boost the release of growth hormones, and improve bone development, which could help maximize height potential [1].

### Scientific Studies on Ashwagandha and Height Growth :-

#### Study 1:- Ashwagandha's Impact on growth plates

A study on rats found that Ashwagandha extracts encouraged the growth and specialization of chondrocytes, which are cells crucial for bone growth. This hints that Ashwagandha might also affect the growth plates in humans, potentially affecting height growth<sup>[1]</sup>.

#### Study 2 :- Ashwagandha's Effect on growth hormone levels

One more study looked at how Ashwagandha affects the release of growth hormones. The study discovered that taking Ashwagandha supplements led to a noticeable increase in growth hormone levels among the participants. Because growth hormone is vital for bone growth, these results hint that Ashwagandha might indirectly impact height<sup>[1]</sup>.

#### Study 3 :- Ashwagandha's Role in bone development

Bone health plays a big role in height growth, and Ashwagandha seems to help with bone development. Studies indicate that Ashwagandha extracts can improve how the body absorbs calcium and boost bone mineral density. This could mean better potential for height growth<sup>[1]</sup>.

#### Study 4 :-

##### Cortisol levels and growth hormone secretion

When you're stressed for a long time, your body's cortisol levels can change, and too much cortisol can affect how much growth hormone your body releases. Ashwagandha has properties that can reduce stress, which might help your body keep cortisol levels normal and allow growth hormone to work better, possibly supporting your height growth<sup>[2]</sup>.

#### Studies on Ashwagandha's stress reducing effect :-

Ashwagandha has been found in studies to reduce stress and anxiety in animals and humans. When stress levels are lower, it can create a better environment for hormones that are important for growth, potentially supporting height growth<sup>[2]</sup>.

#### 2. Asthishrinkala (Cissus Quadrangularis) & Lakshadi Guggulu:

Asthishrinkala and Lakshadi guggulu are traditional Ayurvedic herbal constituents known for their efficacy in treating bone disorders. In modern orthopaedic medicine, the active constituents of these herbs play a crucial role in improving bone regenerative capacity. Let's break down their active constituents and how they benefit treatment outcomes<sup>[4]</sup>.



Figure 2: Asthishrinkala

#### Asthishrinkala :-

- **Botanical Name:-** Cissus Quadrangularis
- **Active Constituents:** Cissus Quadrangularis contains active compounds like flavonoids, triterpenoids (including lupeol and betulin), phytosterols, and calcium.
- **Part Use:-** Fresh juice extracted from its leaves and stem are used.

Animal and human studies suggest that Cissus quadrangularis can help reduce bone loss, speed up the healing of fractures, and prevent conditions like osteoporosis.

In one study, mice with osteoporosis showed reduced bone loss after being fed Cissus quadrangularis for 11 weeks. The herb seemed to work by changing the levels of certain proteins involved in bone metabolism.

Another study with nine participants found that taking 500 mg of Cissus quadrangularis three times daily for six weeks helped heal fractured jaw bones faster. It also reduced pain and swelling.

Additionally, a three-month study involving 60 people showed that taking 1,200 mg of Cissus quadrangularis daily improved fracture healing and increased levels of a protein essential for bone formation<sup>[5]</sup>.

**Uses in Modern Orthopaedic Medicine:** These constituents have been found to promote osteogenesis (bone formation) by increasing alkaline phosphatase and lactate dehydrogenase activity. They also aid in bone healing and may be beneficial in dental bone healing and orthopaedic titanium implants<sup>[4]</sup>.



**Some other properties of Asthishrinkala:-** including: Analgesic: It can help relieve pain and discomfort. Anti-inflammatory: Has anti-inflammatory properties that can reduce inflammation in the body. Anti-osteoporotic: Supports bone health and may help prevent osteoporosis.

**Macroscopic character: -**

**Roots** – are aerial, develop during rainy season.

**Stem** -is buff colored with greenish ting, dichotomously branched, sub angular, glabrous, fibrous and smooth.

**Tendrils** - occasionally present at nodes.

**Internodes** - measures 4-5 cm long and 1-2 cm thick.

**Leaves** - are simple or lobed, cordate, broadly ovate or reniform, serrate, dentate, sometimes 3-foliate.

**Flowers** - are small, greenish white, bisexual, tetramerous, in umbellate cymes, opposite to the leaves. Petals are 4-5, imbricate.

**Calyx** - is short, entire, deciduous and cup shaped.

**Fruit** - are globose or obovoid fleshy berries, succulent, very acrid, dark purple to black.

**Seeds** - are ellipsoid or pyriform, one seeded, flowering and fruiting time - post rain and autumn season.

**Lakshadi Guggulu:**

□ **Botanical Name:-** Commiphora Wightii

□ **Key Ingredient:** Lakshadi guggulu is a traditional Ayurvedic formulation containing ingredients like Guggulu resin, Laksha (shellac), Ashwagandha, Giloy (*Tinospora cordifolia*), Arjuna (*Terminalia arjuna*), and others.

□ **Chemical Composition :-** amino acids, sugars, essential oils, flavonoids, cembrene, camphorene, allylcembrol, and ellagic acid.



Figure 3: Lakshadi Guggulu

**Part Used:-**The oily sap (gum resin) of the guggul tree

**Uses in Modern Orthopaedic Medicine:** The active constituents in Lakshadi guggulu contribute to its osteogenic potential. It has been observed that the methanolic extract of Lakshadi guggulu exhibits superior activity compared to *Cissus Quadrangularis* in terms of increasing alkaline phosphatase and lactate dehydrogenase activity. This indicates its significant role in bone regeneration and healing processes.

The increased alkaline phosphatase and lactate dehydrogenase activity shown by these herbal extracts suggest their potential as competent surface modification materials for dental bone healing and orthopaedic titanium implants. This research highlights the bridge between traditional Ayurvedic medicine and modern orthopaedic practices, demonstrating the valuable contributions of herbal extracts in enhancing bone health and regeneration<sup>[4]</sup>.

**3) Some Other Use of Lakshadi Guggulu:-** Osteoporosis, Bone pain, Fractures, Muscle pain, Bone health, Arthralgia, Muscle cramps, Osteoarthritis, Inflammation, And other Health benefits Shatavari:

□ **Botanical Name:-** Asparagus Racemosus.

□ **Active Components:-** Steroidal Saponins Known As Shatavarins, Oligosaccharides, Mucilage, Isoflavones, Alkaloids, Flavonoids Like Rutin And Quercetin And Sterols Such As Sitosterols.

□ **Part Used:-** The Roots are Used.

Certainly! Shatavari, an Ayurvedic herb, has a rich history of use in addressing numerous health issues such as supporting female reproductive health, managing hormonal imbalances, and alleviating stress. In addition to these benefits, some traditional beliefs suggest that Shatavari may also contribute to height growth<sup>[6]</sup>.



Figure 4: Shatavri

Shatavari powder is believed to function by boosting levels of growth hormone and insulin-like growth factor 1 (IGF-1), crucial for height growth during puberty. Additionally, it may enhance nutrient absorption and reduce inflammation, both of which contribute to promoting height growth<sup>[6]</sup>.

#### Macroscopic character: -

Shatavar is a scandent, much-branched, spinous under-shrub with tuberous roots. The roots are fascicled, fleshy, spindle-shaped, light ash-coloured externally and white internally, more or less smooth when fresh, but on drying, develop longitudinal wrinkles and lack anywell-marked odour<sup>[7]</sup>.

#### 4) Brahmi:

□ **Botanical Name:** Bacopa Monnieri



**Figure 5: Brahmi**

Brahmi is a small creeping herb with numerous branches. The leaves of this plant are oblanceolate, succulent, relatively thick, and are arranged oppositely on the stem. In North India, it can grow in a wide range of temperatures (15–40 °C) and soil pH (5–7.5)<sup>[8]</sup>.

**Chemical Constituents:-** Brahmine, herpestine, hersaponin, monnierin (saponin), bacoside A & B, bacosides A1 – A4 (sapogenins) etc.

**Parts Used:-** Whole plant.

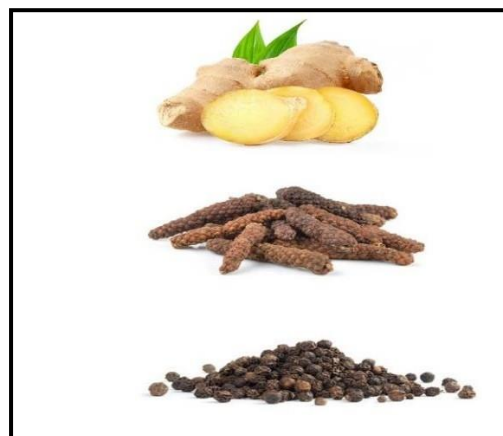
**Some Others Properties of Brahmi:-** Bitter – astringent, cooling, brain tonic, antioxidant, anti-epileptic, febrifuge and for bone growth etc.

In a study on male albino mice, researchers gave Bacopa monniera extract along with phenytoin during the second week of a two-week trial. They found that Bacopa monniera significantly reversed the cognitive impairment caused by phenytoin, leading to improved memory acquisition and retention without affecting phenytoin's anticonvulsant activity. Additionally, some animal studies suggest that Bacopa monnieri

may be beneficial for Alzheimer's disease, epilepsy, Parkinson's disease, and cerebral ischemia/infarct. It has also been shown to heal gastric ulcers in animals and has anti-Helicobacter pylori activity in human colonic tissue and it also increase bone growth<sup>[9]</sup>.

#### 5) Trikatu:

• **Ingredients:** Trikatu is a poly herbal preparation. It consists of three crude drugs namely Maricha (Piper nigrum Linn). Pippali (Piper longum Linn) and Shunthi (Zingiber officinalis Rosc) in the ratio of (1:1:1; ww). Trikatu also called as Katutrikam, Tryusnam, Vyosa<sup>[10]</sup>.



**Figure 6: Trikatu**

Trikatu churna is a traditional polyherbal preparation, meaning "three pungents," made from three spicy ingredients: Maricha (Piper nigrum), Pippali (Piper longum), and Sunthi (Zingiber officinale). These plants are commonly used as spices worldwide and are important ingredients in Ayurvedic, Siddha, and Unani (ASU) drugs and traditional medicine<sup>[10]</sup>. Trikatu churna is known for its numerous health benefits, such as treating fever, asthma, cold, cough, diabetes, nasal diseases, obesity, anorexia, digestive issues, skin disorders, abdominal distention, flatulence, respiratory problems, and urinary tract health. It is also effective in managing dyspepsia and improving gastric function<sup>[10]</sup>.

Pippali and Maricha contain an alkaloid called piperine, which is a major active component. Piper longum also contains piperine, piperlongumine, volatile oil, resin, gums, and fatty oil, and is beneficial for spleen disorders, bronchitis, tuberculosis, and jaundice. Since piperine is a significant component of two of the three ingredients, it plays a crucial role in the therapeutic effects of Trikatu churna<sup>[10]</sup>.

It is majorly helpful for the bone health.



Studies have shown that five active compounds found in trikatu—vanillic acid, ferulic acid, gallic acid, piperine, and 6-gingerol—help reduce inflammation and prevent bone damage. (Bone Erosion)

#### 6) Bala:

- **Botanical Name:** *Sida Cordifolia*
- **Chemical constituents:**  $\beta$ -phenethylamine, ephedrine, pseudoephedrine, S-(+)-Nb- methyltryptophan methyl ester, hypaphorine, vasicinone, vasicinol, choline, and betaine.

**Part Used:-** Whole plant are Used.



Figure 7: Bala

**Macroscopic Characters<sup>[11]</sup>:-** **Stems** - stout and strong

**Leaves** - 2.5-7 cm long and 2.5-5 cm broad, with 7-9 veins.

**Flowers** - small, yellow or white in colour, solitary and axillaries.

**Fruits** - moong-sized, 6-8 mm in diameter

**Seeds** - grayish black in colour and smooth.

**Bark** - Considered as cooling. It is useful in blood, throat, urinary system related troubles, piles, phthisis, insanity etc. **Seeds**- The seeds as considered as aphoradisiac.

**Roots** -It is regarded as cooling, astringment, stomachic and tonic, aromatic, bitter, diuretic. It also use anti-depressant and hight growth.

#### □ **Use For Increasing Bone Strength**

Bala is a well-known herb in Ayurveda, meaning "strength" in English. It is a powerful herb used to boost the strength of bones, muscles, and joints, and to enhance overall stamina and vitality in the body<sup>[12]</sup>.

□ **Some Other Uses of Bala:-** Bala is helpful for urinary system infections and cystitis due to its diuretic, tonic, and antispasmodic properties. It also works as a nasal decongestant and bronchodilator, benefiting lung and upper airway health. It's useful for bronchitis, rhinitis, and common colds or flu<sup>[13]</sup>.

#### **Therapeutic Uses<sup>[11]</sup> :-**

The Plant is alternative tonic, astringent, emollient, aphrodisiac etc.

**Bark** - Considered as cooling. It is useful in blood, throat, urinary system related troubles, piles, phthisis, insanity etc. **Seeds**- The seeds as considered as aphoradisiac.

**Roots** -It is regarded as cooling, astringment, stomachic and tonic, aromatic, bitter, diuretic. It also use anti-depressant and hight growth.

#### 7) **Amla:-**

□ **Chemical Constituent:-** higher amount of polyphenols like gallic acid, ellagic acid, different tannins, minerals, vitamins, amino acids, fixed oils, and flavonoids like rutin and quercetin.

□ **Botanical Name :-** *Emblica officinalis*.

□ **Part used :-** All parts of the Amla plant, including the fruit, are utilized extensively for their medicinal properties, showcasing the plant's versatile health benefits and therapeutic applications across various traditional healing systems.



Figure 8: Amla

**Microscopic Characters :-** The fresh fruit is round in shape with flesh, and it has six slightly visible sections. Its surface is smooth and has a pale or yellowish-green color. Amla, also known as Indian gooseberry, is renowned for its high calcium content, which plays a crucial role in developing and maintaining robust bone health. Its potent anti-inflammatory properties can effectively reduce inflammation and alleviate pain and swelling in joints, often associated with arthritis. Additionally, amla is utilized in the management of bone-related conditions such as osteoporosis, providing a natural means to support bone density and strength<sup>[14]</sup>.

**Other Medicinal Use :-** Amla fruit compounds can protect against oxidative damage, as shown in animal studies. In one study, giving 500 mg of amla fruit extract per kg of body weight to mice every day for 28 days increased the activity of antioxidants like GSH, CAT, and SOD in their thymus. This also reduced levels of harmful molecules like lipid peroxidation and reactive oxygen species (ROS). Another study found that amla fruit extract reduced lipid peroxidation and conjugated dienes levels and improved SOD levels in the liver of mice treated with arsenic, using 500 mg per 100 g of body weight. In a different experiment, amla fruit extract (50–250 µg/mL) increased the activity of SOD and CAT and reduced lipid peroxidation in the kidneys of mice<sup>[15]</sup>.

#### 8) **Moringa:-**

- **Botanical Name :-** Moringa Oleifera
- **Chemical Constituent :-** Fatty acid, beta-Sitosterol, Stigmasterol, Behenic acid, Campesterol, Palmitoleic acid, Avenasterol, Brassicasterol,  $\beta$ -Carotene, Benzyl, isothiocyanate, Isothiocyanate.
- **Part Used:-** bark, pods, leaves, nuts, seeds, tubers, roots, and flowers



**Figure 9: Moringa olifera**

- **Microscopic Character:-** Moringa oleifera is indeed a small, fast-growing tree that can be either evergreen or deciduous. It usually grows up to around 10 to 12 meters in height. The tree is characterized by

its spreading, fragile branches, feathery foliage consisting of tripinnate leaves, and whitish-gray bark<sup>[16]</sup>.

Moringa oleifera, often referred to as the "drumstick tree," is a highly nutritious plant known for its dense concentration of essential amino acids and micronutrients, including beta-carotene, vitamin C, calcium, and potassium, all of which are vital for maintaining bone health. Bone illnesses such as osteoporosis, arthritis, and joint inflammation can significantly impact bone density, making nutrient-rich foods like moringa valuable for bone preservation<sup>[17]</sup>.

Moringa leaves, when dried, contain an impressive 2185 mg of calcium and 448 mg of magnesium per kilogram. These minerals are crucial for the health of bones and teeth and for normal bodily functions. Moreover, moringa includes vitamins B and magnesium, which enhance calcium absorption in the body. However, moringa also contains 160 mg of oxalic acid per 100 g, which can inhibit calcium action to some extent<sup>[17]</sup>.

In a study involving rats, calcium-rich diets were tested, including one with 30 g of milk powder, 15 g of moringa leaf powder, and 4 g of kilkeerai leaf powder. Both the milk and moringa diets provided the same amount of calcium. The results showed that moringa is an excellent source of calcium, with 73% of the calcium being absorbed and 59% being retained by the body. This suggests that moringa could be beneficial for individuals with osteoporosis, helping to maintain and improve bone density through its high calcium and nutrient content<sup>[17]</sup>.

Oxidative stress can disrupt the balance of antioxidants in the body, leading to tissue damage. This disruption can affect lipids, membranes, nucleic acids, and proteins, causing harmful effects and metabolic complications. For many years, the primary drugs for treating metabolic complications like diabetes have been metformin, thiazolidinediones, and rosiglitazone. However, research has shown that plant polyphenols and their bioactive compounds might be more effective in treating diabetes by targeting oxidative stress and inflammation to improve human health. For example, Moringa oleifera has shown strong antioxidant activity in tests like DPPH and ABTS. However, these results only indicate its potential as an antioxidant, and more studies using established preclinical and clinical models of diabetes are needed to confirm its effectiveness. The following evidence from preclinical and clinical studies supports the therapeutic potential of Moringa oleifera in reducing oxidative stress and inflammation-related complications of diabetes without causing adverse effects<sup>[18]</sup>.

- **Other Medicinal Uses:-** Protecting and Nourishing skin and Hair, Treating Edema, Protecting the Liver, Preventing and treating Cancer, Treating Stomach Upset, Fighting Foodborne Bacterial Infections, Preventing Rheumatoid Arthritis, Treating mood and Nervous System disorders, Protecting the Cardiovascular System, Treating Diabetes, Treating asthma, Preventing kidney stone, Reducing high blood pressure, Improving eye health, Treating anemia and sickle cell disease.

#### 9) Licorice :-

- **Botanical Name :-** Glycyrrhiza glabra.
- **Chemical Constituent:-** Glycyrrhizin, Enoxolone, Liquiritin, Liquiritigenin, Isoliquiritigenin, Glabridin, isoliquiritin, Licochalcone A, hispaglabridin b, glabrocoumarin, licochalcone c, Formononetin, Glycyrrhizinate dipotassium.
- **Part Used:-** Rhizomes and Roots.



Figure 10: Licorice

Licorice, specifically its active compound glycyrrhizin, has been studied for various health benefits, but its direct mechanism in height growth is not well-established. However, there are some indirect ways in which licorice might influence growth:

- **Hormonal Balance:** Licorice contains phytoestrogens, which are plant-based compounds that can mimic the activity of estrogen in the body. Estrogen plays a role in bone growth and development, especially during puberty. By influencing estrogen levels or activity, licorice might indirectly impact bone growth.
- **Anti-inflammatory Effects:** Licorice has anti-inflammatory properties, which can help reduce inflammation in the body. Chronic inflammation can affect overall health, including bone health. By reducing inflammation, licorice may indirectly support optimal conditions for growth.

- **Adrenal Gland Function:** Licorice has been studied for its effects on the adrenal glands, which produce hormones like cortisol. Cortisol levels can influence various processes in the body, including growth and development. By modulating cortisol levels, licorice might indirectly affect growth mechanisms.

- **Other Medicinal Uses:-** Licorice (*Glycyrrhiza glabra*) has been traditionally used for a variety of health issues, including digestive problems, menopausal symptoms, coughs, and bacterial and viral infections. Specifically, licorice gargles or lozenges are utilized to help prevent or reduce sore throat, a common postoperative complication. Licorice contains compounds such as glycyrrhizin, which possess anti-inflammatory, antimicrobial, and soothing properties that contribute to these health benefits. However, it is important to use licorice cautiously due to potential side effects like hypertension and hypokalemia, especially with long-term use<sup>[19]</sup>.

#### 10) Tulsi:-

- **Botanical Name:-** Ocimum Tenuiflorum.
- **Chemical Composition:-** Linalol, Eugenol, Methylchavicol, Methylcinnamat, Linolen, Ocimene, Pinene, Cineol, Anethol, Estragol, Thymol, Citral, And Camphor<sup>[20]</sup>.



Figure 11:- Tulsi

Tulsi, also known as holy basil, is a medicinal plant native to India and widely used in Ayurveda. The oil extracted from tulsi leaves contains several pharmacologically active compounds, including methyl eugenol (1-hydroxy-2-methoxy-4-allylbenzene), (E)- caryophyllene, and  $\beta$ -elemene.



Additionally, tulsi leaves contain various other phytochemicals such as linalool (3,7-dimethylocta-1,6-dien-3-ol), limatrol, caryophyllene, and carvacrol (5-isopropyl-2-methylphenol). The seeds of tulsi are rich in fatty acids, sitosterol, and sugars like xylose, as well as polysaccharides. These components contribute to tulsi's numerous health benefits, making it a valuable herb in traditional medicine.

Main medicinal use of Tulsi was Increasing Bone Health<sup>[21]</sup>.

• **Some other Medicinal Use of Tulsi:-**

Promotes Healthy Heart, Anti- Aging, Treats Kidney Stones, Relieves Headaches, Fights Acne, Relives Fever, Eye Health, Oral Health, Cures Respiratory Disorders, Rich Source of Vitamin K., etc.

❖ **Requirements & Ingredients:-**

**A. Apparatus :-**

- 1) Weighing balance.
- 2) Grinder.
- 3) Beaker.
- 4) Stirrer.

5) Measuring Cylinder.

6) Spatula.

7) Morter Pestle.

**B. Ingredients :-**

- 1) Ashwagandha.
- 2) Guggul.
- 3) Shatavari.
- 4) Brahmi.
- 5) Trikatu.
- 6) Bala.
- 7) Amla.
- 8) Moringa.
- 9) Licorice.
- 10) Tulsi.
- 11) Wheat.
- 12) Chocolate Powder (Cocoa Powder).
- 13) Almonds.
- 14) Cardamon.
- 15) Ground Nut.

• **Ingredients With Quantity Taken:-**

Sr.No.	Ingredients	Quantity Taken
1	Wheat	
2	Ashwagandha	1.5 gm
3	Guggul	60 gm
4	Shatavari	30 gm
5	Brahmi	20 gm
6	Trikatu	4 gm
7	Bala	90 gm
8	Amla	60 gm
9	Moringa	50 gm
10	Licorice	80 gm
11	Tulsi	60 gm
12	Chocolate powder	200 gm
13	Almonds powder	20 gm
14	Cardamon powder	30 gm
15	Groundnut powder	100 gm

**Procedure:-**

1. Take 20 gram wheat in beaker add 50 ml water & soaked well
2. After this Drain off wheat in a clean cloth, Tie tight it & rest for 2 days.
3. After 2 days sprouts are formed , sprouted wheat roast at low flame up to wheat turns crunchy
4. Add almonds- 3 spoons, peanut- 2 spoons, roast at low flame & turns it crunchy
5. Add all sample in mixer vessel and add in mishri ¼ cup & 4 cardamon turns into fine powder.
6. Add Ashwagandha, guggul, Shatavari, Brahmi, Trikatu, Bala, Amla, Moringa, Licorice, Tulsi (Each 20 grams).
7. Add Chocolate powder and milk powder.
8. Transfer into sieve make a fine powder & mix well, well combined.
9. Store in Airtight container.

## ❖ Evaluation Of Height Booster Powder:-

Sr.No.	Parameter	Observation
1	Colour	Dark Brown
2	Odour	Earthy, Nutty
3	Taste	Sweet And Nutty
4	Angle Of Repose	Passable
5	Bulk Density	0.5gm/ml
6	Tapped Density	0.66gm/ml
7	Comprassibility	24.2
8	Moisture Content	0.75
9	Ash Content	17.1%
10	PH	6.5

**RESULT:**

Participants will be measured for height at the beginning, midpoint, and end of the trial. Health markers such as stress levels, bone density, and overall well-being will also be evaluated to determine the holistic benefits of the formulation.

**CONCLUSION:**

- Herbal Height booster made up using Ashwagandha herb can be effectively use for boost up height.
- It can be a effective substitution for currently marketed Chemical height booster.
- It is comparatively more safe.
- It is more pocket friendly
- So we can effectively substitute chemical height booster with Herbal height booster
- This study aims to determine the efficacy of an Ashwagandha-based herbal supplement in promoting height growth and improving general health in adolescents, potentially offering a natural alternative to conventional growth-enhancing methods.

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