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# A study on development, analysis and supplementation of instant greens tea for anaemic adolescent girls

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### Abstract

Nutrition influences the growth, development, health and well-being of adolescents. Iron supplementation is one of the important strategies, which helps to prevent and treating the iron deficiency anaemia. By keeping these aspects in view, the present research work on "A Study on Development, Analysis and Supplementation of Instant Greens Tea for Anaemic Adolescent Girls" has been taken up. Three different varieties of Instant greens tea were developed by using cauliflower leaves, guava leaves, lemon leaves, jaggery and cardamom and Standard instant greens tea was used as control sample. To find out the overall acceptability, organoleptic evaluation was done with the help of 10 panel members. Based on this study, Sample B got more scores than sample A, sample C and control. Selected Instant greens tea (Sample B) and control were selected for nutrient analysis. Nutrient analysis of an instant greens tea projects that except fat all other nutrients such as moisture, energy, protein, fibre, ash, vitamin C, calcium, phosphorus, and iron are higher than the control. Microbial analysis was carried out to find out shelf life of the instant greens tea. In this study, survey was conducted to find out the socio economic of the adolescent girls. Hb test indicates that majority (88.9%) of the respondents had moderate anaemia and the remaining 11.1% come under the category of severe anaemia. Selected anaemic adolescent girls were supplemented with five grams of instant greens tea for a period of six months. After six month of supplementation Hb level of the adolescent girls increased drastically. It was also proven statistically.

**Keywords:** Anaemia, adolescent, instant greens tea, haemoglobin

## Introduction

Anaemia due to iron deficiency is still a widespread problem. Among adolescent girls, it will bring negative consequences on growth, school performance, morbidity and reproductive performance. Anaemia is currently one of the most common and intractable nutritional problems globally. It is a global public health problem that affects both developing and developed countries with major consequences in terms of human health as well as social and economic development. WHO estimates the number of anaemic people worldwide to be a staggering two billion with approximately 50% of all anaemia attributable to iron deficiency. Iron deficiency anaemia occurs at all stages of life cycle, but it is more prevalent in pregnant women and young children. Adolescents, particularly girls, are vulnerable to iron deficiency. The World Health Report 2 (2002) identified iron deficiency among the 10 most serious risks in countries with high infant mortality coupled with high adult mortality and reported that measures to address iron deficiency anaemia are among the most cost effective public health intervention.

Adolescence is an opportune time for interventions to address anaemia. As it is the stage of development, there is a need for growth and preparation for pregnancy. Strategic focus on prevention of IDA among adolescents is more important from the point of view of productivity gains from improved physical capacity; productivity gains from increased cognitive ability; and (for adolescent girls) improved pregnancy outcomes and intergenerational benefits.

Keeping in view, the importance of adolescence period in human life and nutritional problem of adolescent girls, the present study has been carried out to alleviate iron deficiency anaemia by using iron rich food items. For this study, Instant Greens tea was prepared by using cauliflower leaves, guava leaves, lemon leaves, jaggery and cardamom.

These are the "Magic Bullets" locally available to alleviate iron deficiency anaemia without the risk of antagonistic nutrient interactions or overload. The following are the objectives set forth for this study.

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**Objectives**
- To formulae and standardize the Instant Greens Tea.
- To estimate the nutrient content of the selected standardized Instant Greens Tea.
- To analyze the microbial count of the selected standardized the Instant Greens Tea.
- To conduct the survey to find out anaemic among adolescent girls.
- To study the supplementation of the Instant Greens Tea among the selected anaemic adolescent girls.

**Methodology**
The methodology adopted for the study consists of five phases. They are:-

**Development and Standardization of Instant Greens Tea**
Cauliflower (Brassica Oleracea) fresh leaves, Guava leaves and lemon leaves were collected from the local market of Virud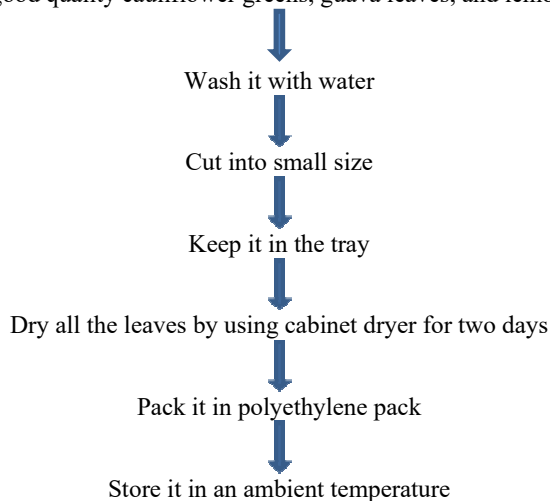hunagar. The leaves were separated and washed under running tap water. After washing the leaves, they were spreaded in the tray and dried in the cabinet drier for 2 days to dry greens leaves. After that, dry matter was crushed by hand and packed in air tight container for further use. The following table-1 and plate-1indicates the Variation of Instant greens tea and flow chart 1 & chart 2 show the preparation of instant greens tea.

**Table 1:** Variations of Instant Greens Tea

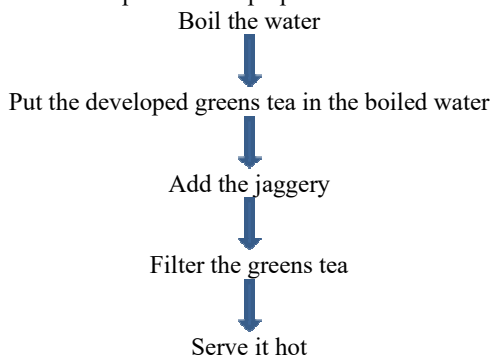| Name of the ingredients | Control | Sample A | Sample B | Sample C |
|---|---|---|---|---|
| Standard Instant greens tea(g) | 80 | - | - | - |
| Cauliflower leaves (g) | - | 70 | 60 | 50 |
| Guava leaves(g) | - | 10 | 20 | 30 |
| Lemon leaves(g) | - | 10 | 10 | 10 |
| Cardamom (g) | 3 | 3 | 3 | 3 |
| Jiggery(g) | 17 | 17 | 17 | 17 |

**Development of an Instant Greens Tea**
Flow chart-1 describes the development Process of an Instant Greens Tea.
Select good quality cauliflower greens, guava leaves, and lemon leaves

⬇

Wash it with water

⬇

Cut into small size

⬇

Keep it in the tray

⬇

Dry all the leaves by using cabinet dryer for two days

⬇

Pack it in polyethylene pack

⬇

Store it in an ambient temperature

**Flow Chart-1**
**Preparation of Greens Tea**
Flow chart -2 presents the preparation of Greens Tea.
Boil the water

⬇

Put the developed greens tea in the boiled water

⬇

Add the jaggery

⬇

Filter the greens tea

⬇

Serve it hot

**Flow Chart-2**



**Fig 1**

**Estimation of the Nutrients Content of the Selected Instant Greens Tea.**
The nutrient content of the selected Instant Greens Tea. and control were done for moisture, carbohydrate, fiber, protein, fat, fiber, ash, vitamin C, Iron, calcium and phosphorus.

**Analyze the Microbial Count of the Selected Iron Rich Food Products.**
In the present study, Total Plate Count was used. It is the most widely used method to know the microbiological quality of the food sample.

**Conduct the Survey to Find Out Anaemic Adolescent Girls.**
The area selected for the study was V.V. Vanniaperumal College, which comes under Sivagnanapuram Panchayat, Virudhunagar Taluk. Hemoglobin test was conducted for Two hundred students. Among the Two hundred students, 36 adolescent girls who have Hb level below 9mg/dl were selected for this study. Selection was done based on the subjects' Hb level and willingness to co-operate with the study and participate in the supplementation programme sincerely. The tool used for data collection was an Interview schedule. As surveys are the most popular means of obtaining the desired data, the selected adolescent girls were interviewed and informations were obtained regarding their age, economic background, BMI, dietary habits, Hb level, details regarding anaemia and an awareness of iron rich food items by using the interview schedule.

**Supplementation of Iron Rich Food Products among the Selected Anaemic Adolescent Girls**
Before starting supplementation, one tablet of Albendazole, 400mg was administrated of deworming the target groups. Deworming produced marginal additional benefits in haemoglobin increase ranging from 0.16g/dl to 0.47 g/dl in seven out of eight groups studied (Atrukorala & Silvia, 1994). As a part of the study, every girl was given 5 grams of Instant Greens Tea for a period of 6 months.
After supplementation of Instant greens tea for a period of six months, their Hb level was assessed at three month intervals to find out the impact of supplementation among selected adolescent girls.

**Result and Discussion**
The result and discussion of the study are,

**Sensory Evaluation of Instant Greens Tea**
The following figure-1 shows the result obtained from the sensory evaluation of an Instant Greens Tea
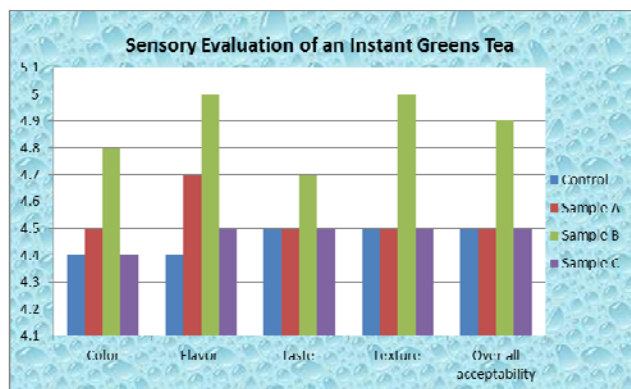


**Fig 2**

Attributes of an Instant Greens tea can be inferred from the above figure-1 shows that the average score was obtained by the samples regarding the attributes of an Instant greens tea. Regarding color, sample B (4.8) got high score than the sample A (4.5) and sample C (4.4) and control (4.4). Pertaining to flavor, sample B (5) got high score than the sample A (4.7) and sample C (4.5) and control (4.4). Relate to taste, sample B (4.7) got high score than the sample A(4.5) and sample C (4.5) and control (4.5). Regarding texture, sample B (5) got high score than the sample A (4.5) and sample C (4.5) and control (4.3). sample B (4.9) got overall acceptability than sample B(4.5),sample C(4,5) and control(4.5).
From this analysis, we can conclude that the Sample B got more scores than sample A, sample C and control regarding color, flavor, taste, texture and overall acceptability.

**Nutrient analysis**
The selected instant greens tea (Sample B), and control were subjected to nutrient analysis. From this analysis, it was found out that moisture content of sample A was 5.6% and control was 3.2%. Energy content of sample B was 22.4 Kcal than 84Kcal.Sixteen grams of carbohydrate was presented in sample B than control (4 g). Sample B had 5 g of protein than control (1.62g). Sample B and control had no fat content. Fibre content of sample B had 15 g than control (2g). Ash content sample B was 12.4% and control was 2.36%. Vitamin C content of sample B was 140 mg than control 40 g. Sample B had 12 g of calcium than control (2.6g). Sample B had more phosphorus (120mg) than control (36mg). Iron content of sample B was 46 g than control (40g).
Nutrient analysis of an instant greens tea projects that except fat all other nutrients such as moisture, energy, protein, fibre, ash vitamin C, calcium, phosphorus, and iron are higher than the control.

**Microbial analysis**
Microbial analysis was carried out in the 1st Day and 15th day for identifying the bacterial colony. From this analysis, it was found out that it is safe to consume up to 15 days storage period.

**Conduct the Survey to Find out Anaemic Adolescent Girls Socio Economic Status of the Selected Rural Anaemic Adolescent Girls**
- This study reveals that 38.9% of the respondents were belonging to 20 years old, 1/3 from 19 years old, 16.7% were belonging to 21 years and the remaining 11.1% were 18 years old adolescent girls.
- 58.3% of the respondents had two siblings. 19.4 5 of the respondents had three siblings. 16.7% of the respondents had one sibling and 2.8% had above three siblings. Only 2.8 5 had no siblings.
- Among the selected respondents parents, one fourth (25%) of the respondents parents had High school level of education. 22.2% of the respondents had primary school level of education and 19.4% of the respondents parents were belonging to illiterate group. 16.7%, 8.3%, 5.6%, and 2.8% of the respondents parents had middle school, higher secondary school, others, graduate level of education respectively.
- Half of the parents were belonging to the category of daily wages, one fourth were belonging to business group and 16.7% of the parents were from Agriculturalist. Only 5.6% of the parents were doing government job.
- Regarding the economic status, 36% of the respondents

parents annual income was 20,000-40,000 and 33.3%, 19.4%, and11.1% of the respondents parents had annual income of rupees 40,000-60,000, <10,000 and >60,000 respectively.

## Dietary Habits
- It can be inferred from the study that majority (75%) of the respondents were Non- Vegetarian and only 25% were Vegetarian.
- This study reveals that nearly 16-25% of the respondents never consumed Non-veg, milk and milk products, tea/coffee and soft drinks. Only 8.3% and 2.8% of the respondents did not consume jaggery and whole grains respectively.
- Majority (86.1%) of the respondents had their meals without skipping. Only 13.9% of the respondents skipped their meals.
- This study depicts that each 40% of the respondents skipped their dinner and lunch respectively. Remaining 20% of the respondents skipped their breakfast.
- Majority (70-100%) of the respondents got awareness regarding iron and vitamin C rich food items after supplementation.

## Health and Nutritional Status of the Respondents
- Pertaining to BMI, majority (66.7%) of the respondent were belonging to Grade I obesity and the remaining 33.7% of the respondents had come under the category of normal.
- This study indicates the majority (88.9%) of the respondents had moderate anaemia and the remaining 11.1% had come under the category of severe anaemia.

## D. Effect of Supplementation of Iron Rich Food Products among the Selected Anaemic Adolescent Girls
This study was statistically proved that there was a drastic change in the Hb level of the respondents after the supplementation with Instant Greens Tea.

## Conclusion
From this present study we can conclude that using locally available natural iron rich food items and vitamin C rich food items can boost the haemoglobin level of the human being and thereby alleviate the iron deficiency anaemia among them. This study highlights the food -based rather than drug-based approach will be the proper answer to the problem of preventing iron deficiency anaemia.

## Reference
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