

UTILIZATION OF WHEAT BRAN BREAD FOR THE BENEFIT OF COMMUNITY COMMON DISEASE A DIABETES

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ABSTRACT

Changes in life style has increased consumption of fast food like bakery products and incidences of diseases like Diabetic Mellitus (DM) among middle income group in India with special reference to Gujarat. Thus there is a need to develop health bakery products that will be useful to both the ends. Fiber paly important role to minimise the rise in blood sugar level. Therefore, the present study was planned to develop high fiber (wheat bran) bread and testing it for possible use in the dietary management of diabetics. Bread was developed in laboratory with replacement of wheat bran at 7.5 % and used for study. A total of 20 subjects with type II diabetics of average age 55 years were fed 97.84 g white bread (WB) and 104.40 g wheat bran bread (WBB) (approximately 5 slices) on 2 different days. Blood glucose levels were determined at fasting, 60, 120 and 180 min. Fasting blood glucose levels at the time of feeding both the breads were found similar. After 1 hr, the percent increase in blood glucose level was lower for WBB as compared to WB indicates beneficial effect of wheat bran supplementation. Results found in concurrence with Dubois et al. (1995). Thus it may be concluded that the bread prepared by supplementing 7.5 % wheat bran is acceptable and could be useful in the dietary management of diabetics.

Keywords : diabetes, functional food, bakery products, bread, wheat bran, high fiber food, blood glucose

INTRODUCTION

WHO reports that there may be 57 million “people with diabetes” in the India by the year 2025. High fiber diets beneficial in diabetes. Socio-economic conditions have increased the domestic demand and consumption of bakery products. Normally bakery products are calorie dense and bearing negligible fiber and therefore, continuous consumption of these may lead to DM (Kamaliya, 2005). Increasing health consciousness and easy modification of bakery products has led to their development as functional food suitable to diabetics. Matz (1996) has suggested the use of bran to increase the fiber content in bakery products. The present study was thus planned for testing beneficial effect of high fiber bread prepared using wheat bran in the dietary management of diabetics.

OBJECTIVE

To study the utilization of wheat bran breadfor the bebenefit of community common disease a diabetes

METHODOLOGY

To check the beneficial effect of WBB on diabetes, 20 subjects were selected as volunteers through purposive random sampling technique with the help of local doctors. Classification of enrolled subject is given in Table 1.

Table 1: Classification of subjects enrolled for the study

Subject	No.	Age (Yrs.)	
		Range	Avg.
Male	15	41-66	54
Female	05	49-70	55
Total	20	41-70	55

Subjects aged 41 to 70 years from a similar socio economic status, had a more or less similar physical activity, patterns, lifestyle and food consumption pattern. The enrolled subjects were asked to maintain an approximately constant activity level, dietary pattern, a general life style and avoidance of sweets and party meals during the feeding period. Data on general information, dietary pattern, routine

life style, exercise, basic medical history and present drug therapy were collected through a simple questionnaire.

Blood samples (finger prick) of the subjects were collected in the fasting condition. Immediately after that, they were fed 5 slices of WB (weighing 97.84 g and providing 50 g carbohydrate). The blood collection were repeated after at 1, 2 and 3 hrs of WB ingestion. Similarly, within a period of 2 week, the subjects were fed approximately 5 slices of WBB

(weighing 104.40 g and providing 50 g carbohydrate) and blood was collected in similar fashion. Blood glucose level was measured for each sample collected and blood glucose response curve was plotted.

The standard SPSS program was run to analyse the data. All the data were tested for significance using the ANOVA/ Duncan's test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Table 2: Fasting and Postprandial as well as Percent Change in Blood Glucose Levels After Feeding White Bread

n=20

Group	Fasting	1 hr	% ch (1 hr)	2 hr	% ch (2 hr)	3 hr	% ch (3 hr)
Male (15)	161.07 ^a ± 20.16	302.31 ^a ± 21.80	102.30 ^a ±10.72	264.35 ^a ± 31.96	-15.71 ^a ± 4.97	194.00 ^a ± 29.52	-29.43 ^a ± 3.15
Female (5)	167.52 ^a ± 32.70	317.43 ^a ± 35.32	100.78 ^a ± 19.20	262.84 ^a ± 41.20	-18.44 ^a ± 5.00	190.72 ^a ± 28.32	-27.29 ^a ± 2.73
Total (20)	162.68 ^a ± 16.77	306.09 ^a ± 18.18	101.92 ^a ± 9.10	263.97 ^a ± 25.57	-16.39 ^a ± 3.88	193.18 ^a ± 22.89	-28.90 ^a ± 2.43
'F' Value	1.55 ^{NS}	1.61 ^{NS}	0.17 ^{NS}	1.00 ^{NS}	0.26 ^{NS}	0.60 ^{NS}	0.44 ^{NS}

NS = Non significant, % ch = Percent change, Values are Mean±SEM
Means bearing the same superscript within the column do not differ significantly (p ≤ 0.05)
Values in parentheses indicate number of subjects

Results for fasting and postprandial blood glucose levels (1 hr, 2 hr and 3 hr) as well as percent change in blood glucose levels after the ingestion of WB are presented in Table 2. Both male and female diabetic groups showed more or less similar increase in percent glucose at the end of one hour. The reason for the increase is well known that after ingestion

of food, by about 1 hr the blood glucose level is increased to the maximum. An average fall of 42.12 mg in blood glucose levels was found between 1 hr and 2 hr. The blood glucose level did not come back to their fasting concentrations even at 3 hr postprandial due to diabetes.

Table 3: Fasting and Postprandial as well as Percent Change in Blood Glucose Levels After Feeding Wheat Bran Bread

n=20

Group	Fasting	1 hr	% ch (1 hr)	2 hr	% ch (2 hr)	3 hr	% ch (3 hr)
Male (15)	166.70 ^a ± 16.75	248.67 ^{ab} ± 16.33	55.56 ^a ± 7.37	216.19 ^a ± 24.28	-15.60 ^a ± 5.35	197.39 ^a ± 22.36	-7.82 ^a ± 2.70
Female (5)	174.61 ^a ± 32.53	306.59 ^b ± 35.36	84.37 ^a ± 16.20	267.45 ^a ± 33.45	-13.01 ^a ± 3.14	203.97 ^a ± 46.03	-27.33 ^a ± 7.39
Total (20)	168.67 ^a ±14.54	263.15 ^a ± 15.70	62.76 ^a ± 7.22	229.00 ^a ± 20.27	-14.95 ^a ± 4.05	199.04 ^a ± 19.70	-12.70 ^a ± 3.26
'F' Value	1.15 ^{NS}	2.91 ^{NS}	1.57 ^{NS}	1.87 ^{NS}	0.39 ^{NS}	1.30 ^{NS}	3.22 ^{NS}

NS = Non significant, % ch = Percent change, Values are Mean±SEM
Means bearing the same superscript within the column do not differ significantly (p ≤ 0.05)
Values in parentheses indicate number of subjects

Results for fasting and postprandial blood glucose concentrations as well as percent change in blood glucose concentrations at 1, 2 and 3 hrs after ingestion of WBB are presented in Table 3. Fasting blood glucose levels were found

similar to WB feeding time as the subjects again came back for the feeding trial within a period of one week. After 1 hr, the percent increase in blood glucose level was lower for WBB as compared to WB indicating the beneficial effect of wheat

bran supplementation. The 2 hr postprandial blood glucose level were reduced with an average percent decrease of 14.95%. Results for blood glucose levels are in concurrence with Dubois et al. (1995) who reported that adding oat bran to the test meals markedly reduced the post meal insulin rise ($p \leq 0.05$).

CONCLUSION

Considering the lower rise in blood glucose level for WBB in comparison to WB in, 7.5 percent wheat bran fortified bread may be recommended as a replacement for the commercially available white flour bread for the diabetic.

FUTURE SCOPE

Like bread other bakery products such as biscuits, cookies, cakes and pastries could be modified to make it useful for diabetics.

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