The dietary fibre composition of supplements

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Abstract Six fibre supplement products available to the public without prescription were analysed for both the amount and detailed chemical composition of their dietary fibre content. When taken in quantities recommended by the manufacturers most supplements would not raise fibre intakes to levels considered conducive to good health. The chemical composition of the dietary fibre in the supplements varies and they may produce physiological effects which are neither predictable nor appropriate for the intended outcome. **(Aust J Nutr Diet 1991;48:25-6).**

Keywords: dietary fibre, fibre, supplements, pharmaceutical fibre preparations, dietary fibre intake.

Introduction

It is well known that the preferred way to obtain dietary fibre is from food. Dietary fibre contributes to the structure and texture of food, both of which play an important role in food acceptability and in producing appropriate physiological responses to ingested nutrients (1). Consumption of a wide variety of foods not only ensures an intake of a range of essential nutrients, but also provides a variety of fibre types.

Dietary fibre supplements are sometimes used in an effort to rectify dietary deficiency and sometimes for more specific therapeutic purposes. Therapeutic uses are predominantly in the management of constipation and haemorrhoidal disease (2) and they are also promoted as part of weight reduction programs although their effectiveness in this regard remains to be unequivocally demonstrated (3).

The potentially diverse physiological functions of different dietary fibre types (4,5) indicate the importance of defining the chemical nature of these supplements. Thus better therapeutic choices from the range of dietary fibre supplements may be possible if the chemical composition is known. With this knowledge, different supplements may be combined for closer approximation to the profile of fibre types available from food sources or to elicit a specific physiological response. We set out to examine the amount of dietary fibre present in commercial preparations and to define the chemical nature of the individual fibre components. We expect that this information will be of value in determining the most appropriate use for specific supplements.

Materials and methods

Six different products available 'over the counter' were purchased from pharmacies and all were available to the public without prescription. Approximately 50 g of each fibre preparation was ground to a fine powder. Sub-samples (300 mg) taken from thoroughly mixed samples were subjected to a detailed chemical analysis for dietary fibre using a slight modification of a technique developed at the Dunn Laboratory, Cambridge (6). This provides information on the amount of non-starch polysaccharides (NSP) together with the proportion of NSP that is insoluble (in phosphate buffer pH7). The polysaccharide contents are estimated from a quantitative analysis of the component monosaccharides by gas-liquid chromatography. Lignin was measured in a separate subsample using a gravimetric assay (7). Wheat bran from the American Association of Cereal Chemists (AACC, S. Paul, Minnesota) was used for the intra-laboratory quality control.

Results

The amounts and types of dietary fibre in each of the products are presented in Tables 1 and 2.

Discussion

Dietary fibre supplements are likely to be consumed in conjunction with a diet typically providing between 15 g and 25 g of dietary fibre per day (8,9), the estimated daily per capita intake range in the United Kingdom. Their regular use would increase the dietary fibre content to between approximately 17 and 37 g per day (Table 1). It has been postulated that a diet containing at least 37 g per day may be 'protective against some chronic diseases in Western societies' (10). Therefore it would appear that the regular use of most of these products would not be 'protective' when used at the levels recommended by the manufacturers.

Dietary fibre is, with the exception of lignin, largely composed of polymers of sugars and sugar acids. The predominant types are those based on hexose sugars (hexosans) e.g. cellulose, those based on pentose sugars (pentosans) such as the so-called hemicelluloses, and polymers comprising largely sugar acids (uronans and others) like the pectins. Some fibre preparations are used because of their purported laxative effect (11) and pentosans are more effective in increasing faecal weight than are cellulose and pectins (4). The amount of pentosan-containing fibre in the pharmaceutical preparations varies widely (Table 2) and their effect on faecal weight may therefore be disparate. It would be expected that those preparations that contribute little to the pentosan intake, such as Granocol or Normacol, would not be as effective in increasing faecal weight as would Fybogel which contains significant amounts of pentosan from ispaghula husk.

It is evident that dietary fibre may be important in the dietary management of some diseases but it is less clear what is the role of individual fibre components in the aetiology of disease. Different types of dietary fibre exert different effects, for example pectin, oat bran and viscous gel-forming fibres increase bile acid

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excretion but wheat bran does not (12). This diversity of effect is reflected in the chemical composition of dietary fibre from different sources (Table 1). Until more is known about the relationship between gut physiology and dietary fibre composition, the regular use of fibre supplements may have effects for the individual which are not predictable or appropriate. For most people an increased consumption of cereals, fruits and vegetables remains the preferred way to raise fibre intake.

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Table 1. Total dietary fibre in some pharmaceutical products.

Product name	*Manufacturer*	*Stated biological source of dietary fibre*	*Suggested daily intake of product (weight[a])*	*Total dietary fibre (g) per 100g of product*	*Total dietary fibre (g) per suggested daily intake*
Fibyrax	Roussel	grains and citrus extract	2–4 tablets, 2–3 times daily (4.5 g)	35.0	1.6
Fybogel	Reckitt & Colman	ispaghula husk	1 sachet 2 times daily (9.2 g)	75.6	7.0
Fybranta	Norgine	bran	6–12 tablets daily (28.3 g)	19.1	5.4
Granocol	Schering	bassorit and cortex frangulae	1–2 teaspoonsful 2 times daily (13.4 g)	33.4	4.8
Metamucil	Searle	psyllium hydrophilic mucilloid	1 rounded tablespoonful 1–3 times daily (22.0 g)	55.0	12.1
Normacol	Norgine	sterculia and frangula	1–2 heaped 5 ml teaspoonsful, 1–2 times daily (12.9 g)	36.5	4.7
Wheat bran[b]	—	—	—	35.9	—

(a) Based on average of suggested intake.
(b) Soft white wheat bran is a reference material obtainable from the American Association of Cereal Chemists, St Paul, Minn, USA, and these data are given for comparison.

Table 2. Dietary fibre fractions in some pharmaceutical products (g fibre/100 g product).

	Insoluble dietary fibre[a]	*Soluble dietary fibre*	*Hexosans in dietary fibre*	*Pentosans in dietary fibre*	*Uronans in dietary fibre*
Fibyrax	32.2	2.8	11.1	17.1	3.8
Fybogel	33.0	42.5	7.7	63.4	4.0
Fybranta	17.6	1.4	4.8	12.8	0.5
Granocol	6.4	26.9	18.3	1.2	11.4
Metamucil	15.4	39.6	2.6	50.8	1.3
Normacol	4.4	32.0	19.4	1.3	14.1
Wheat bran[b]	31.3	4.5	9.4	22.5	0.7

(a) Includes lignin.
(b) See footnote (b), Table 1.