

## **NUTRIENT ANALYSIS OF DEVELOPMENT IRON RICH PREMIX AND ITS PRODUCT**

**Swati Yadav\* and Vimla Dunkwal\*\***

### **ABSTRACT**

Iron rich premix was formulated in three different combination with processed pearl millet flour, soyabean flour, roasted bengal flour, rice flakes powder, niger seed and lotus stem powder in the following ratio i.e 6:3:1:1:1:1, 5:2:2:2:1:1 and 5:2:2:1:1:1, respectively. All these three combinations were evaluated organoleptically. Among these combinations high scored was selected for the nutritional quality. Nutritional analysis of the premix revealed that moisture, crude protein, crude fat, crude fibre, ash, carbohydrates, and energy were estimated to the 1.67 percent, 12.5 percent, 4.86 percent, 1.27 percent, 1.35 percent, 78.35 percent and 407.14 kcal/100gm respectively and iron and antinutrient like phytic and oxalic acid of premix was estimated to 10.6 mg, 1.4 and 0.12, gm/100gm respectively.

### **INTRODUCTION**

Iron is an important constituent of hemoglobin and its deficiency is the main etiological factor responsible for nutritional anemia in the community. Inadequate intake of other hemopoietic factor like vitamin C, folate, vitamin B<sub>2</sub>, vitamin B<sub>6</sub> and protein has also been reported to be a cause in about 20 percent of the anemic cases (WHO, 1975). Iron deficiency anemia is the most common type of anemia (also called IDA) is the state of being a person having insufficient amount of iron to fulfill the body demand. Iron deficiency anemia is generally caused by very poor intake of iron in normal diet.

The best strategy to correct the nutritional deficiencies is the food-based approach where nutrient-rich food supplements are formulated with nutrient-rich familiar foods. Premix is finite mixture of nutritional supplements such as minerals and vitamins, usually combined with a carrier and ready to mix in a fixed ratio. These premixes vary in method of preparation and processing. In this way, these foods have become popular with time because of less cost, time and energy saving, convenience in preparation (Rao, 2002).

Pearl millet is a staple food for arid zone people and economically weaker section in India. It contains the highest amount of iron among all the cereals. It is nutritionally comparable and even superior to many

cereals in terms of protein, fat, energy, vitamins and minerals content. Pulses are rich source of protein in our diet and supplement proteins to our cereals. The quality of the protein from a mixture of cereals based diets and pulses are superior to that of either one (Gopalan, 1989). Soybean also known as the "GOLDEN BEAN" of the 20-century. Soybean has great potential as an exceptionally nutritive and contains all three of the macronutrients required for good nutrition i.e. complete protein, carbohydrate and fat, as well as vitamins and minerals, including calcium, folic acid and iron. Similarly bengal gram is the most important pulse crop of India. On the whole, Bengal gram protein is the best pulse protein owing to its high net-protein-utilization value. Bengal gram is an iron rich food. Rice flakes are made from parboiled rice. The vitamin content is equal to that of parboiled rice and also rich in iron. Niger seed is a well-known oilseed. Niger seeds known to be high in calories and rich in many mineral contents like iron, magnesium, manganese, copper, and calcium. The seeds are also a good natural source of vitamin B<sub>1</sub> and vitamin E. Lotus stems are very much used in Asian cuisines and are much relished for their taste and nutritional value. They are very rich in iron and calcium content besides high dietary fiber content. So that these iron rich cereal and pulses combination was used in making iron rich premix with suitable combination.

---

\* Ph.D Scholar, College of Home Science, S. K. Rajasthan Agriculture University, Bikaner, Rajasthan

\*\* Prof. & Head, College of Home Science, S. K. Rajasthan Agriculture University, Bikaner, Rajasthan

## RESEARCH METHODOLOGY

Pulses are rich sources of protein in our diet and that can supplement proteins of our cereals. The qualities of the protein from a mixture of cereals and pulses based diets are superior to that of either one (Gopalan, 1989). Raw material like pearl millet, rice flakes, roasted bengal gram, lotus stem, soybean, niger seed were purchased from the local market. The processing techniques like cleaning, washing, soaking, blanching under controlled condition and drying were carried out for the preparation of premix.

### Development of iron rich premix and its products

The premix was prepared in different ratios using flour of pearl millet: roasted bengal gram: rice flakes: soybean: niger seed: lotus stem in the following ratio i.e. 6:3:1:1:1:1, 5:2:2:2:1:1 and 5:2:2:1:1:1 were prepared. Among these, ratio of 5:2:2:1:1:1 was selected best by panel member. The premix so developed was used for development of biscuits.

### Organoleptic evaluation of the product (biscuit)

Standardization of the developed products was carried out through organoleptic evaluation. Devel-

oped products evaluated for their sensory characteristics like color, flavor, texture, appearance, taste and overall acceptability by selected 10 panel members (Swaminathan, 1987).

### Nutritional analysis of premix

The premix and biscuit were analyzed for its proximate composition by use in methods describe in (AOAC, 1995).i.e. moisture, crude protein, crude fat, crude fiber, ash, carbohydrate, micronutrients like-iron and antinutrient like phytic acid and oxalic acid.

### Statistical analysis

Following statistical analysis was carried out as suggested by Chandel (1997) i.e Arithmetic mean, Standard deviation.

## RESULTS AND DISCUSSION

### Organoleptic evaluation of the developed product

Biscuits were prepared and subjected to organoleptic assessment on nine point Hedonic rating scale.

The mean acceptability scores obtained by the biscuits were noted to be ranging between “liked very much” to “liked extremely” (Table 1). The re-

**Table 1: Organoleptic acceptability of Biscuit**

S.No	Products	Mean score of sensory characteristics on nine point hedonic scale					
		Colour	Appearance	Texture	Aroma	Taste	Overall acceptability
1	Biscuit	9.00±0.00	8.70±0.46	8.50±0.50	8.70±0.46	8.80±0.40	8.75±0.24

**Table 2: Proximate composition of premix and biscuit (on dry weight basis)**

Samples	Moisture (%)	Crude protein (%)	Crude Fat (%)	Crude Fibre (%)	Ash (%)	Carbohydrate (%)	Energy (Kcal)
Premix	1.67±0.32	8.83±0.10	12.5±0.32	1.25±0.04	1.33±0.10	74.42±1.79	445.45±4.64
Biscuit	2.48±0.50	8.58±0.44	11.2±0.54	0.87±0.05	1.26±0.15	75.61±1.67	437.56±4.70

Values are Mean ± SD of 3 replicates.

**Table 3: Iron content and antinutrient of premix and biscuit (on dry weight basis)**

Samples	Iron (mg)	Oxalic acid (g)	Phytic acid (g)
Premix	10.6 ±0.24	1.4 ±0.06	0.12 ±0.01
Biscuit	10.2±0.27	1.26 ±0.44	0.11 ±0.04

Values are Mean ± SD of 3 replicates

sults clearly revealed that mean scores for biscuit's color was 9.00 while appearance and flavor secured similar score i.e. 8.70, similarly texture, taste and overall acceptability scored 8.50, 8.80, and 8.75, respectively.

#### Assessment of nutritional quality

The nutritional analysis of the acceptable and standardized premix, biscuit was analyzed for moisture, crude protein, crude fat, ash, crude fiber, total carbohydrate and energy contents (Table 2), as per the standard procedures. In addition, iron and anti-nutrients like phytic acid and oxalic acid (Table 2) content were also analyzed using standard methods. The result of the analysis has been depicted in Table 1 and 2.

Result of nutritional analysis showed that developed premix and biscuit contained 1.67, 8.83, 12.5, 0.04, 1.33, 74.42 g/100g and biscuit 2.48, 8.58, 11.2, 0.87, 1.26, 75.61 g/100g of moisture, crude protein, crude fat, fiber, ash, total carbohydrate, respectively (Table 2). Energy content of premix and biscuits was analyzed to be 445.56 and 437.56 kcal/100g, respectively (Table 2). Iron and antinutrient contents i.e. phytic acid and oxalic acid were also analyzed in these two and reported values for iron, oxylates and phytates were 10.6, 1.40 and 0.12 mg/100g in premix while biscuit contain 10.2, 1.24 and 0.11 mg/100g, respectively (Table 3).

## CONCLUSION

It can be inferred that the developed iron rich premix and biscuit was highly acceptable by panel members. The premix and biscuit were found very good in nutritional quality.

## REFERENCES

- AOAC, (1995). Association of Official Analytical Chemists. Official Method of Analysis (16<sup>th</sup> edition). Arlington, V.A.
- Chandel, SRS., (1997). A handbook of Agriculture Statistics. Achal Prakashan Mandir, Pandu Nagar, Kanpur.
- Gopalan, C., Rama Shastri, B.V., Balasubramanian, S.C.(1989). Nutritive value of Indian foods. National Institute of Nutrition, ICMR, Hyderabad, India.
- Rao, K. (2002). Approaches to Intervention among Children and Adolescent. *Nutr Rev.* 60 (5): **118-125**.
- Swaminathan, M.S. (1987). Food science chemistry and experimental food. The Bangalore Printing and Publishing Co.Ltd. Mysore road, Bangalore.
- WHO. (1975). Control of nutritional anemia with special reference to iron deficiency. *Technical report series. No.580*. Geneva.
- World Health Organization (1993). Prevention and management of anemia in pregnancy. WHO/FHE/MSM/93.5. Geneva

□□□

Received : November, 2013

Accepted : January, 2014