

Diet Therapy



FIBER IN THE DIET

By CORINNE H. ROBINSON*

PLANT FIBER is an essential constituent of the normal diet even though it has practically no nutritive value. It is not digested by the enzymes of the intestinal tract, but certain bacteria accomplish a softening and disintegration of the fibrous particles. Because of its hygroscopic effect, the proper amount of fiber gives suitable bulk and consistency to the fecal matter.

Considerable emphasis was placed some years ago on the need for roughage in the diet, but a survey of recent texts and dietary guides indicates only a cursory interest in this subject. Justifiably, it may be argued that any normal diet will provide sufficient bulk for laxation. Be that as it may, the purveyors of special dietary supplements or drugs are attaching great importance to the laxative properties of their products. The layman who has had little guidance in the planning of his diet from professionally trained persons succumbs to the claims made for these unnecessary, expensive, and sometimes dangerous products. It seems proper, therefore, briefly to review some of the essentials for the modification of the diet with respect to its fiber content.

TERMINOLOGY

A number of terms are used to describe indigestible carbohydrate residues. Among them are "roughage," "fiber," "cellulose," "unavailable carbohydrate," and "residue." These terms are not altogether synonymous.

The publication *Composition of Foods—*

*Raw, Processed, Prepared*¹ lists values for the fiber content of numerous foods. The values given refer to "that portion of the sample which resists solution when boiled in dilute acid and dilute alkali. It is made up largely of celluloses, hemicellulose, and lignin." These values are based, for the most part, on fresh, uncooked foods, whereas many vegetables and fruits are consumed only after cooking, which in turn may have brought about considerable disintegration. Moreover, the values for "crude fiber" do not give a quantitative expression of the nonutilized material in the gastrointestinal tract, inasmuch as the proportions of lignin, cellulose, and hemicellulose in the food may vary. Lignin is most resistant to bacterial decomposition, while the hemicelluloses are more readily attacked. A limited number of analyses of foods for their cellulose, hemicellulose, and lignin content have been reported.^{2,3}

Hosoi, Alvarez, and Mann⁴ reported the results of extensive studies on the amount of residue remaining in the intestine after digestion. On the basis of experiments on dogs, they found, as might be expected, that fruits gave large residues. Quite unexpectedly, unusually large residues also remained following the ingestion of milk, Swiss cheese, bread, potatoes, raw or soft cooked eggs, lard, butter, and lactose. Foods providing a minimum of residue included sucrose, dextrose, rice, farina, cottage cheese, meats, hard cooked eggs, and gelatin. When certain foods such as bread and milk, or egg in milk, were given in combination, the residue was found to be smaller than when one food alone was taken.⁵

The experiments cited above have been widely used as a basis for planning so-called

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“low-residue” diets. Unfortunately, there is no evidence which establishes that the same conditions apply in man as in the dog. There is consequently a wide divergence of opinion as to the proper foods for a “low residue” diet. Diets recommended by some are liberal in food choice and adequate in nutrition, while those described by others are greatly restricted and applicable for only short periods of time.

INCREASING THE FIBER CONTENT OF THE DIET

Any normal diet can be so planned that it will contribute sufficient amounts of roughage to maintain laxation. The daily need for “crude fiber” has been estimated by Cowgill⁶ to be about 90 to 100 mg per kilogram of body weight, or approximately 6 g per day for the adult. An example of the way in which cereals, fruits, and vegetables in any customary menu might contribute to such a fiber allowance follows:

		<i>Grams fiber¹</i>
Orange	1 medium	0.9
Apple	1 medium	1.5
Cabbage	1 serving	1.0
Potato	1 medium	0.4
Carrots, cooked	1 serving	0.8
Shredded wheat or Oatmeal	biscuit 1/2 cup	0.7
Whole wheat bread	2 slices	1.0
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		6.3

When the fiber content of a normal diet must be increased these suggestions may be helpful.

1. Whole grain breads and cereals should be substituted for fine grain breads and cereals.
2. Three to four servings of fresh, preferably raw, fruits with skins should be eaten each day. Some stewed fruits such as prunes and dried apricots or figs are also valuable. Thus, in meal planning fruit generally replaces the customary dessert.
3. Some vegetables should be eaten raw. It is a good plan to include a salad at noon and one in the evening.

Not all persons tolerate fiber equally well. Small amounts of bran may be helpful to some, but others may find it to be especially irritating.

Milk, cheese, eggs, and meat rightly belong in the diet of increased fiber content. It is erroneous to call such foods constipating.

They are, to be sure, concentrated foods without fiber, but they are essential components of a nutritionally adequate diet. It may be pointed out, in passing, that these foods are excellent sources of the B-complex vitamins which have a role in the maintenance of normal gastrointestinal tone.

It goes without saying that other factors, such as liberal fluid intake, regularity of habits, adequate rest, exercise, and relaxation also bear emphasis when the need arises.

DECREASING THE FIBER CONTENT OF THE DIET

The bland diet described fully in an earlier paper of this series⁷ may be used as a basis for planning a diet of moderately reduced fiber content. Such an allowance of food may be given in three or six meals as the situation warrants. A diet which is severely restricted in fiber is often indicated for severe diarrhea or following some surgical procedure. Whole grain cereals and breads, fruits, and vegetables are not used in such a regimen. It is also believed that milk may increase the intestinal residue; therefore, the recommendation is frequently made that milk be boiled, combined with other foods, or omitted entirely. Obviously, any diet in which these essential foods are omitted is nutritionally inadequate, and therefore should be used for only a few days unless supplemented with vitamins and minerals. The following plan may serve as a starting point for the planning of a diet which is greatly reduced in residue.

<i>Suggested Meal Pattern</i>	<i>Sample Menu</i>
<i>Breakfast</i>	
Strained fruit juice	Strained orange juice
Refined cereal with cream and sugar	Cream of wheat with cream and sugar
Egg	Scrambled egg
White toast with butter	White toast with butter
Coffee	Coffee with cream, sugar
<i>Luncheon</i>	
Clear soup	Beef broth
Tender meat, fowl, fish, or egg	Roast beef
Potato, rice, macaroni, noodles	Baked potato (no skin) with butter
White bread with butter	Soft roll with butter
Plain dessert	Raspberry sherbet
Coffee or tea	Tea with sugar, lemon



Dinner

Clear soup or strained juice	Tomato juice
Tender meat, poultry, fish	Broiled chicken
Potato or substitute	Buttered rice
White bread with butter	Crusty white roll with butter
Plain dessert	Jello with Angel cake
Coffee or tea	Tea with sugar, cream

Note: Milk may be used as a beverage when it is tolerated.

Foods from Which to Choose

<i>Beverages:</i>	<i>Eggs</i> —not fried
Coffee	<i>Fats</i>
Tea	Butter, margarine, cream
Carbonated beverages	
Milk, as tolerated	<i>Fruits</i>
<i>Breads</i>	Strained juices only
Enriched white	<i>Meats</i>
Plain white rolls, soft or hard	Tender beef, veal, lamb, liver
Saltines	Chicken, turkey
Melba toast	Nonfatty fish
<i>Cereals</i>	<i>Soups</i>
Refined or strained cooked	Broth
Cornflakes, puffed rice, rice flakes	<i>Sweets</i> , moderate amounts only
Macaroni, rice, noodles	Sugar and sirup
<i>Cheese</i>	
Cottage, cream, mild cheddar in sauces	

Desserts

Plain cake and cookies	Jelly, honey Hard candy, gum drops
Plain gelatin	<i>Vegetables</i>
Puddings, custard, rennet desserts	White potato without skin
Ice cream	Strained juices

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