

Utility of Bran Products in Non Insulin Dependant Diabetes Mellitus (NIDDM) Patients

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ABSTRACT Bran is the waste material in the preparation of extruded products from millets. To develop a cheapest product for diabetic patients and to assess its impact on them was the major objective. Hence, bran products i.e. wheat, jowar and mixed bran were prepared and evaluated in terms of its effect on the blood glucose response among 40 to 50 years old non obese, non insulin dependent diabetes mellitus (NIDDM) patients. As compared to the different bran products, mixed bran papadi had found significant impact on reducing the blood glucose level among all the grades of diabetic patient.

INTRODUCTION

Bran of the millets is rich source of dietary fibre, which termed as complex unavailable polysaccharides. Due to higher viscosity, glycemic index and water holding capacity dietary fibres plays a key role in reduction of blood glucose level as well as insulin response. Easwaran et al. (1991: 46-47); and Kavitha et al. (2001: 101-103). It also lowers the level of cholesterol Potdar et al. (1994: 22-25) and decreases the risk of bowel disorders. People living with diabetes mellitus are highly susceptible to fraudulent therapies and remedies. Hence, there is a pressing need for valid therapeutic interventions. Keeping this in view the present study was designed to prepare the bran products from locally available cheapest source and assess its effect to the diabetic patients.

METHODOLOGY

The required quantity of jowar and wheat fresh bran was procured from the extruded product industries in local market of Kolhapur city. Jowar (100% jowar bran), wheat (100% wheat bran) and mix bran (45% jowar bran + 45% wheat bran + 10% fenugreek seed powder) papadi were the products made separately. All these bran were soaked separately in ½ litre lukewarm glass distilled water for 2.0 hours.

Salt and table spoon of cooking oil were added in the batter for taste. This batter was cooked separately till soft (45 minutes). The balls of 100 gm were prepared by pressing manually and made round on clean wet muslin cloth. These papadi, were spread on clean thick plastic transparent sheet and sun dried. After turning side of

papadi were again sun dried. These papadi were stored in sealed dry container.

The content of dietary fibres i.e. acid detergent fibre, lignin and cellulose from the bran products and diet mixture were estimated by using Van soest method (1970: 812-822).

The organoleptic characters like colour, texture, taste and overall acceptability of bran products were evaluated by selected expert panel by threshold test.

For the evaluation of efficacy of bran products, 45 non insulin dependent diabetes mellitus (NIDDM) non obese patients having range between 40 to 50 years of age were selected purposively from Kolhapur city. According to fasting blood sugar level, patients were categorized into three grades of hyperglycemia i.e. 1st above 120 to 170, IInd 171 to 221 and IIIrd above 221 blood sugar level mg/100 ml of blood. Again each grade of the patients was subdivided as per the dietary bran treatment given i.e. jowar bran, wheat bran and mixed bran.

The patients were provided dietary bran treatment for regular days with increasing level per month with their regular diet for three months. For the first month each grades of patients were given 10 gm of bran in the form of product i.e. papadi. This level of bran was increased to 20 gm and 30 gm for second and third months respectively.

Blood sugar level of each grade of patients was analysed by Folin WU method after bran dietary treatment, by keeping with a month of interval period. The values of their blood sugar level compared and analyzed statistically with their previous report by using Gomez and Gomez (1984: 201-222) method of analysis.

RESULTS AND DISCUSSION

The average values of dietary fibre (cellulose + lignin) contains in bran products were graphically presented in figure 1.

It indicated that, wheat bran papadi contains the higher (46.2 gm) dietary fibre which includes 32.1 of cellulose and 14.1 of lignin. Mixed bran papadi shows 43.7 gm dietary fibre with the combination of 35.9 gm cellulose and 8.0 gm lignin. Where as jowar bran represents 40.6 g dietary fibre which contains 28.8 cellulose and 11.8 gm of lignin.

The per cent score of the organoleptic evaluation of bran products can be seen from the pie figure 2. It highlighted that, wheat bran papadi found more accepted (i.e. 90.0%) by the panel

which includes 35.0, 29.0 and 26.0% qualities like taste, texture and colour respectively.

Mixed bran papadi score 76.0% of acceptance in terms of 30.0% taste, 25.0% texture and 21.0% colour. Where as jowar bran papadi obtained 79.0% of acceptability which measures 31.0% taste, 25.0% texture and 23.0% colour.

Table 1 gives an idea about the average intake of brans (gm) by the NIDDM patients.

It observed that, Group A which taken as jowar bran consumed 7.1 gm., 10.2 gm. and 16.3 gm of dietary fibre along with their regular diet for 1st, 2nd and 3rd months respectively. Group B who had treated with wheat bran, consumed dietary fibre for 1st month i.e. 8.4 gm, 2nd month i.e. 12.2 gm and 3rd month i.e. 16.8 gm with their regular diet. Group C was supplied with

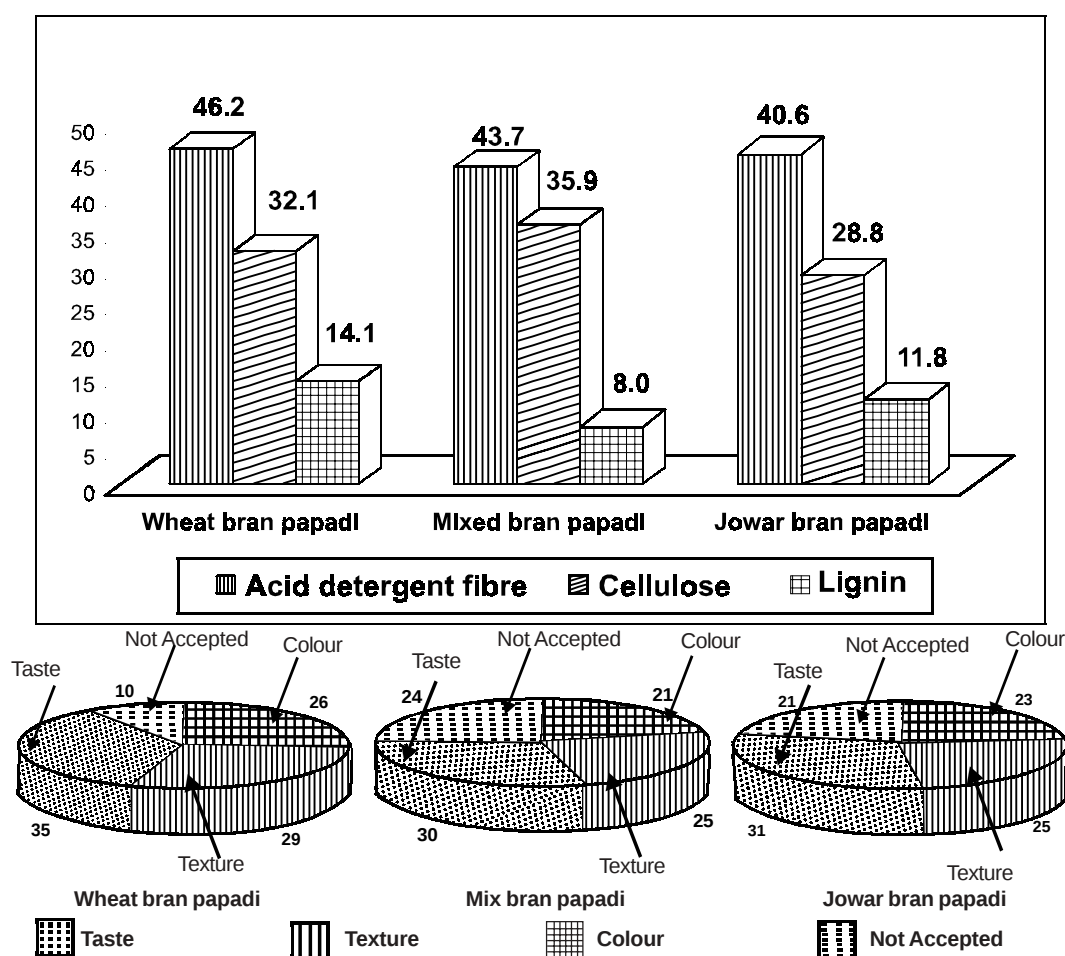


Fig. 2. Per cent score of organoleptic evaluation of bran products

Table 1: Average intake of dietary fibre by NIDDM patients

Intake of dietary fibre	NIDDM patients groups			'r' value
	Group A	Group B	Group C	
<i>1st Month</i>				
Regular diet	3.0	3.8	2.0	(0.002) NS
Supplementary	4.1	4.6	4.4	(0.001) NS
Total	7.1	8.4	6.4	(0.018) NS
<i>2nd Month</i>				
Regular diet	1.9	3.0	2.0	(0.003) NS
Supplementary	8.2	9.2	8.8	(0.002) NS
Total	10.1	12.2	10.8	(0.003) NS
<i>3rd Month</i>				
Regular diet	4.0	3.2	2.5	(0.019) NS
Supplementary	12.3	13.6	13.2	(0.001) NS
Total	16.3	16.8	16.7	(0.001) NS

NS – Non significant

dietary fibre in the form of mixed bran, they were taken 6.4 gm., 10.8 gm. and 16.7 gm. of dietary fibre including with their routine diet for 1st, 2nd and 3rd months respectively.

Efficacy of the bran products with the blood glucose response of the NIDDM patients can be measured from the Table 2. It was noticed that, jowar bran papadi lowered the blood glucose level as 168.0-156.0-143.0-135.0 mg from initial to 1st, 2nd and 3rd month of period among 1st grade of hyperglycemic patients. Wheat bran had shown (170.0 to 141.0 mg) decreasing level of blood sugar level. Where as mixed bran treatment reduced the blood sugar level from 170.0 to 128.0 mg during three months of

experimental period.

Jowar, wheat and mixed bran products were reported lowering blood glucose level among the 1st grade of hyperglycemia at the per cent of difference as 24.5, 20.5 and 32.8 respectively with their initial glucose level.

In the second grade of hyperglycemic patients jowar bran lowered 201.0 to 166.0, wheat bran decreased 215.0 to 200.0 and mixed bran reduced 218.0 to 162.0 mg of blood glucose level. Per cent of difference in lowering the blood glucose level were noticed as 21.1, 7.5 and 34.8 by jowar, wheat and mixed bran respectively.

Among the third grade of hyperglycemic patients, Jowar bran had found lowering the blood glucose level from 259.0 to 218.0 mg. Wheat bran had shown reducing the glucose level from 242.0 to 230.0 mg where as mixed bran was noticed to decrease the blood glucose level from 264.0 to 195.0 mg. Per cent difference of reducing blood glucose level among the 3rd grade of hyperglycemia bran papadi was shown as 18.8, 5.2 and 25.4 respectively.

In conclusion, it can be said that, mixed, jowar and wheat bran papdi, has tremendous positive effect to the lowering of blood glucose level. Among these three products mixed bran shows a significant impact for reducing the glucose level among all the three grades of hyperglycemia patients. The increasing level of bran treatment with increased period noticed non significantly with decreasing the per cent rate of blood sugar level.

Table 2: Effect of dietary fibre in blood glucose level of NIDDM patients

Group of NIDDM patients	Blood glucose level (mg/100 ml of blood) among different grades of hyperglycemic patients														
	I st grade (120 to 170)					II nd grade (171 to 221)					III rd grade				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Group A (Jowar bran)	168.0	156.0	143.0	135.0	24.5	201.0	189.5	170.0	166.0	21.1	259.0	243.8	230.0	218.0	18.0
Group B (Wheat bran)	170.0	159.5	151.9	141.0	20.5	215.0	210.0	204.0	200.0	7.5	242.0	238.9	235.0	230.0	5.2
Group C (Mixed bran)	170.0	162.8	150.2	128.0	32.8	218.0	200.5	187.5	162.0	34.8	264.0	234.8	212.5	195.0	25.4
CD	1.05	1.35	1.33	1.30		2.99	3.11	2.80	1.15		1.31	2.11	3.12	3.94	

(P < 0.05)

0: Initial level

1: 1st month,2: 2nd month3: 3rd month4: difference in per cent of rate between initial to 3rd month level of blood glucose.

REFERENCES

- Easwaran, P.P., Mageshwari, V.S. and Narayanan, G.: Therapeutic use of globe artichoke in non-insulin dependent diabetes mellitus and hypercholesterolemia. *Ind. J. Nutr. Dietet.*, **28(12)**: 321-327 (1991).
- Gomez, K.A. and Gomez, A.A.: *Statistical procedures for Agricultural Research*. Wiley International John Wiley and Sons, New York (1984).
- Kavitha, P, Easwaran, P. and Mageshwari, U.S.: Effect of different methods of cooking on the dietary fibre content of wheat and wheat products and their hypoglycemic effect on NIDDM patients. *Ind. J. Nutr. Dietet.*, **38(6)**: 173-181 (2001).
- Potdar, K. Mistra, M. and Yesikar: A study on the effect of soyabean, wheat bran and pyrodextrins on the blood sugar and lipid profile in obese diabetics; *Ind. J. Nutr. Dietet.*, **31(10)**: 299-302 (1994).
- Vansoets, P.G.: *Determination Of Dietary Fibre by Using Detergents, Spillar and Amman Book of Fibre in Human Nutrition*. 2nd Edn. Plenum Press, New York (1970).