

Development And Evaluation Of Dietetic Unleavened Bread

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Abstract: Diabetes mellitus a heterogeneous metabolic disorder is characterized by hyperglycemia due to defective insulin secretion, resistance to insulin action (or) both. Management of diabetes without any side effect is still a challenge to the medical community. Medicinal plants provide the useful source of pharmaceutical entities (or) as a dietary adjunct to existing therapies. So the concept of low glycaemic index foods are gaining interest for the effective management of diabetes mellitus efforts has been accelerated in this direction to bring into light various foods of low glycaemic index. A whole wheat flour has been designed with the addition of functional food ingredient like methi seed powder, neem powder and curry leaf powder at the suitable level that do not affect the functional properties of the product. The content of protein, iron, dietary fibre, ash has been increased remarkably from (12.48-15.06, 12.87-23.8, 2.91-9.43, 2.32-4.54) respectively. The glycaemic index of the developed unleavened bread (42.18) was significantly lower as compared to the glycaemic index of whole wheat flour unleavened bread (62.17). Enriched whole wheat unleavened bread can be included in the diet for the management of the diabetes more effectively and to avoid further secondary complications.

Keywords: Glycaemic index, Fenugreek, Curry leaf, Neem powder.

1. INTRODUCTION

Diabetes has affected more than 285 million people around the world and is expected to reach 438 million in the next 17 years. Diabetes prevention and management has gained momentum due to dietary intervention, managing diabetes throughout with drugs is cumbersome and costly. Hence, diet remains the most important and basic treatment of diabetes. Epidemiologic data suggests that a low glycaemic index diet plays a protective role against the development of diabetes currently the challenge is to identify hypoglycaemic diet supplements to control blood glucose levels (John and Chellappa, 2005) and to make such supplements easily accessible to the general public in a way, that it will be easy for them to follow the instructions as long-term practice.

regarding this issue, cereals draw the major attention to serve as a base for such formulations. The whole wheat is particularly appreciated for its content of dietary fibre, protein and has been considered as a mild but effective regulator of intestinal functions (Fares et al, 2008). Hence in the present study the glycaemic index of unleavened bread of whole wheat developed with the incorporation of few suitable hypo glycaemic ingredients like Fenugreek seed powder, neem powder and curry leaf powder at suitable proportion that will not affect sensory characteristics of the product has been analyzed to judge the suitability of the product for the diabetes.

Glycemic index

The glycaemic index of the dietetic unleavened bread was evaluated by conducting the glucose tolerance test. Nine healthy human subjects falling under the age group of 45-50 years were fed with white bread that has been chosen as a reference food and on the subsequent visits subjected were fed with Dietetic unleavened bread. The amount of all the foods given were adjusted to provide 50g of carbohydrate. The blood glucose was noted through capillary blood at fasting and then with in half an hour interval for two hours. The GI were calculated using the formulae given by Wolever and Jenkins $Glycaemic\ index = \frac{Area\ under\ glucose\ curve}{Area\ under\ glucose\ curve\ of\ reference\ mean} \times 100$

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2. Materials and Methods

The experiment was conducted in the department of food processing engineering, school of bio-engineering, SRM University. The wheat, fenugreek, neem and curry leaf was purchased from the local market. The whole wheat was milled to flour. The methi seed powder, neem and curry leaves powder was prepared after soaking in overnight followed by drying. Initial trials were made for optimizing the unleavened bread by incorporating different seed powder in whole wheat flour individually at different ratios. Finally 2 percent methi seed powder, 4 percent of curry leaf powder, 0.4% of neem powder has been selected as the modified unleavened bread mix, according to the feasibility in the form of physical and rheological properties as well as acceptability of the product. The proximate principles and nutrient composition of the dietetic of the unleavened bread has been assessed and compared with that of normal and individual incorporation of powder in wheat flour bread, following the standard AOAC methods (Anon, 1990).

Results and Discussions

Table 1; Nutrient composition of the Dietetic unleavened bread

Sn	Nu- trient	Norm al	Fenu- greek	Curry leaves	Nee m powd er	Combination of all ingredi- di- ents(DIETET IC UNLEA- VENED BREAD)
1	Mois- ture	28.3	30.4	30.6	29.2	25
2	Pro- tein	12.48	14.42	11.02	13.73	15.06
3	Fat	1.72	1.857	3.349	2.150	2.389
4	Ash	2.32	4.90	4.15	3.73	4.54
5	Dieta- ry fibre	2.91	5.34	7.90	1.45	9.43
6	Cal- cium	106.4	129.3	233.0	69.4	302.3
7	Iron	12.87	15.84	39.7	3.60	23.8

Table 1, exhibits the nutrient composition the Dietetic unleavened bread compared to the normal unleavened bread, A significant increase in all nutrients except moisture the calcium has been noticed with maximum figure increase as reported in dietary fibre (9.43), followed by calcium (302.3) and Iron (23.8). This increase is possible due to the addition of protein and dietary fibre rich food ingredients such as Fenugreek seed powder, Curry leaves powder and Neem powder.

Table 2; Mean and standard error mean for Control unleavened bread

S.NO	Fasting	½ hr	1hr	1 1/2hr	2hr
1	102	246	152	117	111
2	99	310	252	174	118
3	104	230	198	159	116
4	89	145	126	102	102
5	91	169	135	106	102
6	102	196	147	112	107
7	88	189	166	125	117
8	97	198	169	120	104
9	95	145	128	113	92
Mean &SD	96.33& 8.32	203.11& 57.13	163.66& 34.28	125.33& 25.42	107.66& 8.96

Table 3: Mean and standard Error Mean for Dietetic Unleavened Bread

S.No	Fasting	1/2hr	1hr	1 ½ hr	2hr
1	115	162	134	131	122
2	104	148	120	116	106
3	95	129	103	101	98
4	94	126	113	107	103
5	97	134	106	98	98
6	92	141	135	117	109
7	96	138	131	109	116
8	94	116	104	99	104
9	106	142	134	116	101
Mean& SD	99.22& 9.72	137.33& 12.62	120& 21.52	110.44& 12.62	106.33& 9.78

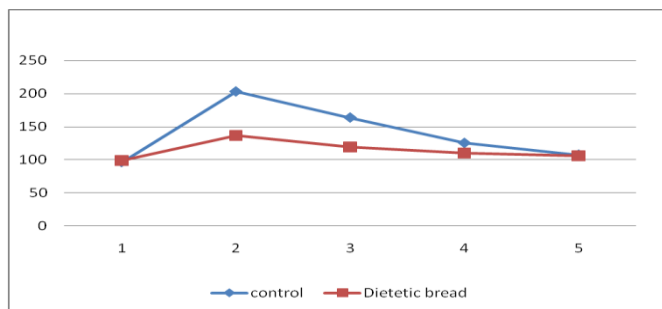
Figure1

Table 3, shows the blood glucose response of control unleavened bread in 9 healthy volunteers (N=9). Results revealed that maximum peak rise after one hour was remarkably higher with normal bread followed by Dietetic unleavened bread. The lowest peak was observed in Dietetic unleavened bread. The decrease in the peaks after two hours of food ingestion is a desirable feature and the peaks of blood glucose among the three foods followed the same trend has observed in the hours peaks. The peak rise has been shown in fig.1 and is evident from the figure that the peak of glucose decline sharply in case of developed products that may be due to the slow but steady release of glucose, which is beneficial, as satiety value for such products would be high. The mean GI and standard error mean have been displayed in table 2. The mean GI Value of the dietetic unleavened bread (42.18) was significantly compared to normal unleavened bread (62.18). The studies done in NIN also reported the hypoglycaemic effect of fenugreek seed powder. A reduction in 10 to 20 percent in blood glucose response was recorded in many recipes enriched with 12.5gm of fenugreek seed powder (Raghuram et al., 2006). The lowering of glycaemic index of Dietetic unleavened bread can be attributed to the addition of Curry leaf, Neem and Fenugreek powders which contain more percent of protein compared to normal.

4. CONCLUSION

Whole wheat products have been found beneficial for the management of diabetes. Enrichment of functional food ingredients like fenugreek, Neem and curry leaves powders has brought the Dietetic unleavened bread under low glycaemic index food successfully.

References

- [1] M.I. Sudha, G. Rajeswari, G. Venkateswara Rao; Chemical composition rheological quality characteristics and storage stability of buns enriched with coriander and curry leaves powder; J. Food Sci- Technol DOI.10.107/s 13197-013-0930-1
- [2] L. Suchetha Soma Kirupa, R. Kavitha, Hypoglycemic effect of *Murraya koenigii* (curry leaf) in type 2 diabetes mellitus; ISSN 2320-7876 vol.2, Iss 1, Jan-Mar 2013
- [3] Mundra Ankitha, Nirmala B. Yenagi, B. Kasturiba, 209), Designing of low glycaemic chapathi of dicoccum wheat for the effective management of diabetes. Karnataka J. Agric. Sci., 23(3); (476-479) 2010
- [4] Joy. C. Atawodi, Sunday E. Atawodi, *Azadirachta indica* (neem); a plant of multiple biological and pharmacological activities, *Phytochem Rev* (2009) 8; 601-620.
- [5] Jayadev Raju, Dhananjay Gupta, Araga R. Rao, Pramod K. Yadava and Najma Z. Baquer, *Trigonella foenum graecum* (fenugreek) seed powder improves glucose homeostasis in alloxan induced diabetic rat tissues by reversing the altered *in vivo* gluconeogenic and lipogenic enzymes. *Molecular and Cellular Biochemistry* 224; 45-51, 2001.
- [6] Vahini. J. K. Bhasarachary; effect of processing and cooking on glycaemic index of jowar varieties, e-ISSN 2320-7876, vol-2, ISS.3, Jul-Sep 2013.
- [7] M. Mostafa, M. E. Chodhary, M. A. Hassain, M. Z. Islam, M. S. Islam and M. H. Suman; Anti-diabetic effects of *Catharanthus roseus*, *Azadirachta indica*, *Allium sativum* and *Glime pride* in experimentally diabetic induced Rat, *Bangl. J. vet. med.* (2007). 5(1&2); 99-102.
- [8] Khan M. A., Semwal A. D., Sharma G. K., Mahesh. C., and Harilal P. T., Development and storage stability of spinach chapathies; *International Journal of Advanced Food Science and Technology* 2013, Volume 1, Issue 1, PP 12-19, Article ID Sci -123