JOURNAL OF CURRENT RESEARCH IN FOOD SCIENCE

**E-ISSN:** 2709-9385
**P-ISSN:** 2709-9377
JCRFS 2022; 3(2): 01-04

www.foodresearchjournal.com
Received: 02-04-2022
Accepted: 06-05-2022

**Sonal**
Ph.D. Research Scholar, Department of Food and Nutrition, BPSMV University, Khanpur Kalan, Sonipat, Haryana, India

**Dr. Nutan**
Assistant Professor, Department of Food and Nutrition, BPSMV University, Khanpur Kalan, Sonipat, Haryana, India

**Correspondence**
**Sonal**
Ph.D. Research Scholar, Department of Food and Nutrition, BPSMV University, Khanpur Kalan, Sonipat, Haryana, India

# Effect of *Digera muricata* (Kondhra) leaves on iron status of school going adolescent girls

**Sonal and Dr. Nutan**

**DOI:** https://doi.org/10.22271/foodsci.2022.v3.i2a.64

**Abstract**
An experiment was planned to study the effect of *Digera muricata* (Kondhra) leaves powder through a value-added product that is Laddoo and Mathri in the increase of Hb level, serum ferritin and serum iron level in the 30-school going adolescent girls (16 -18years). Three homogenous groups of ten girls each were allotted the treatments keeping one group as control and other two groups with Laddoo 7.5gm/100gm *Digera muricata* (Kondhra) leaves powder Mathri supplementation. The response was measured after an experimental period of 90 days and the data was analysed statistically using paired t test (for before and after effect) for Hb content, serum ferritin and serum iron measured through venous blood at end of the experiment. The analysis revealed a significant increase between pre and post intervals ($p< 0.01$) for all the 3 groups. However, in the case of serum ferritin, a control did not show any significant increase ($p< 0.05$). The Karl's Pearson coefficient of correlations was also calculated between Hb, serum ferritin 0.569 ($p< 0.01$) and serum iron 0.369 ($p< 0.05$) and serum iron and serum ferritin 0.501 ($p< 0.01$) and presented as a correlation matrix. Mean increase has also been presented.

**Keywords:** *Digera muricata*, paired t test, correlations, adolescent girls

## 1. Introduction
Adolescence as a stage in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19 (WHO, 2001) [7]. Adolescence is the second stage of rapid growth and development after early childhood. Growth during adolescence period contributes significantly to the attainment of final body development of an individual. This intensive growth period brings not only a dramatic change in anthropometric measurements, but also hormonal changes that profoundly affect every organ of the body. In addition to enormous amount of physical growth and development that occur demographically, adolescent experience psychological coupled with social changes.
Adolescents are tomorrow's adult, taken as a state or transition from "puberty to maturity". Adolescent growth and development are closely linked to the diet they receive during childhood and adolescence. Young girls are just on threshold of marriage and motherhood. The nutritional intake and liking in these years of life has also some vital significance. Young girls require high intake of calorie, protein, vitamins & minerals for their body growth due to onset of menstruation. At this stage, there is a great requirement of iron in the body. If their nutritional needs are not filled, they are likely to give birth to undernourished children, thus transmitting under nutrition phenomenon to future generations (Mulugeta, A. *et al*. 2009) [4].
Iron deficiency is one of the most vital factors associated with founders in the world. Iron deficiency, which is the main cause of anaemia, is the most common nutrition disorder worldwide (WHO, 1998) [6]. Iron deficiency anaemia is particularly prevalent among babies, children, women, ethnic groups and low-income families and, to a greater extent, among people living in developing countries (WHO, 2001) [7]. All age groups are vulnerable to anaemia particularly Iron deficiency anaemia. Their current nutritional status will decide the wellbeing of the present as well as the future generations (Malhotra *et al*. 2007) [3].
In India, many school going children are suffering from nutritional deficiency especially the growing girls. The nutritional food-based approach is comparatively practical solution than the drug-based approach. On the other hand, many wild edible foods are abundantly available but not used because of lack of knowledge and awareness. These are rich sources of various nutrients and are the cheapest, free from insecticides and pesticides natural growing and readily available source of micronutrients. *Digera muricata* (Kondhra) leaves is one of the vital sources of iron (protein 2.48mg/100gm, iron 15.80mg/100gm).

Hence, an intervention study was necessary to assess the impact of value-added traditional food products on the nutritional and health status, among school going adolescent girls.

## 2. Review of Related Literature

Traditional food products are very popular in modern society. It is a one of the top foods which people like so much with another food item used on daily basis and on different occasions also. It is an important part of modern daily life style and is convenient to eat and fulfilling the consumers social requirements. Gupta, A., Sheikh, S. and Yadav, N. (2013) [2] reported that supplementation of mathri improved the haemoglobin status of adolescent girls. Dehydrated C, argentea leaves at 20% level were incorporated to enrich mathri had iron (26.48±0.14mg/100g), calcium (170.6±2.17mg/100g), vitamin C (66.6± 7.07mg/100g) and B carotene (2166±136ug/100g). Due to supplementation, it was found that weight and haemoglobin status of adolescent girls was increase (14.3%).

Rana, R. and Kaur, P. (2016) [5] reported that the supplementation of garden cress seeds flour lad doo improved the haemoglobin and the serum iron status of experimental adolescent girls.

## 3. Materials and Methods

### 3.1 Ethical approval

Prior to the study, Ethical approval for this study was obtained from the Chairperson and Committee members of the BPSM Vishwavidyalaya, Khanpur Kalan, Sonipat. After presenting the complete information and appropriate explanations and guidelines, the interested parents or legal guardians of the children, who were interested and willing to participate in the study by heart, had to give their consent with the signature or the thumb impression on the consent form before this study was initiated.

### 3.2 Study design and population

A sample of 30 adolescent's girls of age (16-18 years) homogenous, socio economic status and food habits was randomly selected from the Government Senior Secondary School, at Karnal. In order to study the impact of supplementation, the subjects were divided into three homogenous groups randomly: Group I was referred as the control group without supplementation of nutrition rich food and were on the normal diet. The II and III group formed the experimental groups which received the nutrient rich food which supplied good amount of energy and iron. The products were prepared and packed in the polythene pouches, named and given to them in the school premises. Girls were carefully observed for their side effects if any over an experimental period.

### 3.3 Collection of Blood samples

The blood samples of the selected (30) experimental adolescent girls were taken by the well-trained laboratory technician. The blood samples of the subjects were collected early in the morning between 10-11:00 am. 5ml blood was drawn intravenously from each individual in ethylene diamine tetra – acetic (EDTA) coated vial and the biochemical estimation for haemoglobin (Hb) level in adolescent girls was done in the Kalpana Chawla government medical college, Karnal by cyanmethemoglobin method and serum iron and serum ferritin levels were also calculated for assessing the iron status initially and after the completion of intervention study.

### 3.4 Supplementation given

The supplementation was given for a period of 90 days to thirty adolescent girls. All the selected subjects were dewormed before intervention by Albendazole tablets (400mg) one week prior to the study. They were advised to maintain proper sanitation during experiment.

### 3.5 Statistical Analysis

The data generated through experiment on Hb, serum ferritin and serum iron for 10 girls each in the 3 groups for pre and post periods were subjected to further statistical analysis to draw logical and scientific inferences (George W. Snecdecor., 1989) [1] Paired t - test was used to test the hypotheses that there is no significant difference between pre and post observation:

Where
Null Hypotheses. Ho: $\bar{d} = 0$

Calculated $t = \frac{d-0}{s} * \sqrt{n}$ for n: D.F.

Where $\bar{d}$ = mean difference
S = standard deviation
N = 10 (sample size)
P = <0.05 and <0.01 (level of significance)

Further Karl Pearson's coefficient of correlation "r" was also calculated to estimate the intensity of relationship between Hb, serum ferritin and serum iron and presented in the form of a correlation matrix

$$r = \frac{\Sigma(X-\bar{X})(Y-\bar{Y})}{\sqrt{\Sigma(X-\bar{X})^2}\sqrt{(Y-\bar{Y})^2}}$$

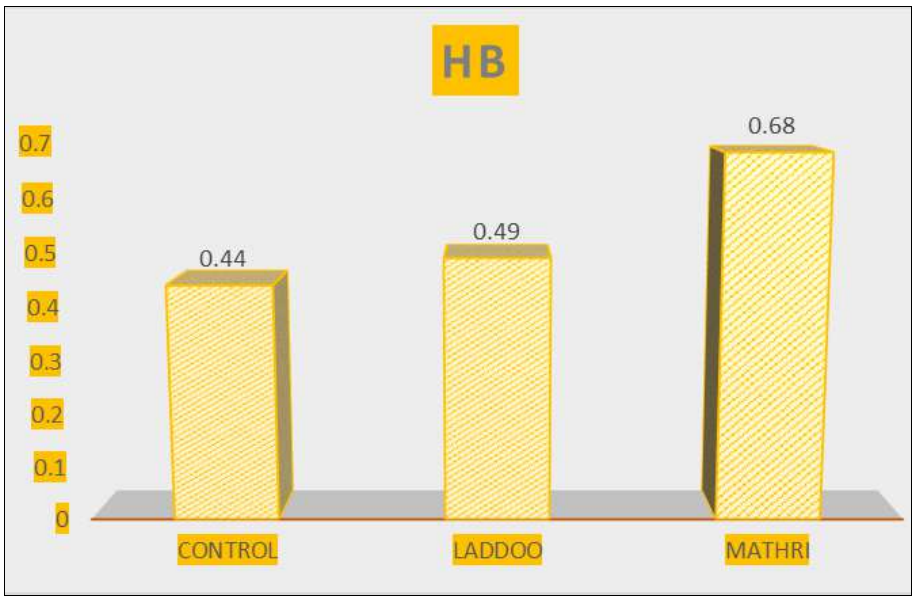
Where,
$\bar{X}$ = mean of x variable
$\bar{Y}$= mean of y variable
Data has been analyzed using the IBM SPSS software, version 25.

## 4. Results and discussion

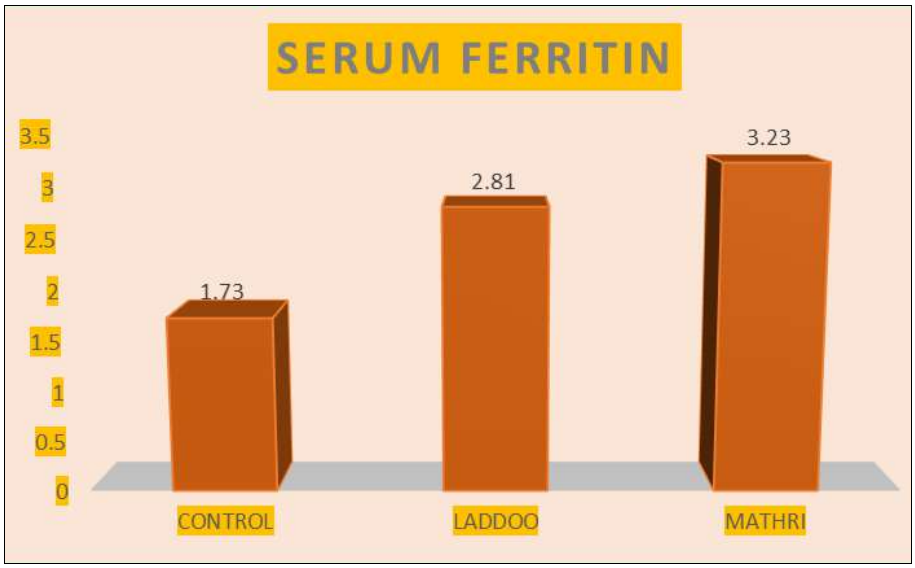
The results of the paired t test have been summarized in Table 1 and their related graphs in Table 2.

**Table 1:** Statistical Annexure for Hb, Serum ferritin and Serum Iron

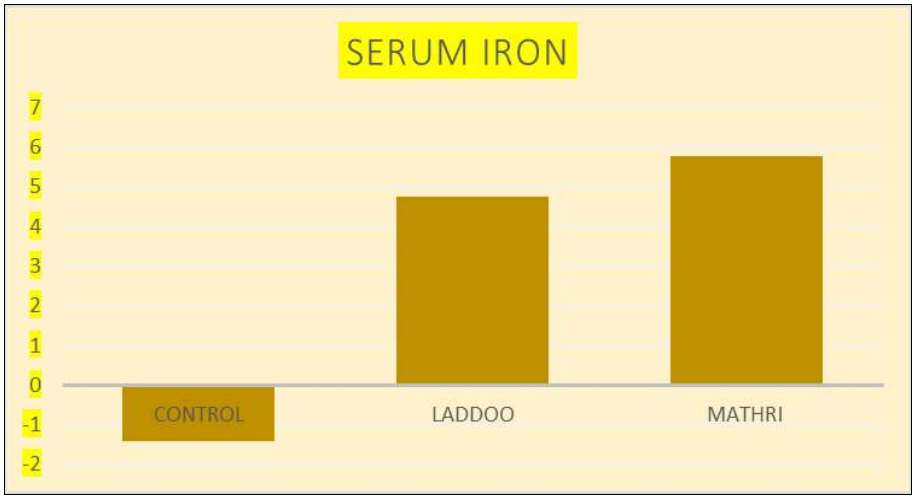
| | | Hb | Serum Ferritin | Serum Iron |
|---|---|---|---|---|
| Control | N | 10 | 10 | 10 |
| | Mean difference | 0.44 | 1.839 | -1.419 |
| | ST.DEV | 0.39 | 3.35 | 11.5 |
| | t value | 3.54** | 1.73(NS) | -0.39 |
| | p value | 0.006 | 0.116 | 0.705 |
| Laddoo | N | 10 | 10 | 10 |
| | Mean difference | 0.49 | 4.714 | 5.038 |
| | ST.DEV | 0.26 | 5.29 | 3.35 |
| | t value | 5.95** | 2.81* | 4.75** |
| | p value | 0.0002 | 0.02 | 0.001 |
| Mathri | N | 10 | 10 | 10 |
| | Mean difference | 0.68 | 7.67 | 6.052 |
| | ST.DEV | 0.59 | 7.49 | 3.32 |
| | t value | 3.63** | 3.23* | 5.76** |
| | p value | 0.0054 | 0.01 | 0.0002 |




**A**




**B**




**C**

**Fig 2:** Graphs showing Hb, Serum ferritin and Serum Iron

### 4.1 Hb

The analysis suggested that in all the three groups namely control, Lad doo and Mathri the Hb has shown a significant change (control t = 3.54, lad doo t = 5.95 and mathri t = 3.63, $p < 0.01$). It indicates that lad doo and mathri both with the supplementation of *Digera muricata* (Kondhra) powder 7.5gm/100gm have impact in increasing the Hb value in adolescent girls taken under study. The mathri has shown comparatively higher mean difference value (0.68) than lad doo (0.49), it indicates that mathri is a better source of Hb compared to lad doo.

### 4.2 Serum ferritin

The analysis suggested that there is no significant difference in pre and post value in respect of control for serum ferritin. On the other hand, t test has shown a highly significant period effect (t = 2.81, $p < 0.05$) in respect of lad doo and so also for mathri. The quantitative change in mathri (mean difference = 7.67) is comparatively higher than lad doo. Therefore, mathri can be taken as a better substitute with *Digera muricata* (Kondhra) powder supplementation of 7.5gm/100gm than lad doo (mean difference = 4.714) for serum ferritin.

### 4.3 Serum iron

The analysis has indicated that for the control group, serum iron has declined over a period of 90 days (mean difference = 1.419, non – significant). Further there is a significant increase ($p < 0.01$) for lad doo and mathri both. Here also, the effect of mathri is comparatively better than lad doo.

The analysis indicated that on the basis of the experiment conducted over a period of 90 days the mathri group (7.5gm/100gm *Digera muricata* (kondhra) powder) has shown better response for all the 3 parameters studied namely Hb, serum ferritin and serum iron compared to lad doo.

### 4.4 Correlation analysis

**Table 2:** Correlation matrix

| | Hb | Serum ferritin | Serum Iron |
|---|---|---|---|
| Hb | 1 | | |
| Serum ferritin | 0.569** | 1 | |
| Serum Iron | 0.368* | 0.501** | 1 |

The table 2, represents a correlation matrix having a set of Karl Pearson's correlation coefficient calculated for a sample of (n =30) and the variables under study were Hb, serum ferritin and serum iron.

The correlation between Hb and serum ferritin was of the order of (0.569, $p < 0.01$), between Hb and serum iron (0.368, $p < 0.05$) and between serum ferritin and serum iron (0.501, $p < 0.01$). The study indicated that all the three possible inter correlations are significant and positive that is to say that an increase in one follows an increase in other also.

## 5. Conclusion

The consumption of wild edible green leafy vegetable *Digera muricata* (Kondhra) powder value added food products increased the mean haemoglobin concentration, serum ferritin and serum iron concentration significantly of the study participants. It minimized the prevalence of anaemia among the participants. Wild edible green leafy vegetable *Digera muricata* (Kondhra) powder has the potential to minimize the prevalence of anaemia among the study participants.

## 6. References

1. George W. Snecdecor-Statistical Methods-8th Edition, 1989.
2. Gupta A, Sheikh S, Yadav N. Development of underutilized celosia argentea, 2013.
3. Malhotra A, Passi SJ. Diet quality and nutritional status of rural adolescent girl beneficiaries of ICDS in north. India. Asia Pac J Clin Nutr. 2007;16(1):8-16.
4. Mulugeta A, Fit sum H, Barbara Gideon S, Vincent K, Zenebe L, Makonnen Yohannes A. GGS. Nutritional Status of Adolescent Girls from Rural Communities of Tigray, Northern Ethiopia. Ethiop. J. Health Dev. 2009;23(1):232-237.
5. Rana R, Kaur P. Development of garden cress seeds flour lad doo, 2016.
6. World Health Organization. The world health report 1998 - Life in the 21st century: A vision for all Geneva, Switzerland, 1998.
7. World Health Organization. Iron deficiency anaemia Assessment, prevention and control: A guide for programme managers. World Health Organization, Geneva, 2001.