

# Hemoglobin, Iron Deficiency Anemia, Role of Halim Seeds to Eradicate the Ailment - A Complete Overview

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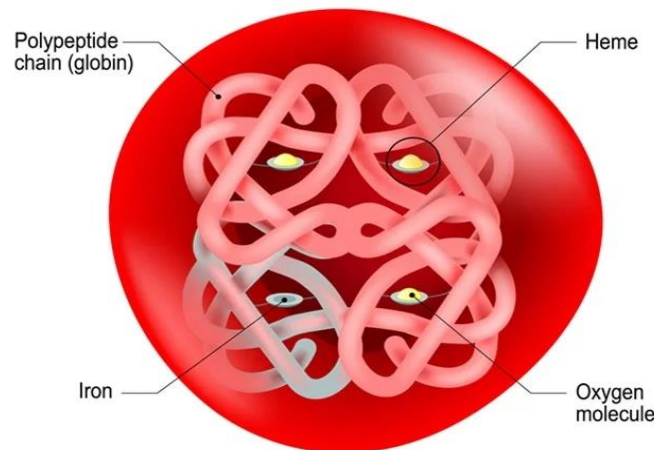
## Abstract

The *Lepidium Sativum* is also known as garden cress seeds or the Halim seeds is a commonly known herb for its plethora of health benefits. Moreover they have been proved to be a rich source of ample of nutrients as well as phytochemicals. In addition to this the garden cress seeds are a rich source of iron which is absorbed in the small intestine effortlessly and helps in the elevation of the hemoglobin levels of the human body in the blood. Furthermore, the seeds of the garden cress have some remarkable medicinal properties such as anti-anemic, anti-diabetic effect, anti-oxidant effect etc ...the Halim seeds or the garden cress seeds are composed of not only a good amount of iron but also the vitamins such as C, E, A, B12, as well as protein. Anemia is an ailment in which the number of red blood cells is insufficient which yields to the constant decrement in the oxygen carrying capacity that does not necessarily meet the physiological needs of the body. Since the ancient times the Halim seeds have been used as the traditional medicines. They are a rich source of carbohydrates, protein, lipids, crude fibres, etc. Afterwards the Vedic era the Garden cress has been considered as an important plant with not only rich nutritional values but also medicinal values. Henceforth the seeds of garden cress can be used for treating the condition of iron deficiency anemia as they have anti anemic properties which has an enormous ability to boost up the hemoglobin levels of the body.

**Key words:** - Anaemia, Iron deficiency anaemia, Hemoglobin, Garden cress seeds, Halim seeds.

## Introduction to Hemoglobin

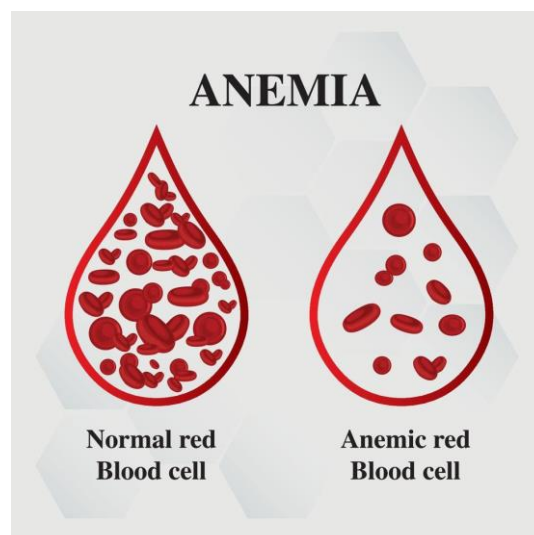
# HEMOGLOBIN



**Figure: 1 Structure of Hamoglobin**

The set of proteins that for a symmetric pair of dimer or polypeptide chains, is the molecule of hemoglobin of humans. This functional unit is a tetrameric structural unit consisting of three chains, the dimer polypeptide chain  $\alpha$  chain as well as  $\beta$  chain. Moreover, the main function of hemoglobin is the transfer of oxygen [1]. It transports oxygen from lungs to tissues. In addition to this, hemoglobin molecule also specifically interacts with three different gases for instance, Nitric oxide, carbon dioxide as well as carbon monoxide. These also have a major and a vital biological role [2].

## Anemia, Iron Deficiency Anemia

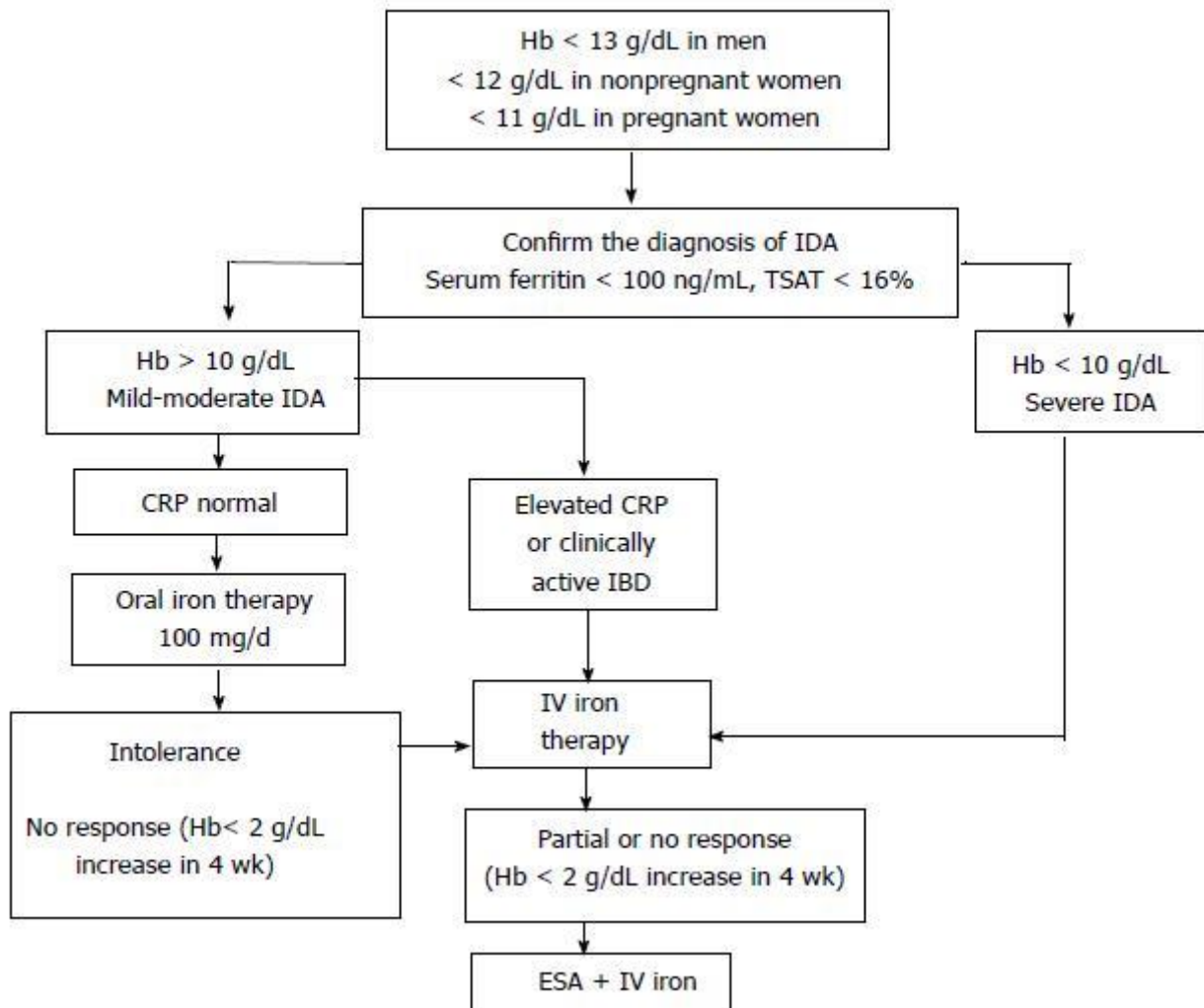


**Figure: 2 Normal Cells vs. Anemic Cell**

In a human body Nutrition is something that plays an important role in the life of a human being starting of the life until the death. Moreover, Anemia is an ailment in which the red blood cell's number decreases and the capacity to carry oxygen of the red blood cells is not completely sufficient to meet up all the physiologic needs of the human body. Furthermore, iron deficiency anemia is a condition which has been found the most prevailing one globally [3]. In addition to this, Anemia can be expounded as the

decrement or the fall in the concentration of the hemoglobin of blood, which is also the most profound nutritional deficiency diseases that has been affecting the quarter of the all-around the globe’s population [4].

Moreover, Iron deficiency anaemia can be considered as a morbid disease which is a worldwide condition that not only significantly affects elder people but also targets public of all age groups and is a major challenge in all the countries irrespective of the development. Additionally, the iron deficiency anemia yields top various manifestations such as low birth weights of the infants, the pre mature delivery risks, growth retardation, impaired cognitive performance as well as the reduction in the physical activities [5].

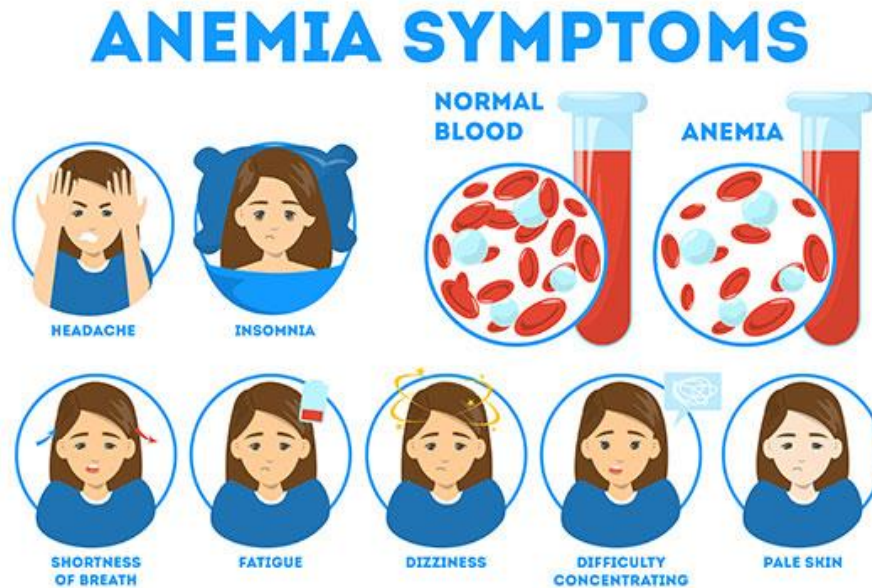


**Figure: 3 a Chart of Iron Deficiency Anemia**

The most common form of malnutrition that affects the global population in billions is termed as anemia, which is the most commonly prevalent micronutrient condition which is critical yet taken for granted. It has been a worldwide necessity to start understanding and start taking the necessary steps in order to eradicate the iron deficiency all around the world and improve the intake of iron in human body [6].

Major causes of anemia can include various parameters for instance , not only acute but also chronic inflammation, deficiencies of vitamin A, B 12, folate etc ... also the acquired or genetically inherited

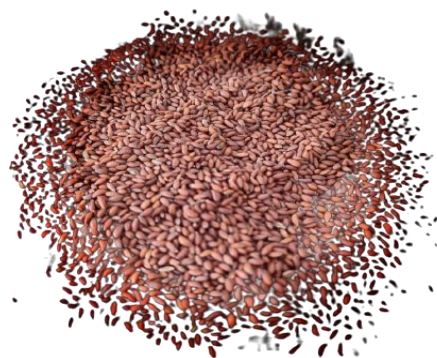
disorders which are responsible for red blood cell formation and their disruption, synthesis of Hemoglobin [7].



**Figure: 4 Symptoms of Anaemia**

### Introduction to Halim seeds

The Halim seeds also known as the garden cress seeds, [GC], scientific name is *Lepidium sativum* is available from an edible plant that is also herbaceous and grows annually, is also botanically related to the mustard as well as the watercress family. Moreover the Halim or the garden cress plant natively belongs to not only the south west Asia but also some parts of Egypt. In addition to this the cultivation of garden cress seed plant also prevails in India [8].



**Figure: 5 a Picture of Halim Seeds**

### **The taxonomical classification of garden cress seeds**

The garden cress seeds also known as Halim seeds belongs to the kingdom Plantae .In Addition, to this the division is referred to as Magnoliophyta and the class is Magnoliopsida with the order as Brassicales. Furthermore it belongs to the Brassicaceae family with the Lepidium sativum genus [9].

### **The morphological characteristics of garden cress seeds**

The Halim seeds or the garden cress seeds are little oval shaped triangularly pointed at one end with the length of approximately 3 mm , and width of 1-2 mm , possessing the reddish brown colour . When these particular seeds are soaked in water they swell and the seed coat gets covered through transparent colourless mucilage and it also acquires a mucilaginous taste [10].

### **Physical Properties of Garden cress seeds**

During the development of any pharmaceutical preparation many physical parameters must be taken in to consideration for instance the colour of the substance, the odour of the substance, its viscosity, its refractive index etc... cause these are the parameters that are responsible for effecting the quality of the synthesized formulations.

### **Colour of Garden cress seeds**

The colour or the substance is responsible in the determination of the Attractiveness to the consumer as well as the rate of acceptance of the product. The colour of the garden cress varies from red to brown as an amalgamation of both. Moreover the extracted oil of the Halim seeds is dirty yellow because of the chlorophyll as well as the caretonoid pigments [11].

### **Viscosity of garden cress seed and its extracted oil**

The viscous parameters of the oil extracted from the garden cress seeds ranges from about 53.08 to 64.3. However the cold pressed oil from the garden cress seeds is more viscous on comparing to extraction. The more the temperature the lesser the viscosity gets .Henceforth it can be said that the temperature and the viscosity here in the case of garden cress seeds are directly proportional [12]

### **Refractive index of the garden cress**

The higher the refractive index of the index the higher the indication of substantial unsaturation as well as the presence of unusual components for instance the hydroxyl groups [13].

### **Specific gravity**

The specific gravity of the garden cress seeds is found to be 0.91. This indicates that it can be a beneficial fortifying agent [14].

<b>Nutrition Facts</b>	
<b>Serving size</b>	<b>50g</b>
Amount per serving	
<b>Energy</b>	<b>37.7Kcal</b>
% Daily Value*	
<b>Total Fat</b> 0.2g	5%
Saturated Fats 0g	0%
Trans Fat 0g	
<b>Carbohydrates</b> 1.5g	10%
Dietary fibre 0.3g	8%
Sugars 1.2g	
<b>Protein</b> 0.7g	
Vitamin A	39%
Vitamin C	32%
Calcium	2%
Iron	2 %
Magnesium	3%
Potassium	5%
Manganese	8%

**Figure: 6 Nutritional Facts of Halim Seeds**

#### **Use of the garden cress seed as Haematic agent**

The Halim seeds or the garden cress seeds are considered as one of the richest sources of iron , which is easily absorbable in the small intestine also helps in the increment of the hemoglobin levels in the blood [15].Moreover , the bioavailability of the content of iron present in the garden cress seeds or the Halim seeds can be a superficial benefit for treating and eradicating anemia , if its consumption is made on a day to day basis [16].

#### **Use of garden cress seed as the anti anemic Agent**

An experiment was conducted on adolescent girls in order to check the anti anemic effects of the garden cress or Halim seeds where in approximately 25 grams of the powder of the seed was incorporated into an Indian sweet treat which showed remarkable elevation in the hemoglobin levels of the girls who were fed [17].

#### **Use of Garden cress seeds as an anti diabetic agent**

The garden cress seeds show significant presence of alkaloids that were profound to be effective against fighting with the blood sugar levels [18].The use of garden cress or Halim seeds has been significantly found interlinked with the reduction in the rate of starch hydrolysis[19].

#### **Nutritional composition of garden cress seeds**

The garden seeds or the Halim seeds are packed with plethora odd nutrients such as protein as well as fats [20]. It is also a significant source of ample of iron, as well as folic acid, calcium and the various vitamins such as C, E, and A etc [21]. In addition to this the Halimseeds also consists of minerals for instance calcium as well as phosphorous [22]. Furthermore, it consists of vitamins such as thiamine, carotene, and riboflavin etc ... [23]. IT is packed and loaded with the nutrients that have benefits of health enhancement and it's the richest source of iron that is nonheme [24]. The garden cress or seeds or Halim seeds is enriched with not only macro but also micro nutrients. Moreover since the Vedic and

ancient era in India it has been used as a traditional ingredient in the medicine. They are bitter in taste yet have the depurative, thermogenic as well as rubefacient properties. Furthermore, they are tonic as well as ophthalmic and diuretic [25]. These seeds also comprise as a rich source of ample of things for instance omega 3 – fatty acids. Moreover the omega 3 – fatty acids helps in the decrement of cholesterol levels in the patients. Furthermore, the Halim seeds are well renowned for plethora of ethano pharmacological properties [26].

These seeds consist of ample of anti anemic as well as anti oxidant properties and the galactagogue pharmacological parameters [27]. The Halim seeds have an enormous ability to curate the formulations which work as natural supplements [28]. The garden cress or the *Lepidium sativum* has been well renowned to have plethora of health enhancement properties henceforth it can be categorized as a functional food. It has been proved to consist of not only PUFA but also MUFA [29]. These seeds possess ample of medicinal as well as pharmacological properties that it can be used as an aphrodisiac as well as carminative. In addition to this it can also be used as demulcent [30]. Moreover, these seeds can also be used as the natural supplementation in the diet of humans as it may be useful in iron, calcium, vitamins and dietary fibres, fatty acids etc deficiency. They are also rich in Tocopherols as well as carotenoids [31].

During the ancient times that are in the Vedic era the seeds of the garden cress have been considered rich in nutrition and has been used as medicines since the times between 500 to 1700 BC. Moreover the Halim seeds are full of folic acid, calcium, iron, fatty acids, vitamins A, E, C, B12 etc ... They are not just consisting protein but also Linolenic as well as arachidonic fatty acids as well. Not only this but also the Cress seeds have been proved to regulate the irregular menstrual cycle and also elevate the milk production in the new mothers. Just because they are rich in iron they are very good on consumption for new moms as well as post – partum. Due to rich in iron source they can be used in medicinal preparations to treat the iron deficiency anemia [32].

### **Medicinal Activities of Garden Cress seeds**

The Halim seeds have been considered as the most significant source of medicines since the golden era. In various parts of the globe they are used as food materials such as in salads or sweet treats however they possess a pungent taste. All around the globe they are used in different ways due to their good medicinal properties such as seeds fresh or dried to eat, ground in honey or infused in hot milk, condiments or baking etc [33]. These seeds possess lepidine, glucapaeolin as well as carotene. Moreover the oil of the Halim seed consists of Palmitic, oleic, lineolic, arachidic, behenic, benzyl isothiocyanate acids. In addition to this the leaves of the garden cress plants captures the essences of Vitamin, thiamine, Niacin as well as ascorbic acid [34].

### **Numeric Percentages of nutrition in garden cress seeds**

The seeds of garden cress comprise of carbohydrates, protein, lipids as well as crude fibres in 33-54 %, 25 %, 14-24 % and 8 % respectively [35].

Lastly the very low anti nutritional parameters may never fidget with the nutritional value of garden cress seeds henceforth they may show remarkable health benefits if used in any medicinal formulations [36].

## Conclusion

Anemia is the most common global ailment which needs to be eradicated as soon as possible. Moreover, it may also yield to iron deficiency which is the commonly prevailing nutritional deficiency, however, there is a very thin line distinction between the two conditions that is the iron deficiencies as well as the anemia. It must be made clear that people may not be anemic but still have iron deficiency as well. Although to eradicate both the problems a medicinal preparation must be formulated that stops the depletion of the iron and red blood cells in the body and also elevates the lower hemoglobin levels of the body. The Halim seeds also known as the garden cress seeds, [GC], scientific name is *Lepidium sativum* is available from an edible plant that is also herbaceous and grows annually, is also botanically related to the mustard as well as the watercress family. Moreover the Halim or the garden cress plant natively belongs to not only the south west Asia but also some parts of Egypt. In addition to this the cultivation of garden cress seed plant also prevails in India. The Halim seeds or the garden cress seeds are considered as one of the richest sources of iron, which is easily absorbable in the small intestine also helps in the increment of the hemoglobin levels in the blood. Moreover, the bioavailability of the content of iron present in the garden cress seeds or the Halim seeds can be a superficial benefit for treating and eradicating anaemia, if its consumption is made on a day to day basis.

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