

Diet Therapy

Q. Can one quantify the hypoglycemic effect of dietary fibre? Indicate your preference for commercial or natural fibre?

A. Therapeutic value of fibres became evident over the last decade. Beneficial effects of high fibre diet has been proved in number of studies. Diet should provide minimum 40 – 50g fibre or 25g/1000Kcal¹. It is the soluble fibres like gums pectins, mucilages and galactomanose which are beneficial. Presence of fibre delays absorption of glucose and nutrients and hence improves glycemic control. Table 1 summarize presently available data on this aspect.

Diet providing adequate from natural sources is effective and has no side effects on vitamin or mineral status. The measurable benefits appear to outweigh the side-effects. We can achieve a reduction upto 10% in fasting blood sugar and HbA_{1c} with the use of high fibre diet.

Studies showing hypoglycemic effect of fibre are summarized (Table – 2).

These days certain commercial/purified fibres are being marketed and used injudiciously. There are greater chances of GI distress, abdominal discomfort, flatulence and excess of these may alter availability of vitamin and minerals. Therefore, high fibre diet using commonly available natural foods contributing high complex carbohydrate to diet should be consumed. These

foods have an added advantage of providing proteins, vitamins and minerals.

HIGH FIBRE FOODS

CEREALS	WHEAT, BAJRA, RAGI, OATS
PULSES	BENGAL GRAM WHOLE, GREEN GRAM WHOLE, GREEN GRAM DHAL, RAJMAH, COWPEA, WHITE CHANA, MOTH DAL.
VEGETABLES	CLUSTER BEANS, OTHER BEANS, CUCUMBER, LEAFY VEGETABLE, CABBAGE, TOMATO.
FRUITS	GUAVA, RASPBERRIES, PLUMS, JAMBU FRUIT, PEAR, POMEGRANATE,
CONDIMENTS	FENUGREEK SEEDS, CUMIN SEEDS, CORIANDER SEEDS, GREEN CHILLIES.

Cautions While using high fibre foods

- People at risk of deficiency such as postmenopausal women, elderly or growing children may require supplements of Ca and trace minerals.
- People with upper GI dysfunction should be cautioned against a diet high in fibre.
- Careful attention must be paid to insulin dose because hypoglycemia can result if there is a radical change in fibre intake and insulin dose is not reduced appropriately. [I.K.]

TABLE – 1
BENEFITS OF FIBRE IN DIET

Type of fibre	Water insoluble Cellulose, Hemicellulose	Water Soluble Gums, Pectins, Mucilages
Benefits	<ul style="list-style-type: none"> ↑ Bulk of stool Regulation of Bowel Movement ↑ Satiety value 	<ul style="list-style-type: none"> ↑ Viscosity of foods ↓ Absorption of nutrients ↓ Post-prandial Plasma glucose ↑ Tissue insulin sensitivity. ↑ Insulin receptor number ↓ Serum cholesterol ↓ Fasting & PP Serum TG ↑ Satiety Value
Sources	Whole wheat products Bajra, Ragi, Maize	Oats, pulses, fruits & vegetables.

TABLE – 2

AUTHOR	YEAR	FIBRE	AMT/DAY	PATIENT TYPE	RESULTS
1. FUESSL et al	1986	GUAR GUM	15 g	NIDDM	10% ↓ F.B.S., ↓HbA1, TC AND LDL CHOLESTEROL
2. JONES et al	1985	GUAR GUM	10 g	NIDDM & IDDM	10% ↓ HbA1, NEED TO ↓ INSULIN DOSE IN IDDM AND SULPHONYLUREA THERAPY IN NIDDM
3. McIVOR et al	1985	GUAR GUM	30 g	NIDDM	NORMALISED CHO INTOLERANCE WITHOUT SERIOUS CONSEQUENCES
4. PAGANUS et al	1987	GUAR GUM	5% OF daily CHO	IDDM CHILDREN	↓ HbA1, IMPROVED GLYCOSURIA ↓ TC INDEX
5. PETERSON DB et al	1987	GUAR BREAD GRANULATED GUAR	7.6 g 8.3 g	NIDDM	8% FALL IN HbA1
6. OSILESI et al	1985	XANTHUM GUM	12 g	NIDDM	↓ FASTING AND PP SUGAR, FASTING AND TOTAL SERUM CHOL, VLDL AND TG
7. KARLSTORM et al	1987	LEGUMINOUS SEEDS	37 g of fibre from diet	NIDDM	IMPROVED GLYCEMIC CONTROL
8. CERUTTI et al	1987	VEG FROM DIET	66 g	IDDM	↓ HbA1, ↓ INSULIN REQM, MEAN DAILY BLOOD GLUCOSE VALUE
9. SHARMA et al	1990	FENUGREEK SEEDS	100 g	IDDM	↓ FBS, 54% ↓ 24 HRS. URINARY EXCRETION, ↓ TC, ↓ LDL AND ↓ VLDL
10. CHATERJEE et al	1992	PSYLLIUM FIBRE	7.5 g twice/day	NIDDM	↓ FBS, IMPROVED OGTT, ↓ LDL, ↓ TC

REFERENCES FOR FURTHER READING:

- Fuessi H.S., William G, Adrian T. E, and Bloom S. R. Guar sprinkled on food: effect on glycaemic control, plasma lipids and gut hormones in non-insulin dependent diabetic patients; *Diabetic Medicine*; 1987;4:463-8.
- Jones D. B. Lousley S. Jelfs R. et al. Low dose guar improves diabetic control. *Jr. Soc. Med* 1985;78:546-8.
- McIvor M.E., Cummings C. C. and Mendaloff A. I. Long term ingestion of guar gum is not toxic in patients with NIDDM : *Am J. Clin Nutr* 1985;41:891-4.
- Paganus A, Maenpaa J, Akerblom H. K. Beneficial effects of palatable guar and guar plus fructose diets in diabetic children. *Acta paediatr Scand.* 1987;66:76-81.
- Pererson D.B, Ellis P. R, Baylis J.M. et al Low dose guar in a novel food product. Improved metabolic control in non-insulin dependent diabetes. *Diabetic Med* 1987;4:111-5.
- Osilesi O, Trout D. L, Glover E.E. et al. Use of xanthum gum in dietary management of diabetes mellitus. *Am. J. clin Nutr* 1985;42:597-603.
- Karlstrom B. Vessby B. ASP N-G. Effect of leguminous seeds in a mixed diet in non-insulin dependent diabetic patients *Diabetes Res* 1987;5:199-205.
- Cerutti F, Vigo A, Guidoni C, et al. Usefulness and side effects of a high fiber diet in a group of adolescents affected by insulin-dependent diabetes mellitus (Fren) *Helv Paediatr. Acta* 1987;42:281-8.
- Sharma R. D, Raghuram T. C. Rao N.S. – Effect of fenugreek seeds on blood glucose and serum lipids in Type-I diabetes *Eur J. Clin. Nutr.* 1990;44:301-6.
- Chaterjee S, Sen A, Mookerjee G. C., Mukherjee K.C. The effect of psyllium fibre supplement on lipid profile in patients with NIDDM ; *Intl. J. Diab Dev. Countries* 1992;12:5-8.