IJFANS
International Journal of Food And Nutritional Sciences

Volume 4, Issue 4, Jul-Sep 2015, www.ijfans.com e-ISSN: 2320-7876

INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

IMPACT FACTOR ~ 1.021

Official Journal of IIFANS

INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

e-ISSN **2320 –7876** *www.ijfans.com*
Vol.4, Iss.4, Jul-sep, 2015

Research Paper ***Open Access***

DEVELOPMENT OF MICRONUTRIENT RICH FOOD PRODUCT BY USING INDEGENOUS COARSE GRAINS AND GREEN LEAFY VEGETABLES

Alka Gupta[1], Sushila verma[1]*, Sarita Sheikh[1], Ranu Prasad[1] and Neelam Yadav[2]
[1]Department of Foods and Nutrition, Ethelind School of Home Science, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh, India, [2]Center of Food Technology, Allahabad University, Allahabad

*****Corresponding author: riyasushila@gmail.com

Received on: 21th May, 2015 **Accepted on: 14th September, 2015**

ABSTRACT

Through this study an attempt was made to analyze the and acceptability of micronutrient rich food products prepared from the micronutrient rich leaf mixture *(Spinacia oleracea),* Fenugreek leaves *(Trigonella foenumgraecum),* dill leaves *(Anethum Graveolens)* and coarse grains Pearl millet, *(Pennisetum glaucum)* Maize, (Zea Mays) Chickpea *(Cicer arietinum).* The products *paratha* and *khichdi* were prepared by incorporation of micronutrient rich indigenous foods such as spinach, fenugreek leaves, Dill leaves, pearl millet, maize, chickpea and served as treatments T_1, T_2 and T_3 respectively, T0 without incorporation of dehydrated leaves and coarse grains served as control. Organoleptic evaluation was carried out using the nine point hedonic scale. On the basis of findings, it was observed that T_1 was found to be best with regards to flavour and taste and overall acceptability. Thus it can be concluded that indigenous foods can be incorporated in the preparation of different food products to improve their sensory acceptability.

Key words: Indigenous foods, Incorporation, organoleptic acceptability.

INTRODUCTION

In Eastern districts of Uttar Pradesh various types of Indigenous foods are available but are not utilized to the extent they should be in spite of their higher nutritive value. Looking into the prevalence of high level of micronutrient malnutrition among the vulnerable sections, utilization of micronutrient rich indigenous foods can be explored to overcome micronutrient deficiency**.** Micronutrients are food ingredients needed by the body in small quantities but have great potential to modulate and enhance body functions thereby leading to growth and functioning of the immune and reproductive system. Micronutrients include vitamins such as vitamins A and C, and minerals like iron, zinc and selenium. Deficiency of micronutrients results in micronutrient malnutrition. Vitamin A and iron deficiencies are the most common forms of micronutrient malnutrition facing a large population of the world including India.

According to World Bank 47 percent of Indian children are categorized as moderately or severely malnourished .School aged children are faced with many nutritional problems including deficiency of major micronutrients such as iron and vitamin A.

Deficiency of vitamin A has long been known to be the most common preventable cause of blindness among children. But only recently has it become evident that vitamin A plays important roles in ensuring protection against infections and maintaining many normal body functions, especially body immunity. Mortality in childhood and infancy, as well as even intrauterine fetal loss, has been associated with vitamin A deficiency. Iron deficiency anaemia (IDA) is an important public health problem resulting in considerable morbidity and mortality in women and young children. Its impact on psychological and physical development, behavior and work performance is phenomenal. Iron deficiency anaemia is defined as a condition in which the hemoglobin (Hb) concentration or hematocrit (Hct) of an individual is lower than the level considered normal for the person's age and sex group. Aneamia is associated with weakness and tiredness. (Kapil and Bhavana , 2002).

Green leafy vegetables are basically any part of a plant is it leaves roots, seeds or fruits that can be eaten. This food of plant origin contains many bioactive compounds and thus serves as an important source of minerals, vitamins and certain hormone precursors in addition to protein and energy sources.

Pearl millet most widely grown millet it contain a wide range of micronutrients such as 11.6gm protein, 67.5gm carbohydrate, 8mg iron and 132 microgram of carotene which is highly essential to safeguard our eyes. Maize is a commonly indigenous food which is generally consumed by population of eastern districts of Uttar Pradesh. maize kernels provide 86 and are a good source (10-19% of the Daily Value, DV) of the B vitamins, thiamin, niacin, pantothenic acid (B5) and folate (right

table for raw, uncooked kernels, USDA Nutrient Database). In moderate DV amounts, they also supply dietary fiber and the essential minerals, magnesium and phosphorus whereas other nutrients are in low amounts. The chickpea or chick pea (*Cicer arietinum*) is a legume of the family Fabaceae. Chickpeas are a nutrient-dense food, providing rich content (> 20% of the Daily Value, DV) of protein, dietary fiber, folate, and certain dietary minerals such as iron and phosphorus. Jukanti *et al.* (2012) Chickpeas have a Protein Digestibility Corrected Amino Acid Score of about 76 percent, which is higher than fruits, vegetables, many other legumes, and cereals.

Thus keeping in mind all these perspectives the present study was conducted for developing and quality evaluation of micronutrient rich products made from the micronutrient rich indigenous foods such as green spinach *(Spinacia oleracea),* Fenugreek leaves *(Trigonella foenumgraecum),* dill leaves *(Anethum Graveolens)* and coarse grains Pearl millet, *(Pennisetum glaucum)* Maize, (Zea Mays) Chickpea *(Cicer arietinum).* The combination of such micronutrient rich indigenous foods will help to combat micronutrient deficiency.

METHODOLOGY

The investigation was conducted in the Department of Foods and Nutrition, Ethelind School of Home Science, Sam Higginbottom Institute of Agriculture, Technology and Sciences (SHIATS), Allahabad. The details of the materials, experimental procedure and techniques to be adopted during the course of the investigation were as follows:

EXPERIMENTAL SITE

The present investigation was carried out in the Nutrition Research Laboratory, Foods and Nutrition, Ethelind School of Home Science, SHIATS, Allahabad.

PROCUREMENT OF RAW MATERIALS

The raw materials for the recipe development like spinach, Dill leaves, Fenugreek leaves, Pearl millet, Maize, Chickpea were purchased from the local market of Allahabad district. Only the fresh and sound leaves were collected. These leaves were washed with the help of clean water so as to remove the dirt and other disease causing organisms and were tray dried for 60 to 65° C for 6-7 hours powdered and stored in air tight containers

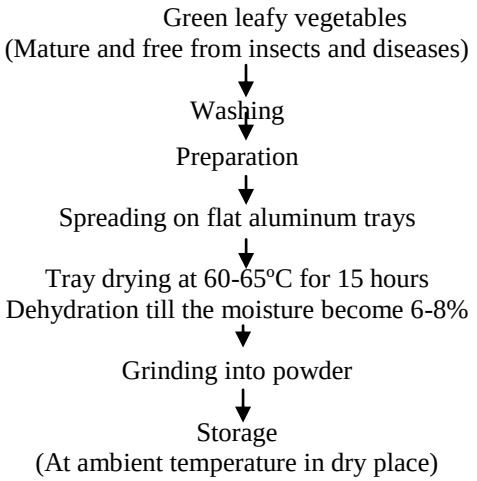

Fig. 1- Flow diagram of green leafy vegetable dehydrate

DEVELOPMENT OF MICRONUTRIENT RICH FOOD PRODUCTS

Two products were prepared with the incorporation of indigenous foods namely *khichdi* and *paratha.* For each product, the basic recipes (control T_0) have three variations T_1, T_2, T_3 respectively where the amounts of incorporation of different indigenous foods were varied.

ORGANOLEPTIC EVALUATION

Sensory evaluation of the food products for their acceptability was done by a panel of 10 judges. The panel members were instructed about the product and its characteristics. Panel members were selected based on their performance in initial evaluation trials. Sensory descriptors of the samples were colour and appearance, taste and flavour, body and texture and overall acceptability. There are ten numbers of judges for the sensory evaluation. The nine point hedonic scale was used for sensory evaluation (Srilakshmi, 2007).

STATISTICAL ANALYSIS

Analysis of variance technique (ANOVA) and critical difference were used to analyze the data (Gupta *et al.*2002).

RESULTS AND DISCUSSION

ORGANOLEPTIC EVALUATION OF VALUE ADDED FOOD PRODUCTS

Khichdi and *paratha* were prepared using different ratios of micronutrient rich indigenous foods. The acceptability of food products was judged by the panel of ten semi-trained members. Sensory evaluation using Nine Point Hedonic Scale revealed that 70 per cent of panelists liked extremely the *khichdi* incorporated with micronutrient rich indigenous foods at the ratio of (10:5:5) dehydrated green leafy vegetable mix powder and 10:10:10 per cent of coarse grains. In case of Paratha T1 scores the best with regard to all sensory characteristics viz. colour and appearance (8.5±0.34), body and texture (8.7±0.25), taste and flavor (8.7±0.25) and overall acceptability (8.62±0.22) (Figure1). The result is supported by Goel *et al.* (2011) also developed recipes by using dehydrated micronutrient rich gudmar leaves namely *biscuit,* The average sensory scores of different parameters in control treated sample of *biscuit* incorporated with dehydrated micronutrient gudmar leaves, clearly indicate that 4% level of gudmar leaves in *biscuit* is acceptable. Ward *et al.* (2009) based on selective chemical and physical properties studied patties containing 5 and 10% purslane for sensory evaluation for colour, juicinesstenderness texture and flavor and rated 5% incorporation to be significantly better than 10% incorporation.

In Paratha, T1 scores the best with regard to all sensory characteristics viz. colour and appearance (8.4±0.36), body and texture (8.55±0.64), taste and flavour (8.5±0.25) and overall acceptability (8.49±0.39) (Figure 4). The result is supported by Gupta *et al.* (2009) also developed recipes. In *mathri* 15% level of dehydrated Quail grass leaves in *mathri* was highly acceptable and the

score for overall acceptability was 8.3 ± 0.18. Singh *et.al* (2007) also developed some recipies in different proportions with dehydrated bathua leaves among two developed products Dal, and Paratha, Dal was accepted at 7% of incorporation level and paratha was accepted at 5% level.

Table no. 1-Proportions of addition of micronutrient rich indigenous green leafy vegetables and coarse grains

Ingredients	T0 (%)	T1 (%)	T2 (%)	T3 (%)
Spinach powder	-	10	15	20
Fenugreek powder	-	5	5	5
Dill leaves flour	-	5	10	15
Pearl millet flour	-	10	10	10
Corn flour	-	10	10	10
Chickpea flour	-	10	10	10
Wheat flour	100	50	40	30

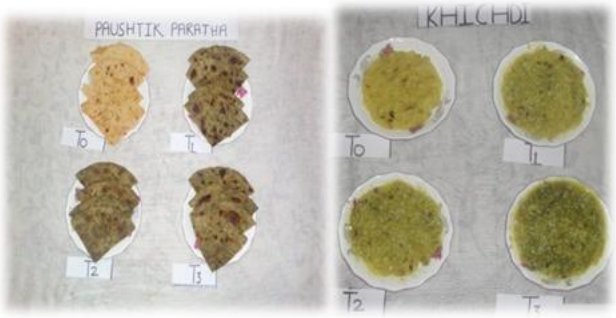

Figure 2. Developed products with micronutrient rich indigenous coarse grains and green leafy vegetables

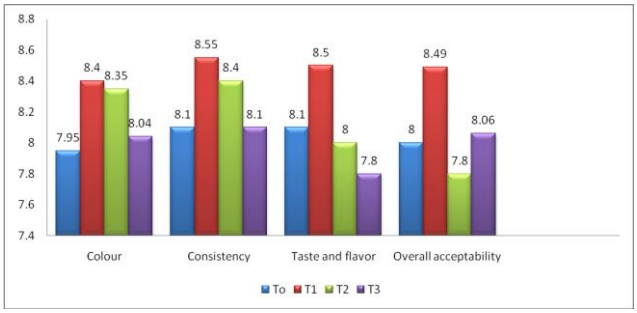

Figure 3.The average sensory scores of different parameters in control and treated sample of 'Khichdi

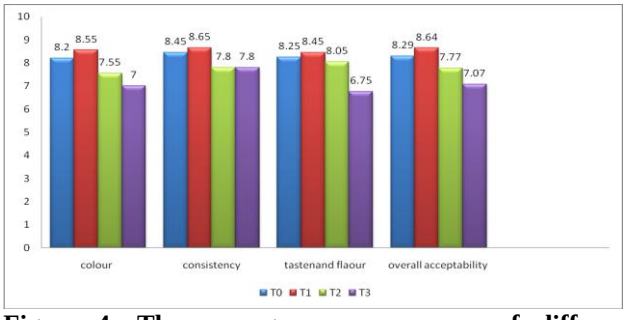

Figure 4- The average sensory scores of different parameters in control and treated sample of 'Paratha

CONCLUSION

On the basis of findings, it can be concluded that the incorporation of Micronutrient rich indigenous foods in the prepared products increases the nutrient density or nutritional qualities. Micronutrient rich indigenous foods can be successfully incorporated in various products which are beneficial to health.

RECOMMENDATIONS

Micronutrient rich Indigenous foods are highly nutritious, being a good source of calcium, iron, fiber and high vitamins and minerals. Thus development of such products incorporated value added products increases their nutritive value and functional properties. To include in the daily diet of all age groups people to make healthy life.

ACKNOWLEDGEMENT

This paper is a part of the UPCAR Major Project entitled "Utilization of micronutrient rich Indigenous foods and their effect on the micronutrient status of school going children in Eastern districts of Uttar Pradesh" which is undergoing. The authors acknowledge the Uttar Pradesh Council of Agriculture Research for giving financial assistance for conducting this project.

REFERENCES

- Gupta, A., Yadav, N., and Sheikh, S. (2009). Nutritional profile of underutilized foods of Allahabad district and their exploitation for development of functional foods and dietary intervention. Thesis, Allahabad Agriculture Institue-Deemed University, Allahabad.
- Gupta, S.C., Kapoor, U.K. (2002).Fundamentals of applied statistics"2nd edition, Chand & Son, pp: 51-85.
- Jukanti AK, Gaur PM, Gowda CL, Chibbar RN (2012). "Nutritional quality and health benefits of chickpea (Cicer arietinum L.): a review". *Br J Nutr* 108 (Suppl 1): S11–26.
- Kapil U. and Bhavana A. (2002). Adverse affect of poor micronutrient status during childhood and adolescence. Nutrition Reviews, Vol 60 No 5.
- Singh L, Yadav N, Kumar A R, Gupta AK, Chacko J, Parvin K, TripathiU (2007). Preparation of value added products from dehydrated bathua leaves (Chenopodium album Linn.) *National Product Radiance*, Vol 6(1) pp- 6-10.
- Srilakshmi, B., (2007). Food Science. 2nd Edition, Delhi: New Age International Limited, Publishers, 70-71.
- Srivastava R.P. and Kumar, S. (2002). Fruits and Vegetables preservation methods and practices. International book distribution.Co., Lucknow
- Ward, J.A., N.L. Dawkins, J. Shikany and R.D. Pace, (2009). Boost for Purslane *The World of food ingredients*. April-May, pp: 58-60.