

Sensory evaluation of Micronutrient rich Value Added Recipes with Amaranth Seeds and Dehydrated Carrot Powder

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ABSTRACT

The present study was undertaken to develop the value added food products by incorporating puffed amaranth seeds as well as to evaluate organoleptic quality of prepared food products. Four value added products namely *Laddoo*, *Cutlet*, *Kheer* and *Muffins* were prepared by incorporating puffed amaranth seeds and carrot powder at 60:30:10, 50:40:10, 40:50:10 level refers as T₁, T₂, T₃ respectively and the control T₀ for all the prepared products was made without the incorporation of puffed amaranth seeds and carrot powder. The product was organoleptically evaluated using Nine Point Hedonic scale. The data obtained during study were analyzed statistically using analysis of variance and C.D techniques. On the basis of findings, in *Laddoo*, *Muffins* and *Kheer* T₁ (main ingredients: puffed amaranth seeds: carrot powder, 60:30:10) was found best with regards to its sensory attributes i.e. colour and appearance, body and texture, taste and flavour and over all acceptability. In *Cutlet* T₂ (main ingredients: puffed amaranth seeds: carrot powder, 50:40:10) was found best with regards to its sensory attributes i.e. colour and appearance, body and texture, taste and flavour and over all acceptability. It is concluded that puffed amaranth seeds and carrot powder can be successfully incorporated in *Laddoo*, *Cutlet*, *Muffins* and *Kheer* to increase their nutritive value.

Keyword: Amaranth seeds, Acceptability, Carrot, Dehydration, Gluten, Micronutrients, Nine-point Hedonic Scale, Puffing, powder.

INTRODUCTION

Grain amaranth is also rich in trace elements such as zinc, selenium and copper. Zinc has been shown to be important for memory, immunity, and wound healing. As for immunity, people with AIDS are almost universally deficient of zinc, which contributes significantly to the continued decline of their already damaged immune systems. Restoring their supply with grain amaranth could be one of the most important strategies for stabilizing their immune function and reducing complications from the disease. Grain amaranth has been used for food by humans in a number of ways. The most common usage is to grind the grain into flour for use in breads, noodles, pancakes, cereals, granola, cookies, porridge or other flour-based products. The grain can be popped like popcorn or flaked like oatmeal. Baby food made from amaranth is similar in composition to commercial baby food, though the amaranth cereal is higher in fiber. In most parts of Kenya, the vegetable part of the amaranth plant is used in diets but there is minimal knowledge about the grain amaranth which leads to low production and renders it expensive for use. The consumer on the other hand, knows very little about its use, availability, nutritive value, and functional characteristics and thus currently, adoption into diets is at minimal (Dick, 2006).

A gluten-free diet is a diet that excludes foods containing gluten. Gluten is a protein complex found in wheat (including kamut and spelt), barley, rye and triticale. A gluten-free diet is the only medically accepted treatment for celiac disease. Being gluten intolerant can often mean a person may also be wheat intolerant as well as suffer from the related inflammatory skin condition dermatitis there are a smaller minority of people who suffer from wheat intolerance alone and are tolerant to gluten. Despite the health claims for gluten-free eating, there is no published experimental evidence to support such claims for the general population.

A significant demand has developed for gluten-free food in the United States whether it is needed or not. A gluten-free diet might also exclude oats. Medical practitioners are divided on whether oats are acceptable to celiac disease sufferers or whether they become cross-contaminated in milling facilities by other grains. Oats may also be contaminated when grown in rotation with wheat when wheat seeds from the previous harvest sprout up the next season in the oat field and are harvested along with the oats. The exact level at which gluten is harmless for people with celiac disease is uncertain. In a 2008 systematic review tentatively concluded that consumption of less than 10 mg of gluten per day for celiac disease patients is unlikely to cause histological abnormalities, although it noted that few reliable studies had been conducted. The levels of added amaranth flour to bakery products depend on many factors, primarily the type of the product, its production technology, and others. The effects of substitution of wheat, rye, and other cereals by amaranth on dough properties, final product quality, sensory characteristics, consumer preference, and nutritive value were reported in many articles, which in most cases emphasized the need for an improvement in the quality of cereal-based gluten-free products. Therefore, the research focusing on the use of pseudocereals as amaranth, quinoa, and buckwheat in the development of high-quality bread, pasta, and other "healthy" products has been increasing in order to ensure an adequate intake of nutrients in humans with celiac disease (Alvarez-Jubete and Others 2010a).

MATERIALS AND METHODS

The present investigation "Sensory evaluation of Micronutrient rich Value Added Recipes with Amaranth Seeds and Dehydrated Carrot Powder" was conducted in the Nutrition Research Laboratory, Department of Foods and Nutrition, Ethelind School of Home science, Sam Higginbottom Institute of

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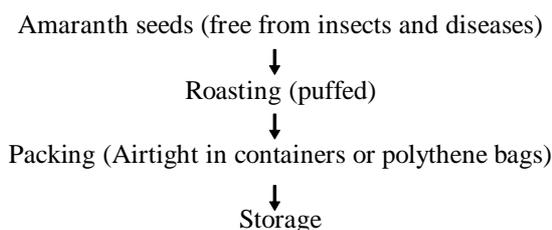
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Puffed amaranth seeds and dehydrated carrot powder were used for the development of value added locally familiar food product namely *Laddoo*, *Cutlet*, *Kheer* and *Muffins* at the ratio of 60:30:10 percent, 50:40:10 percent and 40:50:10 percent incorporation levels referred as T_1 , T_2 , T_3 respectively. The basic recipe was standardized and served as control (T_0). The products are *Laddoo*, *Cutlet*, *Kheer* and *Muffins* were freshly prepared and evaluated organoleptically by a panel of five judges select from Ethelind School of Home Science, SHIATS, Allahabad.

The judges were requested to score the products with the help of score cards based on the nine point hedonic scale (Srilakshmi, 2007). The products were judged for the qualities such as colour and appearance, body and texture, taste and flavor and overall acceptability. The mean scores for each product and each treatment were calculated. The data obtained from sensory evaluation was statistically analyzed by using analysis of variance techniques. Significant difference in the treatment was determined by using CD (critical differences) test. Standard error of each treatment and data of chemical analysis was also calculated (Gupta et al., 2002).

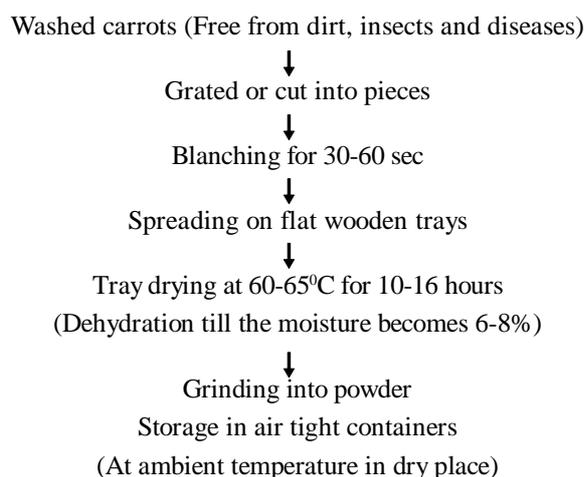
Preparation of puffed amaranth seeds -The standard procedure was slightly modified for the preparation of puffed Amaranth seeds.



Source : Shadaksharaswamy and Manay (2006)

Fig: - 1 Flow diagram for puffing of amaranth seeds

Preparation of carrot powder : The powder of the carrot was prepared as presented by (Srivastava and Kumar, 2009).



Yields : 3 kg of carrot yielded 300 g carrot powder.

Source : - Srivastava and Kumar (2009)

Fig: - 2 Flow diagram for preparation of carrot powder

RESULTS AND DISCUSSION

Table 1 shows that the Sensory evaluation of *Laddoo* with and without the incorporation of puffed amaranth seeds showed that the overall acceptability was highest in T_1 (8.44) followed by T_2 (8.32), T_3 (8.29) and T_0 (7.51) respectively and there was a significant difference, ($P < 0.05$) between the control and treatments. The overall acceptability of T_1 was significantly better than other treatments.

Sensory score of *Kheer* showed that T_1 (8) was ranked best by the panel judges followed by T_3 (7.86), T_2 (7.37) and T_0 (7.23) respectively. Scoring indicates that the treatments were moderately liked by the panel of judges. Products prepared by the addition of puffed amaranth seeds powder were moderately acceptable and there was a significant difference, ($P \leq 0.05$) between the control and the treatments. The overall acceptability of T_1 was significantly better than other treatments.

Table 2 shows that the sensory evaluation of *Cutlet* T_2 was the best at (8.32), T_1 at (8.28), T_3 at (7.21) and T_0 at (7.13) respectively. Products prepared by the addition of puffed amaranth seeds were moderately acceptable and there was a significant difference, ($P \leq 0.05$) between the control and the

Table: 1 Average sensory scores of different parameter in control and treated sample of 'Puffed Amaranth seeds Laddoo and Kheer'.

Parameters	Laddoo				Kheer			
	T_0	T_1	T_2	T_3	T_0	T_1	T_2	T_3
	Mean±SE	Mean±SE						
Colour and Appearance	7.8±0.23	8.53±0.17	8.53±0.17	8.53±0.17	7.53±0.06	8.33±0.06	8.06±0.13	7.73±0.06
Body and Texture	7.6±0.11	8.33±0.06	8.2±0.23	8.13±0.13	7.13±0.13	7.86±0.17	7.93±0.06	7.86±0.06
Taste and Flavor	7.66±0.17	8.66±0.13	8.33±0.13	8.33±0.13	7.13±0.06	7.73±0.06	7.66±0.06	7.86±0.06
Overall Acceptability	7.51±0.20	8.44±0.08	8.32±0.19	8.29±0.17	7.23±0.03	8±0.04	7.37±0.043	7.86±0.03

S= Significant, ±= S.E (Standard Error)

Table: 2 Average sensory scores of different parameter in control and treated sample of 'Puffed Amaranth seeds Cutlet and Muffins'.

Parameters	Cutlet				Muffins			
	T ₀	T ₁	T ₂	T ₃	T ₀	T ₁	T ₂	T ₃
	Mean±SE							
Colour and Appearance	7.26±0.17	8.4±0.11	8.33±0.17	7.86±0.13	7.40±0.23	8.53±0.29	7.93±0.29	8.06±0.06
Body and Texture	7.2±0.20	8.46±0.17	8.26±0.11	7.73±0.17	7.26±0.17	8.33±0.37	7.73±0.13	7.86±0.06
Taste and Flavor	7±0.30	8.26±0.24	8.53±0.06	7.73±0.17	7.33±0.13	8.40±0.30	7.86±0.06	7.80±0.11
Overall Acceptability	7.13±0.21	8.28±0.10	8.32±0.14	7.21±0.42	7.32±0.17	8.39±0.31	7.78±0.05	7.84±0.07

S= Significant, ±= S.E (Standard Error)

treatments. The overall acceptability of T₂ was significantly better than other treatments.

Sensory score of Muffins showed that T₁ (8.39) was ranked best by the panel judges followed by T₃ (7.84), T₂ (7.78) and T₀ (7.32) respectively. Scoring indicates that the treatments were moderately liked by the panel of judges. Products prepared by the addition of puffed amaranth seeds powder were moderately acceptable and there was a significant difference, ($P \leq 0.05$) between the control and the treatments. The overall acceptability of T₁ was significantly better than other treatments.

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CONCLUSION

It is concluded that puffed amaranth seeds and carrot powder can be successfully incorporated in *Laddoo*, *Cutlet*, *Muffins* and *Kheer*. In *Laddoo*, *Muffins* and *Kheer* T₁ (main ingredients: puffed amaranth seeds: carrot powder, 60:30:10) was found best with regards to its sensory attributes i.e. colour and appearance, body and texture, taste and flavour and over all acceptability. In *Cutlet* T₂ (main ingredients: puffed amaranth seeds: carrot powder, 50:40:10) was found best with regards to its sensory attributes i.e. colour and appearance, body and texture, taste and flavour and over all acceptability.

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