

Standardization and Preparation of Multigrain Porridge and Upma

Aman Verma[■], Ranu Prasad[♦] and Anisha Verma[□]

Received 05-09-2019

Accepted 03-03-2020

ABSTRACT

The present study was under taken with the following objectives of multigrain porridge- to use multigrains in different proportions for production of various value added products, to assess the organoleptic quality of the prepared products as well as to determine the nutrient composition of the value added products. Value added products were developed by varying the amount of multigrains that were wheat, green gram, sorghum, amaranthus, soya bean and oats. The products that were prepared were sweet porridge, vegetable porridge and upma. The treatments were set in different proportions and were represented as T₁, T₂ and T₃ were prepared by varying the amount of various multigrains that were used. The basic recipe was marked as control T₀. Sensory evaluation of prepared products was done by using 9 points hedonic scale. Nutritive value of the prepared product was estimated by using food composition table given by Gopalan *et al.*, the experiment were replicated by three times and data obtained during investigation were statistically analyzed using analysis of variance (ANOVA). On the basis of finding it is concluded that multigrain porridge can be suitably used in Sweet Porridge, Vegetable Porridge and in Upma and all the prepared products were highly acceptable on the basis of sensory evaluation. The proportion of mixing of various grains in treatment T₂ was most acceptable for all three products in terms of colour and appearance, taste and flavour, body and texture and overall acceptability. And in all the three treatments with different proportions of various grains the nutrient content of energy (kcal) decreased slightly whereas the content of carbohydrates (g), protein (g), fat (g) and crude fiber (g) increased. The cost of the prepared products per 100g of raw ingredients ranged from Rs.10-Rs11 for Sweet Porridge, Rs.10- Rs.14 for Vegetable Porridge and Rs.10- Rs.14 for Upma.

Key words : hedonic scale, Multigrain, organoleptic quality, proportions, sensory evaluation.

INTRODUCTION

Porridge is a very easy to make and convenient breakfast as well as cheap yet healthy food. It is widely accepted by all age groups whether it be children or elders. It is very easy to digest and is also considered as medicinal food for curing many diseases. In India daalia is commonly prepared by blending coarse granules of wheat and other grains. In most of the developing countries breakfast meals for all age groups are based on local staple diet that is made from cereals, legumes, roots, cassava and potato tubers. Cereals have limited essential amino acids such as lysine even though rich in threonine and tryptophan, while most seeds are rich in lysine and deficient in sulphur containing amino acids (Many and Shadaksharaswamy, 2008). And therefore a combination of cereals and pulses are used for the formulation of daalia which gives a nutritious food containing all the amino acids. A meal consisting of a combination of cereal-pulse mixes is found to be more effective than the only cereal diet (Bijlani, 1993). Multigrain porridge is a prodigious breakfast meal which is a package full of minerals, vitamins, high amount of protein, energy, carbohydrates and dietary fibre. And in the present world weight management is necessary for the healthy life & to protect from different diseases which cause due to overweight & obesity. Obesity is a state in which there is accumulation of excess adipose tissue in the body leading to more than 20 percent of the desirable body weight which eventually invites disability, disease and premature health (Srilakshmi, 2005). Moreover, it often coexists with other cardiovascular risk factors, namely, diabetes, dyslipidemia, and hypertension, which further add to

the burden of cardiovascular disease. The dramatic increase in the occurrence of overweight and obesity over the past several decades is attributed in part to changes in dietary and lifestyle habits, such as rapidly changing diets, increased availability of high-energy foods, and reduced physical activity of people in both developed and developing countries. Thus a healthy change in the diet can resolve many issues. And moreover, consuming multigrain as a part of diet provides one an ample amount of fibre and other nutrients that cure many of the health related problems which leads to a healthy lifestyle.

METHODS AND MATERIALS

The present study entitled "Standardization and Preparation of Multigrain Porridge and Upma" has been conducted in the Nutrition Research Laboratory of Department of Food Nutrition and Public Health, Ethelind College of Home Science, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh. The main raw materials were the multigrains (wheat, green gram, sorghum, amaranths, soya bean and oat) were procured from local market of Prayagraj. The grains were cleaned to remove the dirt, dust and foreign matter by winnowing. The cleaned grains were then grinded in vertical metallic disc grinder consisting of one stationary and one rotating discs, and was sieved using sieves of different sizes to obtain coarse grits of similar size. Preliminary studies were conducted to standardize the formulation for the development of the different cereal-pulses based Porridge. Multi grain Porridge was prepared by using different combination.

[■]Research Scholar, [♦]Professor and Dean, [□]Assistant Professor

Department of Food Nutrition and Public Health, Ethelind College of Home Science
Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, 211007



Figure 1: Process of preparation of multigrain porridge.

Treatment Combination : Milled cereals were mixed in different ratios and were represented as T_1 , T_2 and T_3 were prepared by varying the amount of various multigrains that were used. The basic recipe was marked as control T_0 . The whole experiment was replicated three times with all the treatments. The treatments were based upon pre-trials and the level was varied on the basis of acceptability. Changes done in the proportions of various multigrains in all the three products are described in table 1.

Table 1: Amount of multigrains in control and treatments of all the three products.

Multigrains	Treatments			
	T_0	T_1	T_2	T_3
Wheat	100g	60g	40g	20g
Green Gram	-	5g	10g	15g
Sorghum	-	10g	15g	20g
Amaranthus	-	10g	15g	20g
Soya Bean	-	5g	5g	5g
Oats	-	10g	15g	20g

Preparation of products : Developed treatments were used for the preparation of products. The products sweet porridge, vegetable porridge and upma were prepared by using developed treatments combination.

Sensory evaluation of the prepared products : The sensory evaluation of the prepared products were done by the panel of 5 judges selected from the faculty members of the Ethelind College of Home Science, to assess the acceptability of the products based on the various sensory attributes like colour and appearance, body and texture, flavour and taste and overall acceptability. The sample was placed before the judges with sample code. The evaluation has been done on the nine-point Hedonic scale based score card (Srilakshmi, 2011). The nutrient content of the food products has been calculated with the help of food composition table given by (Gopalan *et al.*, 2011). Cost of the prepared products has been calculated by taking into account the cost of individual raw ingredients that were used in the preparation of the food products as per the prevailing market prices. And the data has been analysed by using ANOVA, CD and Paired t- Test (Chandel, 2006).

RESULTS

The data collected on different aspects as per the materials and methodology have been tabulated and analyzed statistically. The results obtained from the analysis are presented and discussed following:

Sensory evaluation of the products showed that proportion of mixing of various grains in treatment T_2 was most acceptable for both the products in terms of colour and appearance, taste and flavour, body and texture and overall acceptability.

The data illustrated in the above table 2, pertaining to the average sensory scores of different parameters of sweet porridge, clearly indicates that the treatment T_2 had the highest scores that are 8.6, 9.9, 9.9 followed by other treatments which indicates that the proportion of mixing various grains of treatment T_2 was the best. Thus, the proportion of mixing various grains in treatment T_2 was highly acceptable compared to the acceptability of other proportions. With the help of ANOVA it was found that, the calculated value of F in colour and appearance is smaller than the tabulated value F (9.28) at five percent probability level. It can be concluded that there was non-significant difference between treatments regarding the colour and appearance of sweet porridge. Whereas, in taste and flavour, body and texture and in overall acceptability, the calculated value of F was greater than the tabulated value F (9.28) at five percent probability level. It can be concluded that there was significant difference between treatments regarding these aspects of sweet porridge. And in the same way, in vegetable porridge the treatment T_2 had the highest scores that is 8.94, 8.46, 8.67, 8.67 followed by other treatments which indicates the same that the proportion of mixing various grains of treatment T_2 was the best. Thus, the proportion of mixing various grains in treatment T_2 was highly acceptable compared to the acceptability of other proportions. With the help of ANOVA it was found that, the calculated value of F in colour and appearance was greater than the tabulated value F (9.28) at five percent probability level. It can be concluded that there was significant difference between treatments regarding the colour and appearance of vegetable porridge. Whereas, in taste and flavour, body and texture and in overall acceptability, the calculated value of F was smaller than the tabulated value F (9.28) at five percent probability level. It can be concluded that there was non-significant difference between treatments regarding these aspects of vegetable porridge.

Table 2: Average sensory scores of different parameters in control and treated sample of Sweet Porridge and Vegetable Porridge are as follows:

CONTROL AND TREATMENTS	SENSORY PARAMETERS							
	Sweet Porridge				Vegetable Porridge			
	Colour & Appearance	Body & Texture	Taste & Flavour	Overall Acceptability	Colour & Appearance	Body & Texture	Taste & Flavour	Overall Acceptability
	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE
T_0	8.3 \pm 0.1	8 \pm 0	8 \pm 0.1	7.8 \pm 0.1	8.4 \pm 0.2	8.4 \pm 0.2	8.47 \pm 0.06	8.47 \pm 0.06
T_1	8.14 \pm 0.06	8.27 \pm 0.15	8.4 \pm 0.1	8.06 \pm 0.06	8.6 \pm 0.1	8 \pm 0.1	8.34 \pm 0.15	8.34 \pm 0.17
T_2	8.6 \pm 0.29	9 \pm 0	9 \pm 0.0	9 \pm 0	8.94 \pm 0.06	8.46 \pm 0.06	8.67 \pm 0.06	8.67 \pm 0.06
T_3	7.9 \pm 0.28	8.07 \pm 0.12	7.67 \pm 0.15	7.67 \pm 0.15	8 \pm 0	7.8 \pm 0.1	8.34 \pm 0.15	8.2 \pm 0.1
Result	NS	S	S	S	S	NS	NS	NS

Table 3: Average sensory scores of different parameters in control and treated sample of Upma as follows:

Control and Treatments	Sensory Parameters			
	Colour & Appearance	Body & Texture	Taste & Flavour	Overall Acceptability
	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE
T ₀	8.26 \pm 0.06	8.03 \pm 0.06	8.06 \pm 0.06	8.06 \pm 0.06
T ₁	8.06 \pm 0.06	7.8 \pm 0.1	7.06 \pm 0.06	7.46 \pm 0.06
T ₂	8.6 \pm 0.1	8.26 \pm 0.06	8.16 \pm 0.06	8.26 \pm 0.06
T ₃	8.06 \pm 0.06	7.26 \pm 0.1	7.73 \pm 0.06	7.66 \pm 0.06
Result	NS	S	S	S

The data illustrated in the above table 3, pertaining to the average sensory scores of different parameters of upma, indicates that the treatment T₂ had the highest scores that are 8.6, 8.26, 8.16, 8.26 followed by other treatments which indicates that the proportion of mixing various grains of treatment T₂ was the best in. Thus, in this also the proportion of mixing various grains in treatment T₂ was highly acceptable compared to the acceptability of other proportions. With the help of ANOVA it was found that, the calculated value of F in colour and appearance is smaller than the tabulated value F (9.28) at five percent probability level. It can be concluded that there was non-significant difference between treatments regarding the colour and appearance of sweet porridge. Whereas, in taste and flavour, body and texture and in overall acceptability, the calculated value of F was greater than the tabulated value F (9.28) at five percent probability level. It can be concluded that there was significant difference between treatments regarding these aspects of upma.

The results found can be supported by the similar findings of (Bunkar *et al.*, 2012) Sensory profile indicated that, the product was smooth and had homogenous texture and contained roasted cereal/ legume aroma which was a desirable property. Popping induces desirable aroma and snack products based on them are highly acceptable. Even though, the product scored 5.0 for pastiness and 4.2 for stickiness, there were no adverse remarks by the panelists. The overall quality of the product was fairly high which aptly reflected its acceptability. Further, the consumer acceptance study indicated that the product in the form of porridge, laddu and burfi was under "like category" by majority of the population.

And in all the three treatments with different proportions of various grains the nutrient content of energy (kcal) decreased slightly whereas the content of carbohydrates (g), protein (g), fat (g) and crude fiber (g) increased. The cost of the prepared products per 100g of raw ingredients ranged from Rs. 10 - Rs 11 for Sweet Porridge, Rs.10- Rs.14 for Vegetable Porridge and Rs. 10 - Rs.14 for Upma.

RECOMMENDATION

Multigrain porridge can be recommended to make our food superior. It contains high amount of fiber, B-Complex Vitamins including Niacin, Thiamine and Riboflavin, essential Amino Acids, Methionine, Lecithine and some Vitamin E. It helps in lowering cholesterol, and hence aids weight-loss. In the present world people are developing in the same way there food choices are also developing and they are being more and more aware about their health because of which multigrains are becoming popular.

There are no special precautions that are needed to develop multigrain porridge. Thus, multigrains need to be brought in lights to make people aware about its multiple benefits.

REFERENCES

- Bijlani, R.L., Narain, J.P., Shukla, K., Kochhar, K.P., Puri, P., Karmarkar, M.G. and Bala, S. (1993):** Glycaemic and metabolic responses to a traditional cereal legume mixture. *International Journal of Food Science and Nutrition*. **44:** 243-251.
- Bunkar DS, Jha A, Mahajan A (2012)** Optimization of the formulation and technology of pearl millet based "ready-to-reconstitute" kheer mix powder. *J Food Sci Technology*, doi:10.1007/s13197-012-0800-2
- Chandel, S.R.S. (2006)** "Analysis of variance a handbook of Agriculture Statistics" **4(17):**13B35
- Gopalan, C., Ramasastri, B.V., Balasubramanian, S.C., Rao, N.B.S. Deothale, Y.G. and Pant, K.C. (2011)** 'Print by The National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, "Nutritive Value of Indian Food", 4th edition.
- Many, N.S. and Shadaksharaswamy, M. (2008):** Foods facts and principles, Third revised edition, Page 227, 228, 256, 262, 263, *New Age International (P) Ltd*, publishers 4835/24.
- Srilakshmi, B. (2005)** :Text book of Diet therapy. Edition 5th. New Age International Limited, Publishers New Delhi .