

Development of a Low-cost Iron and Calcium rich Nutri- Chikki

Luxita Sharma¹ and Deepti Khatuja²

¹Associate Professor and Head, Dept of Dietetics and Applied Nutrition, Amity University Haryana

²Head, Clinical Nutritionist, Fortis Memorial Research Institute, Gurgaon

Corresponding Author: gangaachuthan99@gmail.com

Abstract

Ethnic foods are savoured by people all over the world. In India large numbers of all traditional foods are known to impart nutritional wellbeing for all age-groups. These products are categorized under sweeteners, savoury or snack products and are generally prepared using locally available materials. Among such foods is Chikki, a popular sweet product that is enjoyed all over the India. The popular products are peanut chikkis, Sesame seeds chikkis and puffed rice chikkis. (Sathiya.et.al. 2015).

Rice Chikki was prepared by using iron rich powder. Iron rich powder was obtained by mixing powder of nuts and beet greens (iron rich powder) and Rice Flakes in ratio of 50:50 with dates syrup. Sample A, sample B, sample C and sample D of rice chikki was prepared using rice flakes: iron rich powder and dates syrup in the ratio of 50:45:5, 50:40:10, 50:35:15 and 50:30:20. The sensory evaluations of all products were carried out by 10 panel members on the basis of taste, colour, texture, firmness, stickiness and overall acceptability. The sample C contains 35 g of iron rich powder was highly accepted by the panel members. The prepared rice chikki was cheap in price and loaded with nutrients like iron, calcium and dietary fiber. Rice chikki was used to manage certain disease like hypertension, iron deficiency anemia, diabetes and showed therapeutic effects.

Introduction

In today's modern world the hectic lifestyle leaves no time with people to have healthy food or even to have meals. Therefore, High energy and mineral - Chikki is a solution for the lack of nutrition. So this Chikki will complete the most important nutrients such as IRON, CALCIUM & PHOSPHORUS required by human body for supporting metabolism and healthy bones (Nutritive value - Given in table no.1). This chikki could be helpful in treating/managing the Iron deficiency Anemia & Bone disorders such as Osteoporosis, Rickets, Hypocalcemia, Arthritis etc. This can be helpful for poor people as well whose nutritional needs are not completed with food daily.

Rice Flakes: Rice flakes are the flattened rice. These flakes are flat in shape and dry in weight. These

are the native of Indian subcontinent. For the formation of rice flakes rice is semi boiled and this process is known as parboiling. After the parboiling of rice, the next step is flattening of rice. Rice flakes start to swell as they start to absorb liquid during cooking. They easily absorb water, milk or any other liquid. It is also known as "beaten rice." Normal rice flakes are four times thick then rice flakes. These rice flakes are more highly digestible. In India, Nepal, Bangladesh rice flakes are highly consumed. They are easy to prepare and used for long term consumption. Rice flakes are known by different names:

Kannada – Avalakki

Gujarati – Pauaa/Paunva

Rajasthani – Poya

Rice flakes are easily absorbed the water and milk whether it is cold or hot. It is native of India and commonly called as 'Poha'. They are easily digestible and rich in nutrition so they are used in breakfast. Rice flakes a good amount of iron, calcium, carbohydrates and protein. Shelf life of Poha is 2 to 3 months which is quite long

Nuts: Nuts are nutrient-dense, providing healthy fats, protein, fiber, vitamins, and minerals. Regular consumption supports heart health, improves cholesterol levels, and aids in weight management. They also help reduce inflammation, support brain function, and lower the risk of chronic diseases like diabetes and cancer. A small daily portion offers lasting health benefits.

Beet Greens - Beet Leaves are rich in iron content but due to the lack of knowledge these leaves are used as a animal fodder. Beet leaves are a good source of antioxidants because they contain phytochemical compounds like carotenoids and betalains in the good amount. Beet leaves have good microbiological property which is quite similar to other leafy vegetables. On the basis of sensory evaluation beet greens has high level of overall acceptability.

Methodology and Results

Processing of Rice Flakes – Rice flakes were purchased from local market. Then, Rice flakes were

grinded in laboratory mixer and grinder. The rice flakes were powdered.

Processing of Beet Greens - Fresh beetroot leaves were collected from the near fields. Leaves with bulb and wrinkled yellow skin were discarded because they were dehydrated. Leaves green colour without bulb was selected. To remove the dirt and soil leaves were washed under the running tap water. These washed leaves were collected in a utensil.

Washed leaves were blanched for 2 minutes. The blanching was carried out by putting leaves in hot water for 2 minutes and then placed them in cold water immediately. Blanching leaves were placed on a tissue paper. Tissue papers absorb the excess water from the surface of the leaves. Leaves were dried into sunlight for 2 days. After drying, leaves were reduced into powder using grinders and the powder was stored into labeled air tight containers

Processing of Nuts – Nuts like sesame seeds, figs, raisins and coconut powder were taken equally and grinded in laboratory mixer and grinder. The powder of nuts was then stored.

Then the Beet greens and nuts were mixed equally making it a Iron rich powder.

Processing of Date syrup - Date syrup is a natural sweetener made by extracting the juice from dates. To prepare it, pitted dates were soaked in warm water for a few hours until soft. Blend the soaked dates with water until smooth, then strain the mixture using a fine mesh or cheesecloth to remove any solids. Transfer the liquid to a saucepan and simmer over low heat, stirring occasionally, until it thickens into a syrup-like consistency. Once cooled, store the syrup in a sterilized glass jar. Date syrup is rich in antioxidants, vitamins, and minerals, making it a healthy alternative to refined sugar in various recipes.

Recipe of Iron and Calcium rich Chikki

Preparation of dough

All samples were prepared separately with same procedure. All ingredients were mixed properly to get consistent dough. Less 50 ml water and oil was used for the preparation of dough. To prepare chikki dough should be little semi solid in consistency. Grease an 8 inch by 8 pan with oil. Put mixture in prepared pan and spread evenly. Cut into squares while still hot. Wait until the chikkis are cool before trying to remove them from the pan.

Results

Table 1: Variation in samples of chikki (Sample size 100 g.)

Ingredients	Sample A	Sample B	Sample C	Sample D
Rice flakes powder	45g	40g	35g	30
Dates syrup	5g	10g	15g	20g
Iron rich powder	50g	50g	50g	50g
Total	100 g	100 g	100g	100g

Table 2: Nutritional Information of High Iron & Chikki (100 g. approx)

SEEDS	Proteins (g)	Calcium (mg)	Phosphorus(mg)	Iron(mg)	Fiber(g)	Energy (Kcals)	COST (Rs)
Rice flake flour (30 g)	1.98	6	71.4	6	.21	103.8	1.65
Sesame seeds (20 g)	3.6	290	114	1.8	0.6	112.6	5
Raisins (5 g)	0.09	4.35	4	.36	.05	15.4	1.9
Coconut Dry (10 g)	0.68	40	21	.78	.66	66.2	3.45
Figs (5 g)	.065	4	1.5	.05	.11	1.85	3.45
Dates (10 g)	.4	8	4	.92	-	38	1.9
Oil (5 g)	-	-	-	-	-	45	0.4
Beet Greens	1.6	114	95	1.9	2.9	43	.50
Total	8.4	466	310	12	4.63	426	18.2

*Values according to Nutritive Value of Indian Foods – ICMR –NIN, 2011

Table 3: Daily requirement of Adult Man & Woman (ICMR- NIN , 2010)

	Proteins (g)/day	Calcium (mg)/day	Phosphorus(mg) /day	Iron(mg) /day	Fiber(g) /day	Energy (Kcals) /day
Adult Man	60 gms	600	400	17	20	2320
Adult Woman	55 gms	600	400	21	20	1900
Pregnant woman	82.2	1200	800	35	+15	+350
Children 1-3 years	16.7	600	600	9	10-15	1060
Children 4-6 years	20.1	600	600	13	10-15	1350
Children 7-9 years	29.5	600	600	16	12-17	1690

Table 4: Mean and standard deviation of the sensory evaluation scores of all samples.

Samples Parameters	Sample A	Sample B	Sample C	Sample D
Taste	7.05 ± 0.92	6.05 ± 2.13	8.25 ± 1.44	7.25 ± 1.09
Color	7.05 ± 0.92	6.2 ± 2.03	7.35 ± 1.50	7.3 ± 1.14
Texture	6.95 ± 1.12	6.35 ± 1.85	8.75 ± 1.22	7.15 ± 1.11
Consistency	7.1 ± 1.09	6.2 ± 1.96	9.55 ± 1.20	7.2 ± 1.03
Strength	7.15 ± 0.99	6 ± 1.95	9.55 ± 1.69	7.25 ± 0.99
Overall Acceptability	7.25 ± 0.94	6.2 ± 1.96	9.65 ± 1.35	7.3 ± 1.1

Mean±Standard deviation. Number of subjects, n=20

Discussion

In the present study an effort was made to a product which is rich in iron and prepared easily from the less utilized greens of vegetables. Powder of beet plant leaves and rice flakes was used to develop iron rich chikki. Greens of beet plant was wasted due to lack of knowledge. The greens were loaded with nutrition content as well as with anti-nutritional content. To remove anti nutritional factors blanching method was used. This chikki is an Indian traditional product and

easy to prepare and cook. It is concluded that chikki incorporated with 35 g gram iron rich powder are highly accepted in the term of taste, texture, colour, firmness, stickiness and overall acceptability. The nutritive value of chikki was also increased with sensory characteristics. Formulated chikki was rich in iron, calcium, dietary fiber which increases the level of blood and prevents from many diseases. Using greens of beet plant, nuts and rice flakes in preparation decrease the wastage and improve the quality of diet.
