

Iron Rich Recipes

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Introduction

Anaemia is the most prevalent nutritional problem worldwide and it is mainly caused due to iron deficiency. Iron deficiency anaemia is a serious public health concern in most developing countries. Its prevalence is highest among young children and women of childbearing age, particularly in pregnant women. Iron deficiency anaemia can be associated with low dietary intake of iron, inadequate absorption of iron, or excessive blood loss. Iron deficiency adversely affects behavior and physical growth of infants and children. Symptoms of anaemia include fatigue, inability to concentrate, breathlessness, frequent illness and pallor (WHO,2001).

In India, the prevalence of anaemia among adolescent girls is 90 %. Adolescence is considered as a nutritionally critical period of life. The pre pregnancy nutritional status of young girls is important and it impacts on the course and the outcome of their pregnancy. Hence the health of adolescent girls demands special attention. Therefore the recipes rich in content were developed. The consumption of these developed recipes can improve the iron content of daily diet.

Prevalence

Anaemia is the most prevalent nutritional deficiency disorder in the world. It affects all age groups but the most vulnerable are preschool-age children, pregnant women, and non-pregnant women of childbearing age.

The prevalence of any type of anaemia is very high (more than 95 percent) among children, adolescents, and pregnant women in the country. Nearly thirty percent of adolescent girls are severely anaemic. The ordinal regression results show that degree of anaemia declines with increase in household standard of living and educational attainment in general for all the three groups of the study population. Parity has significant effect on anaemia among pregnant women.

Causes:

Inadequate iron intake through diet

Increased need for iron during growth and pregnancy

Low bioavailability of dietary iron

Requirement of iron

Group	Activity/Age	Body weight (Kg)	Iron (mg/day)
Men	Sedentary	60	17
	Moderate		
	Heavy		
Women	Sedentary	55	21
	Moderate		
	Heavy		
	Pregnant		35
	Lactating		
	0-6 months		21
	6-12 months		21
Infants	0-6 months	5.4	710 μ g/kg/day
	6-12 months	8.4	650 μ g/kg/day
Children	1-3 years	12.9	9
	4-6 years	18.0	13
	7-9 years	25.1	16
Boys	10-12 years	34.3	21
Girls	10-12 years	35	27
Boys	13-15 years	47.6	32
Girls	13-15 years	46.6	27
Boys	16-17 years	55.4	28
Girls	16-17 years	52.1	26

(Source : NIN 2010)

Clinical Features

Pallor of skin

Apathy

Irritability

Hyper dynamic circulation leading to palpitation, fatigue or shortness of breath.

Congestive heart failure

Spoon shaped nails

Adverse effect

- Poor physical growth.
- Low performance.
- Low cognitive development.
- Increased irritability and restlessness.
- Poor academic performance.
- Reduced work capacity.
- Reduced stamina for physical work.
- Increased sensitivity to environmental temperature.
- Low resistance to infections.
- Increased maternal mortality and low birth weight babies.
- Higher risk to abortion, infant and child death due to maternal anaemia.

Prevention and strategies to combat IDA

- Include Iron rich sources
- Encourage the people to grow iron rich foods
- Create awareness regarding programmes to combat IDA
- Develop favorable attitude towards iron fortified foods
- Educate school teachers regarding Nutrition education
- Encourage kitchen garden
- Inculcate good food habits in family
- Demonstrate low cost iron rich recipes to the Anganwadi staff, local clubs, mahila mandal, self help group, panchayat samitte, adolescents girls, school and PHC.
- Practice regular deworming
- Prevention from malaria .
- Parental iron therapy
- Blood transfusion

Encourage for Consumption of -

- Iron rich natural foods
- Fortified foods
- Oral iron tablets

Classification of Hb for diagnosis of degree of Anaemia

Degree	Hb (g/dl)
Severe	< 7.00
Moderate	8.0-9.9
Mild	10.0-10.9
Normal	> 12.0

Factors enhancing iron absorption

Vitamin C



MFP factor (Meat, fish and poultry)



Factors inhibiting iron absorption

• Phytates and fibre – Cereals and vegetables

• Calcium and phosphorus (Milk)



• Tannic acid (Tea)

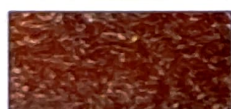

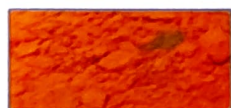



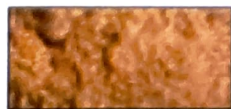


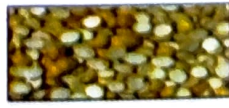


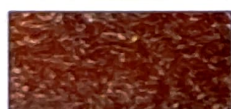

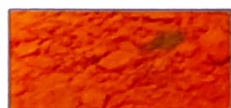



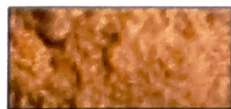


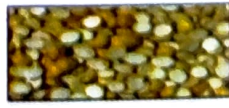


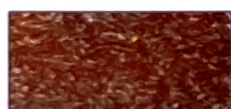



• Poly phenols (Nuts)



The food stuffs containing more amount of iron were selected for the development of recipes. The iron rich recipes prepared were Pearl Pop, Kranky Noodles, Nutrigrans, Crunchyball and Nutriribbon. The developed recipes provided 1/3 daily requirement of iron.

Selected Iron Rich Foods Stuffs and Their Iron Content

	Foods stuffs	Iron (mg)	
	Garden cress	100	
	Turmeric	67.8	
	Niger seeds	56.7	
	Mango powder	45.2	
	Asaefotida	39.4	
	Rice flakes	20.0	
	Rajkeera seed	17.6	
	Omum	12.5	
	Cumin	11.7	
	Soyabean	10.4	
	Bengal gram roasted	9.5	
	Bajra	8.0	

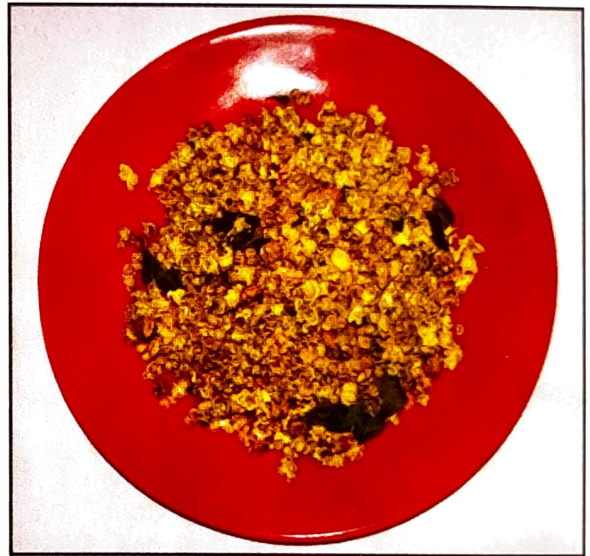
Development of Iron rich recipes

Pearl pop :

Ingredients	Amount (g)
Bajra lahya	60
Rajkeera leaves powder	03
Bengal gram roasted	24
Cumin	03
Turmeric	06
Mango powder	04

Method :

- ♦ Pop the bajra in the hot sand.
- ♦ Season the puffed bengal gram dhal ,cumin seed, turmeric and curry leaves.
- ♦ Add popped bajra , rajkeera leaves powder ,mango powder and salt. Mix it well

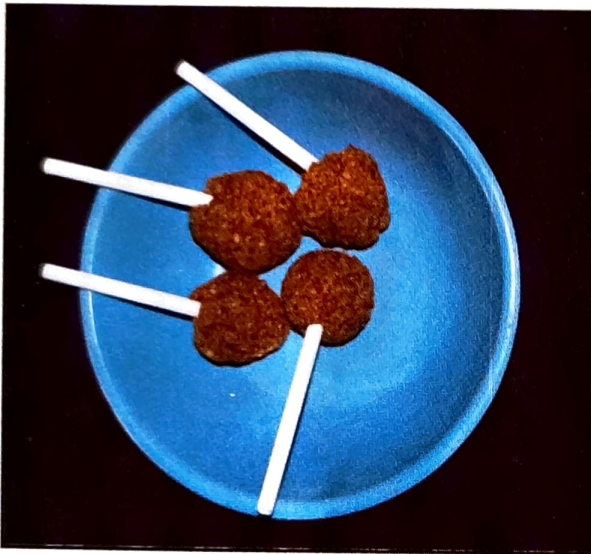


Nutrient composition of Pearl pop

Nutrient content /100g	
Moisture (g)	5.26
Ash (g)	3.06
Fat (g)	1.86
Protein (g)	13.56
Fibre (g)	1.40
Vitamin C (g)	6.15
Iron (mg)	19.10
Calcium (mg)	132

Crunchy ball

Ingredients	Amount (g)
Rajkeera seed powder	20
Garden cress seed	10
Sesamum	10
Mango powder	05
Skimmed milk powder	05
Sugar	50



Method :

- ◆ Weigh all the required ingredients.
- ◆ Prepare the sugar syrup and add the weighed ingredients
- ◆ Cook till required consistency
- ◆ Make ball and insert a stick when it is hot

Nutrient composition of Crunchy Ball

Nutrient content /100g	
Moisture (g)	3.26
Ash (g)	2.36
Fat (g)	3.89
Protein (g)	8.31
Fibre (g)	1.35
Vitamin C (g)	11.50
Iron (mg)	16.10
Calcium (mg)	340
Zinc (mg)	5.01

Nutrigrans :

Ingredients	Amount (g)
Rajkeera seed powder	10
Garden cress seed	12
Sesamum	10
Roasted Bengal gram dhal powder	05
Skimmed milk powder	13
Coco powder	To taste
Jaggery	50

Method :

- Weigh all the required ingredients .
- Prepare the jaggery syrup. Pour all the ingredients in jaggery syrup.
- Cook till required consistency
- Nutrigrans is ready



Nutrient composition of Nutrigrans

Nutrient content /100g	
Moisture (g)	3.34
Ash (g)	2.29
Fat (g)	3.96
Protein (g)	11.82
Fibre (g)	1.30
Vitamin C (g)	11.75
Iron (mg)	16.60
Calcium (mg)	420
Zinc (mg)	5.36

Nutribbon :

Ingredients	Amount (g)
Bengal gram dhal flour	25
Rice flour	20
Soyabean	15
Roasted Bengal gram dhal flour	10
Black gram dhal flour	10
Rajkeera leaves powder	05
Niger seed	04
Sesamum	04
Cumin	2.5
Omum	2.5
Turmeric powder	2.0



Method :

- ◆ Weigh the flours of required quantity
- ◆ Put the dough in a mould (Chakli mould)
- ◆ Pour all flour and little oil to boiling water
- ◆ Make the Ribbon
- ◆ Deep fry in oil.
- ◆ Make a fine dough

Nutrient composition of Nutri Ribbon

Nutrient content /100g	
Moisture (g)	3.68
Ash (g)	1.69
Fat (g)	18.51
Protein (g)	20.56
Fibre (g)	1.65
Vitamin C (g)	17.25
Iron (mg)	14.60
Calcium (mg)	260
Zinc (mg)	4.18

Kranky Noodles :

Ingredients	Amount (g)
Rice flakes powder	40
Rajkeera seed powder	25
Soyabean	15
Green gram dhal powder	15
Cumin	2.5
Omum	2.5



Method :

- Roast the ingredients
- Prepare the flour of all ingredients.
- Weigh the required amount of ingredients
- Keep the flour tied in muslin cloth in a pressure cooker
- After pressure cooking , add salt and little amount of water
- Feed in extrusion
- Extruded noodles further processed to deep frying

Nutrient composition of Kranky Noodles

Nutrient content /100g	
Moisture (g)	3.98
Ash (g)	1.83
Fat (g)	13.8
Protein (g)	15.75
Fibre (g)	2.40
Vitamin C (g)	10.01
Iron (mg)	17.20
Calcium (mg)	204
Zinc (mg)	1.99

Iron rich Toffees

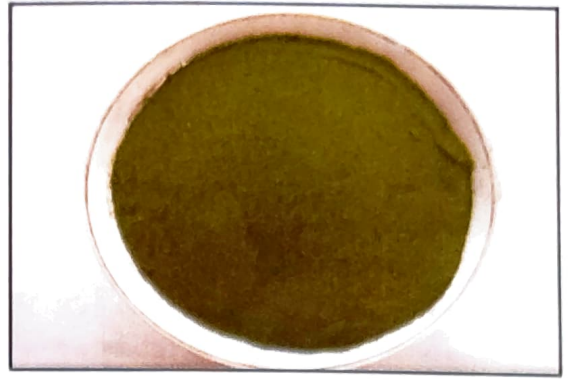
Green leafy vegetables occupy important place among the food crops as these provide adequate amounts of many vitamins and minerals for human nutrition. They are rich sources of carotene, a precursor of vitamin A, vitamin C, riboflavin, folic acid and minerals like calcium, iron and phosphorus. They are less expensive and easily available sources of micronutrients. The use of green leafy vegetables requires promotion among selected populations to improve micronutrient status. Dehydration is one of the best methods of preservation of leafy vegetables because it reduces the cost of storage and transportation by reducing both the weight and volume of the final product. In addition to increasing variety in the menu and reducing wastage, labour and storage space, dehydrated vegetables are simple to use and have a longer shelf life than fresh vegetables. The dehydration of leafy vegetables increases its nutritional content. The green leafy vegetable powders certainly have the potential to enter processed food industry and can be hoped that they will certainly form a part of our daily diet in the near future. Amaranthus is considered to be good source of iron and β carotene and it is within the reach but the consumption is not as it should be. The incorporation of fresh and dried amaranthus leaves in various recipes can improve the nutritional quality of those products which, if consumed regularly can have important contribution in meeting iron and vitamin A requirements.

Iron Content of GLV

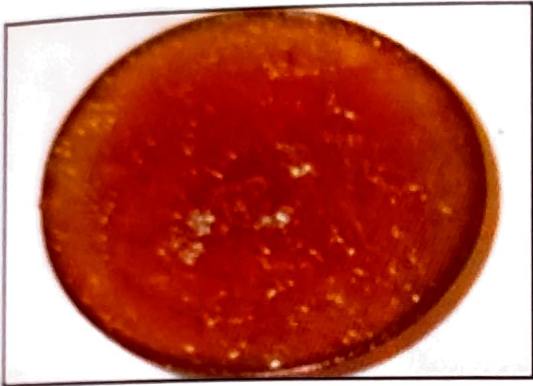
Name of GLV	Iron (mg/100 g)
Rajkeera leaves powder	115.66
Bengal gram leaves powder	73.5
Radish leaves powder	63.05
Ambat chuka powder	62.5
Coriander leaves powder	31.5
Drumstick leaves powder	15
Curry leaves powder	11.37



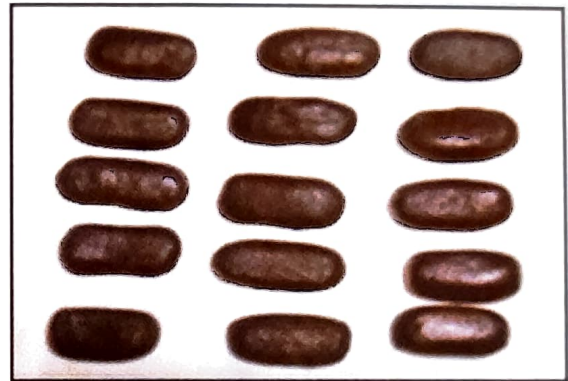
Rajkeera Leaves & Powder



Rajkeera Leaves Powder



Amla Jam



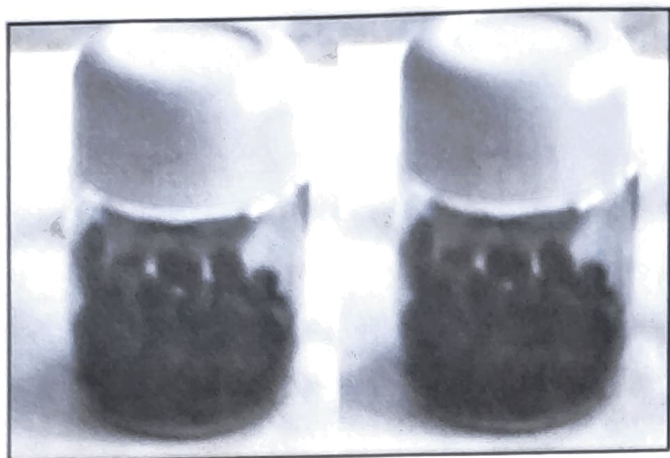
Toffieess

Method :

- ◆ Prepare amla jam and add rajkeera leaves powder, lime and ginger juice.
- ◆ Cook till required consistency and prepare toffees

Nutrient Composition of Iron Rich toffees

Nutrient content /100g	
Moisture (g)	12.0
Ash (g)	2.51
Fat (g)	0.92
Protein (g)	7.9
Fibre (g)	0.50
Iron (mg)	31.8
Calcium (mg)	280
Vit C (mg)	37.53



Conclusion

- All the developed recipes are acceptable and recorded the acceptability score more than 7.
- The recipes can be stored for 3 months period of storage.
- The iron content of the recipes
 - Pearl pop - 9.55 mg/50 g.
 - Kranky Noodles - 8.6 mg/50 g.
 - Crunchy ball - 8.0 mg/50 g.
 - Nutrigrans - 8.3 mg/50 g.
 - Nutri ribbon - 7.3 mg/50 g.
 - Toffiess - 6.36 mg/20 g.
- The cost of iron rich recipes - Rs. 5.35 to 7.00. /50 g.
Toffiess - Rs. 5/- /20 g.
- Supplementation of developed iron rich recipes (50 g/day) and iron rich toffee (20 g/ day) are helpful for managing the anaemia and successfully elevating the haemoglobin level.

