



# GARDEN CRESS SEEDS (*Lepidium Sativum*) INCORPORATED BISCUITS: FORMULA AND NUTRIENT EVALUATION

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## Abstract

The plant known as garden cress, *Lepidium Sativum*, is a member of the *Brassicaceae* family and is botanically related to mustard. The plant seeds are valued for their therapeutic and dietary properties. The seeds' therapeutic qualities are caused by a variety of phytochemical compounds found in them. A variety of plants are utilized for the same purposes since the majority of plants have both nutritional and therapeutic properties. Consumers and manufacturers have recently shown an increased interest in garden cress seeds, which are a viable option to use in food items to add macro- and micronutrients like protein, calcium, and iron. Since ancient times, India's traditional indigenous medicine has employed garden cress seeds. The seeds of garden cress are a good source of calcium, folic acid, iron, and vitamins C, E, and A. The seeds of garden cress are very calorie-dense. It has 25.3 grams of protein and 454 kcal of energy per 100 grams of carbs. When compared to other nuts and oilseeds, it has a low-fat content of 24.5 g. To create a nutrient-dense biscuit that is the ideal substitute for traditional biscuits, the current study created one using garden cress seeds.

Key Words: *Lepidium Sativum*, phytochemical, Biscuits, Enrichment.

## Introduction

The *Brassicaceae* (*Cruciferae*) family member *Lepidium sativum*, sometimes known as garden cress, is grown in India, North America, and some regions of Europe. The seeds are gathered for food in numerous regions of India, even though it is utilized as a vegetable in Europe and America. In India, it is also referred to as common cress, land cress, and have. The Sanskrit name Chandrasura plays a significant role in Indian Materia Medica. (Vohora 1977) is cited. This seed's nutritional content is quite high. It is accessible practically everywhere in the world. Because of its high nutritional value and accessibility, individuals from all socioeconomic groups may incorporate it into their diets and boost the nutritional content of their meals

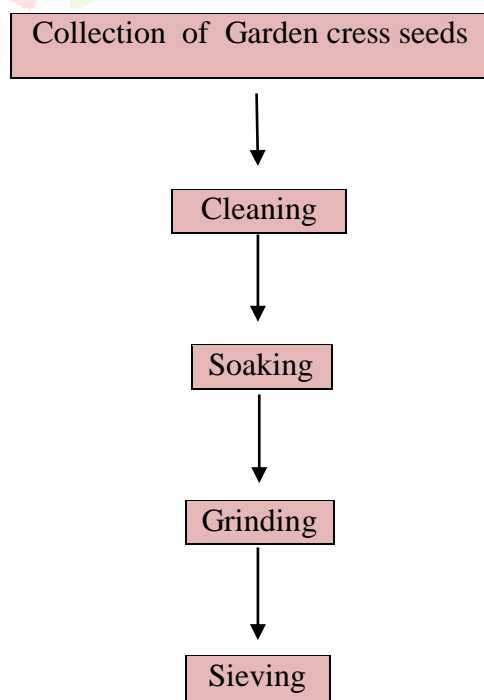
without having to pay more for food. **(1977 Vohora)** Garden cress seeds, or Halim as they are known in Hindi, are incredibly nutrient-dense. It is a significant source of calcium, folic acid, vitamin C, vitamin E, and vitamin A. It contains 100 mg of iron per 100g, making it an excellent source of iron. The seeds of garden cress are very calorie-dense. It has 25.3 grams of protein and 454 kcal of energy per 100 grams of carbs. When compared to other nuts and oilseeds, it has a low-fat content of 24.5 g. **(mali., 2008)** Garden cress seed has the potential to be a valuable, versatile source of medicine. Despite being an oilseed, garden cress seed is a nutritious powerhouse. Garden cress oil (GCO) contains tocopherols and carotenoids, which are natural antioxidants that keep the oil from going rancid. It also contains a balanced amount of polyunsaturated fatty acids (PUFA) (46.8%) and monounsaturated fatty acids (MUFA) (37.6%). **(Eddouks and colleagues, 2005)**. Garden cress seed-eating has been linked to a number of health advantages. In asthmatics, it improves lung function and lessens asthmatic symptoms. **(S.S. Balasubramanian, 2009)** Garden cress seeds have a wide range of therapeutic benefits, including anti-diabetic, anti-hypertensive, anti-diarrheal, anti-spasmodic, and laxative effects. Additionally, it has the capacity to cure fractures and possesses hepatoprotective, diuretic, nephroprotective, anti-inflammatory, antipyretic, and analgesic properties. **(Kulkarni et al. 2012)**. Additionally, garden cress seeds include calcium, ascorbic acid, tocopherol, and beta-carotene, all of which boost the body's defense mechanisms. Linoleic and arachidic fatty acids, in addition to protein, are abundant in garden cress seeds. Consumption of these seeds helps to regulate menstruation and boost milk supply in breastfeeding women because they contain phytochemicals that somewhat mimic estrogen. **(Dreze., 2009)**.

## Methods

### Selection of Sample

In the smaller store Pattukkottai, we bought garden cress seeds, maida flour, sugar, baking powder, eggs, butter, and chocolate powder.

### Development of Garden Cress Seed Powder



**Standardization of recipes through incorporation**

Biscuits incorporated with 5%, 10%, 15%, and 20% percent levels of Garden cress seeds powder.

**Table-I Ingredients for the Preparation of Standard Biscuits**

S.NO	INGREDIENTS	QUANTITY USED
1	Wheat flour	150 gram
2	Sugar	75 gram
3	Baking powder	5 gram
4	Butter	30 gram
5	Milk	50 ml
6	Cardamom powder	5 gram
7	Vanilla essence	2 drop

In a bowl, mix butter, powdered sugar, wheat flour, and baking powder. Now add the milk, vanilla extract, and cardamom powder and completely blend. To achieve a thickness of 1/4 inch, roll the dough. The baking pan is greased and buttered. Make balls of the same size and place them on the tray with about 2 inches between each one. They must be cooked at 350°F for 15 to 18 minutes before being allowed to cool and then served.

**Table-II Ingredients for the Preparation of 5,10,15,20 Percent Level of Garden Cress Seeds Powder Incorporated Biscuit**

S.NO	INGREDIENTS	QUANTITY USED			
		5%	10%	15%	20%
1	Wheat flour	145 gram	140 gram	135 gram	130 gram
2	Garden cress seeds powder	5gm	10gm	15gm	20 gm
3	Sugar	75 gram	75 gram	75 gram	75 gram
4	Baking powder	5 gram	5 gram	5 gram	5 gram
5	Butter	30 gram	30 gram	30 gram	30 gram
6	Milk	50 ml	50 ml	50 ml	50 ml
7	Cardamom powder	5 gram	5 gram	5 gram	5 gram
8	Vanilla essence	2 drop	2 drop	2 drop	2 drop

Baking cookies according to established protocol

## Assessing the Consumer Acceptability

To evaluate the look, color, taste, texture, and flavor of recipes including garden cress seeds powder, a total of 25 consumers were chosen at random. Each person received a scorecard with a hedonic rating of five points.

<b>Excellent</b>	<b>5</b>
<b>Very good</b>	<b>4</b>
<b>Good</b>	<b>3</b>
<b>Fair</b>	<b>2</b>
<b>Poor</b>	<b>1</b>

### Estimation of Nutrients

The usual approach was used to analyze the nutritional content of the most appropriate garden cress seeds powder including biscuits.

**Table –III Estimation of Nutrients Content of the Most Acceptable Garden Cress Seeds Powder Incorporated Biscuit**

S.NO	Nutrients	Methods
1.	Carbohydrate	Anthrone method
2.	Protein	Lowry's method
3.	Fat	Sordhum associated of official chemisty
4.	Calcium	Ethylene dicrmine tetra acetate.
5.	Iron	Ethylene dicrmine tetra acetate
6.	Vitamin –A	Spectro photometer method

### Shelf Life of Standard

The fully generated mixture was packaged in polythene bags and kept in an airtight container at room temperature to determine its shelf life. The recipe's qualitative characteristics, including appearance, color, flavor, texture, and taste, were examined daily. Garden cress seed powder in biscuits has a shelf life of around 15 days.

## Result and Discussion

As a consequence of this investigation, biscuits were combined with garden cress seeds to varying degrees (5–20%). A biscuit that was 10% integrated performed well in comparison to other levels of integration. Garden cress seeds added to biscuits were compared to regular Biscuits for their nutritional value.

### Preparation of Biscuits

**Table – IV Steps Involved in the Preparation of Garden Cress Seeds Powder Incorporated Biscuits**

S.No	Name of the Recipes	Method of Preparation	Time in Minutes
1.	Garden cress seeds Powder incorporated Biscuits	Mixing Baking	30 minutes

### Evaluation of Consumer Acceptability

**Table –V Sensory Evaluation of Garden Cress Seed incorporated Biscuits**

S.No	Criteria	Level of Incorporation			
		5%	10%	15%	20%
1	Appearance	4.5±0.33	4.6±0.13	4.5±0.13	4.1±0.11
2	Colour	4.7±0.32	4.8±0.12	4.7±0.12	3.7±0.12
3.	Flavour	4±0.16	4.5±0.26	4±0.16	4±0.13
4	Texture	6.9±0.12	6.9±0.12	4.9±0.22	4.9±0.12
5	Taste	4.8±0.14	5.0±0.14	4.0±0.14	3.8±0.12

The mean score of consumer acceptability for biscuits containing 5, 10, 15, and 20% garden cress seeds powder is shown in Table VII above. According to the sensory qualities of the garden cress seeds powder, which included appearance, color, flavor, texture, and taste, flavor had a high mean value and taste had a low mean value in biscuits.

**Overall Consumer Acceptability****Table – VI Overall Consumer Acceptability of Garden Cress Seeds Powder Incorporated Biscuits**

S.No	Level of Incorporation	Overall Acceptability
		Garden Cress Seeds Powder Incorporated Biscuits
1	5 percent	24.9±1.07
2	10 percent	25.16±0.77
3.	15 percent	22.01±0.77
4	20 percent	20.5±0.60

The Consumer Acceptability of biscuits containing 10% garden cress seeds powder scored highly, according to the aforementioned Table VIII. Therefore, compared to other levels of inclusion, the 10% level of biscuits was the most palatable. The findings of the sensory qualities, including flavor, texture, and taste of garden cress seeds powder combined into biscuits, showed that flavor had a higher mean value than taste. The mean values of the texture, color, and look were slightly different.

**Nutrient Content****Table – VI Nutrient Content of Most Acceptable Garden Cress Seeds Powder Incorporated Biscuits**

S.No	Nutrients	Garden Cress Seeds incorporated Biscuits
1	Energy (kcal)	482.03±1.79
2	Carbohydrate (g)	72.17±1.26
3	Protein (g)	2.79±1.06
4	Fat (g)	19.51±0.70
5	Calcium (mg)	6.96±11.28
6	Iron (mg)	3.15±0.77
7	Fiber (gm)	3.8±1.58

According to Table-IX, the biscuits with Garden Cress Seeds powder in them have 482.031.7910 kcal of calories, 72.17331.2689 gm of carbohydrate, 2.79331.062 gm of protein, 19.510.7066 gm of fat, 6.966711.2873 mg of calcium, 3.15670.7769 mg of iron, and 3.81.5875 gm of fiber.

## Conclusion

According to the sensory qualities of the garden cress seeds powder, which included appearance, color, flavor, and texture, and taste, flavor had a high mean value and taste had a low mean value in biscuits. Overall consumer acceptance of biscuits with 10% garden cress seed powder received great marks. Therefore, compared to other levels of inclusion, the 10% level of biscuits was the most palatable. A nation may benefit from its youth. If a country's kids are not healthy, it will not develop. Therefore, it is crucial that adolescents develop in a setting that is adequate for their nutritional, social, emotional, and educational requirements. Therefore, it is imperative that foods high in macro and micronutrients, as well as phytochemicals, be a consistent part of our normal diet in order to maintain a healthy and acceptable blood profile. Home processing is a good technique to increase antioxidants and decrease antinutrients. The results of this study indicate that the biscuits with garden cress seed had a substantial impact on the hematological parameters of the anemic participants. As a result, it helps to treat anemia. The biscuits can be recommended in schools and canteens as a supplement because the ingredients are readily available and less expensive locally. All ages may drink it because it is simple to ingest. More studies can be conducted with the goal of treating anemia with locally available foods.

## Reference

- Akodu OS**, Nuha and AH Mohammed. Research Journal of Animal and Veterinary Sciences, 2014, 3, 20-23.
- Anand H**, Mir R, Saxena R. HCS a diagnostic dilemma, Indian J Pathology and Microbiology, 52(3), 1999, 360-362.
- Arlappa N, et al.**, A study to assess the prevalence of anaemia among pre-school children of West Bengal, Annals of Human Biology. 2010; 37(2):231-242.
- Bakru.H.K** (1998). "A Complete handbook of nature cure" 4<sup>th</sup> revised edition, Jaicopublishing house, P.No.187
- Balasubramanian, et al.**, Nutritive value of Indian food, National Institute of nutrition 2009, ICMR, Hyderabad.
- Basu S, et al.**, A study to assess the prevalence of anaemia in adolescent's girls in Chandigarh, Indian Journal of Paediatrics. 2004; 42(17):593-597.
- Bhargavi, et al.**, (2014). Prevalence of anaemia among pregnant women of rural community in Vizianagram, North Coastal Andhra Pradesh, India, Asian Journal of Medical, Vol.5, No.2, pp.1-5.
- Chatlon.R.W** Research Journal of Medicine and Medical Sciences, **1983**, 2(2), 127-132.
- Chopra, R.N.**, Nayer, S.L, Glossary of Indian medical plants (publication and information directorate), 2001 pp.157.
- Dallman** and Deans SG. Antimicrobial agents from plants: antimicrobial activity of plants volatile oils. J App Microbial 1989 Feb; 88(2):308-16 1989. PMID:16390
- Dohe A.M.** and Kefyalew A.A., (2014). Prevalence of Anaemia and Associated Factors among Pregnant Women in an urban area of Eastern Ethiopia, Anaemia, 1, 7.

**Eddonks M, et al.**,2005. Antihypertensive effect of *Lepidium sativum*L. In spontaneously hypertensive rats. *J Ethnopharmacol* 100: 193-197.

**Fayemi PO** (1981). Home Economics Teacher Guide. Ibadan Macmillian Nigeria Publisher Ltd. p 201

**Fayemi PO, et al.**, (1981). Home Economics Teacher Guide.Ibadan Macmillian Nigeria Publisher Ltd. p 201

**Garg S** and **Deshmukh PR**, (2002) epidemiological correlates of nutritional anemia in adolescent girls of rural Wardha. *Indian J Community Med* 31: 4.

**Goddard AF.**, 2011Dietary Determinants of and Possible Solutions to Iron Deficiency for Young Women Living in Industrialized Countries: A Review. *Nutrients*. 6: 3747-3776.

**Jumval Manju** and **Bhai Ismail.**, (2014). Studies on Human anaemia based on Hemoglobin (Hb) estimation and RBC count in Rural and Urban population in Ujjain, *International Research Journal of Medical Sciences*, 2(3), 5-11.

**Kalpana S**, **Premalatha T.**, **Valarmathi S.**, **Sri Jayanthi P.**, **Sundar J.S.**,. (2012). Prevalence of Anaemia and its associated factors among adolescent school girls in Chennai, Tamilnadu, India, *Epidemiology*, 1(2), 118.

**Kanani, S.J.** (2006). Deleterious function input of Anaemia on young adolescent girls, *Indian pediatrics*, 43(3), 21-26.

**Kulkarni M.V, et al.**, (2012). Prevalence of Anaemia among adolescent girls in an Urban Slum, *National Journal of Community Medicine*, .3(1), 108-111.

**Nielsen SS** , **Miller DD**, **Rutzke MA** (2007) Atomic absorptionspectroscopy, atomic emission spectroscopy, and inductively coupled plasma mass spectrometry. Ch. 24.In: **Nielsen SS** (ed)*Food analysis*, 4th edn. Springer, New York

**Okaka JC, et al.**, (1997) *Cereals and legumes: Storage and Processing Technology*. Data and microsystem publishers, Enugu,Nigeria, p 11-124.

**Paccham P, et al.**, Studies on Human anaemia based on Hemoglobin (Hb) estimation and RBC count in Rural and Urban population in Ujjain, *International Research Journal of Medical Sciences*, 2(3), 5-11;1999

**Pangbor RM.** 2002. Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology*, 37(3), 404-417.

**Park. K** Evaluation of hematological parameters in partial exchange and packed cell transfusion in treatment of severe anemia in pregnancy, *Anaemia*, vol. 1995, p.7

**Peters.TJ, et al.**,*Asian Journal of Medical Sciences*,1998 , 3(6), 261-266.

**R. G. Vivek, et al.**,(2012).Prevalence of Anaemia and its epidemiological,Determinants in Pregnant Women, vol. 5, no. 3, pp.216–223.

**RG Mali, et al.**, *Pharmacognosy Magazine*, 2008, 4(15), 189–192.

**Roa.Y, et al.**, (2014). Anaemia in low-income and middle-income countries, *The Lancet*,vol. 378, no. 9809, pp. 2123–2135.

**Robinson**,(1986). *Normal and therapeutic nutrition* MacMillan Publishing company., P.No.159

**Satyanareyaana K**, (1990). “Anaemia and physical fitness of school children of rural Hyderabad”. *Indian pediatric* 27:715-721



**SB Vohora** and **MSY Khan**. Journal of Physiology and Pharmacology, 1977, 21,118–120.

**Sen A.**, (2006). Deleterious function input of Anaemia on young adolescent girls, Indian pediatrics, 43(3), 21-26.

**Shah BK**, (2002). “Anaemia in adolescent girls a preliminary report from semi urban Indian predictor.”

**Shashi N, et al.**,(2011). Impact of iron deficiency anaemia on audio visual reaction time in adolescent girls, Indian Journal of Physiology and Pharmacology, 55(1), 53-59.

**Shrela M.,Srimavo N.,and Vidhushekhar T.** (2014). Some solutions of intra uterine growth deficiencies and iron deficiency anaemia using Garden Cress Seeds, International Journal of Food and Nutrition Sciences, 3(3), 1-6.

**SK Ahsan, et al.**, International Journal of Crude Drug Research,1989, 27(4), 235–239.

**Srilakshmi**, Nutrition science, New age International publishers, New Delhi, 2010, pp.333-335.

**Thompson DR,et al.**, Longitudinal assessment of micronutrient intake among African-American and white girls: The National Heart, Lung, and Blood Institute Growth and Health Study. J Am Diet Assoc. 1986;107(7):1113-1123.

**Vidhushekar T.**, et al. The cost of successful adolescent growth and development in girls in relation to iron and vitamin A status. Am J Clin Nutr. 2014;55(5):955-958.

**Viteri FE and Troun B.** “Anaemia and physical work capacity clinical Haematol.” 3:609-626.

