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Number 8-20

Composition of Foods:

Cereal Grains and Pasta

- Raw
- Processed
- Prepared

By Nutrition Monitoring Division

Principal Investigators:
Dennis L. Drake
Susan E. Gebhardt
Ruth H. Matthews

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Preface

Revising the major nutrient tables issued by the U.S. Department of Agriculture is necessary to provide current nutrient information on foods. This revision of the 1963 edition of Agriculture Handbook No. 8 is being issued in sections to expedite the release of data to the public. Each section contains a table of nutrient data for a major food group. The entire series will cover a wide range of food products.

To facilitate continuous, rapid updating, each section of the handbook is being prepared in looseleaf form. Each page in the table contains the nutrient profile of a single food item given on the basis of 100 grams of food, in two common measures, and in the edible portion of 1 pound (453.6 grams) as purchased. This format permits a concise presentation of the data and a comparison of values from one unit of measure to another.

The scope of the nutrient listing has been enlarged. Values are provided for refuse, energy, proximate composition (water, protein, fat, carbohydrate, and ash); nine mineral elements (calcium, iron, magnesium, phosphorus, potassium, sodium, zinc, copper, and manganese); nine vitamins (ascorbic acid, thiamin, riboflavin, niacin, pantothenic acid, vitamin B-6, folacin, vitamin B-12, and vitamin A); individual fatty acids; total saturated, monounsaturated, and polyunsaturated fatty acids; cholesterol; total phytosterols; and 18 amino acids.

The nutritive values contained in the handbook reflect the increasing information available on nutrients and food products. Our goal is for the revised and enlarged compilation of data to meet the requirements for reliable food composition values, which are basic to nutritional and dietary evaluation.

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Foreword

Agriculture Handbook No. 8 represents a traditional function of the U.S. Department of Agriculture (USDA). The development of the basic food composition tables used in the United States began more than 90 years ago. Data on the nutritive value of foods were first compiled and evaluated in the Department by W.O. Atwater in the 1890's. This nutrition pioneer organized and became the first director of the Office of Experiment Stations in USDA. In 1896, the now classic USDA Bulletin No. 28, "The Chemical Composition of American Food Materials," by W.O. Atwater and C.D. Woods, was published. This document was the first in a long series of food composition tables that have been issued by the Department.

The scope of succeeding tables has been expanded with the discovery of the presence and role of vitamins, minerals, and other dietary essentials in foods. Values from these tables have been used in many other compilations, both in this country and abroad. Nutritionists and scientists working in health-related fields depend on these composition data. Increasing emphasis on food and nutrition in national policies and programs has accelerated the need for comprehensive, up-to-date tabulations of the nutrient content of foods. USDA is continuing to expand and improve these food data. This publication is a major revision of the 1963 edition of USDA Agriculture Handbook No. 8, "Composition of Foods...Raw, Processed, Prepared," currently a basic source of food composition data in this country. Dr. Atwater stated in Bulletin No. 28, "This table is intended to replace previous ones and to serve as a standard reference until it shall in its turn be replaced by a larger and more complete compilation." This revision of Agriculture Handbook No. 8 will, in its turn, also be replaced. The task of deriving representative nutrient values of foods is a historical responsibility of USDA. The task is never ending and is essential in providing more complete knowledge so that we can use our food resources wisely.

Robert L. Rizek, Director
Nutrition Monitoring Division
Human Nutrition Information Service

Contents

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This is number 20 in a series of 22 publications designed to revise and expand the food composition tables published in the 1963 edition of Agriculture Handbook No. 8, "Composition of Foods...Raw, Processed, Prepared" (16).[1] This section was prepared to serve as a basic reference for data on the nutrients in cereal grains and pasta. The table was prepared with computer assistance, using the facilities of the Nutrient Data Bank (NDB) (5).

Nutrient data are presented for cereal grains; for various forms of flour, meal, bran, and germ, and for pasta products. The 90 cereal grain and pasta items in the 1963 edition of the handbook have been expanded to 118 in this revision. Several items included in the 1963 edition of the handbook were omitted because they are no longer commercially available.

Nutrient values presented in this revision supersede values for those foods given in previous publications of the Department of Agriculture.

Sources of Data

Data on cereal grains and pasta were compiled from published and unpublished sources. Sources of unpublished data include industry, government agencies, and studies conducted under contract with the Human Nutrition Information Service. Published sources consist of the scientific and technical literature.

Explanation of Table

Format

Foods in this table are divided into two major sections: Cereal Grains and Pasta. A guide containing the item name, corresponding item number(s) in the 1963 edition, the NDB number, and page number precedes the table.

The five-digit NDB number in the lower right-hand corner of each page is used for computer access to the data in the NDB and also refers to the food item on machine-readable data tapes. The NDB numbers are not necessarily consecutive. The first two digits designate the section or major food group for which the publication is issued, and the last three digits indicate the specific food.

Each page in the table includes the year of preparation. When the table is updated or expanded, new pages will be issued with instructions for insertion.

Weights and Measures

Data in column B are the sample means per 100 grams of edible portion. Values in column C are the sample standard errors, given to three decimal places. Column D contains the number of samples on which the values in columns B and C are based. If the number of samples from any data source used in the mean was one, a standard error cannot be given. For some foods and nutrients, means are given without the standard error and the number of samples. These values were calculated from another form of the food, were calculated from a similar food, or were based on a recipe.

Amounts in two common measures or market units are given in columns E and F. The amount in 1 pound (453.6 grams) of food as purchased is given in column G. Values in columns E, F, and G were calculated from the data in column B on the 100-gram basis given to three decimal places. Weights used to calculate the nutrient values in columns E and F appear at the head of the columns. All items reported in this table have refuse values of zero. U.S. Department of Agriculture Handbook No. 456 (AH-456) (1) and Home Economics Research Report No. 41 (4) were the basic references for weights of common measures. Other sources of information were industry and unpublished data. If information on a specific food was not available, the weights of common measures for a similar form of the food were used.

The number of decimal places for some nutrient data differs from that in the 1963 handbook. The number of decimal places shown is based on the number of decimals used in the bulk of the analytical data collected. The same number of decimal places for data on the 100-gram basis was carried for data given in other units of measure. The number of decimal places does not necessarily reflect the accuracy of the data. Because of rounding, a nutrient value may appear as a zero in some columns even though a greater value appears in other columns. Blanks indicate that no data were available for that nutrient in the particular food. Abbreviations used in the tables are defined in the appendix.

Nutrient data on some prepared cereal grain and pasta products were unavailable or incomplete. For these items, nutrient values were calculated from data on the dry forms by applying retention factors developed by the staff of the Human Nutrition Information Service (12).

Nutrients

Proximate components.--Proximate components include moisture (water), energy, protein, fat, carbohydrate, and ash. Food energy is expressed in terms of both kilocalories and kilojoules. One kilocalorie equals 4.184 kilojoules. The

[1] Underlined numbers in parentheses refer to literature cited, p. 6.

data are for physiological energy values and represent the energy value remaining after the losses in digestion and metabolism have been deducted from the gross energy. Calorie factors are based on the Atwater system for determining energy values. Details of the derivation of the calorie factors are outlined in Agriculture Handbook No. 74 (7).

Specific calorie factors used for cereal grain and pasta products are given in the appendix. Factors for cereal grain and pasta products containing more than one ingredient source of calories were derived by using estimates of the proportion of each ingredient with the appropriate energy factors for each ingredient.

Values for protein were calculated from determinations of the contents of nitrogen (N) in the food; conversion factors recommended primarily by Jones (6) were used. The specific factor applied to each food item is shown in the stub of the table of nutrient data following "Protein." Nitrogen-to-protein conversion factors for grains and pasta containing more than one source of protein were derived by estimating ingredient proportions and weighting factors for ingredients by the amount of protein contributed by each ingredient. The carbohydrate value is the difference between 100 and the sum of the percentages of water, protein, fat, and ash. The value for carbohydrate includes fiber. Values for crude fiber, if available, are given in the table. Values for total dietary fiber appear in the appendix (13).

Minerals.--Data on the content of nine mineral elements are included in the table. Zinc, copper, and manganese have been added to the minerals reported in the 1963 handbook. Most minerals were determined by AOAC methods (2). Phosphorus was determined colorimetrically; sodium and potassium were usually determined by flame photometry; and the remaining minerals were determined by atomic absorption and plasma emission spectrophotometry.

Analytical mineral values represent the total amount present in the food, including any added to the product in preparation for the retail market. The values do not necessarily represent the amounts of the mineral elements available to the body.

Vitamins.--Data on the content of nine vitamins are included in the tables. Ascorbic acid is present in very small amounts in cereal grain and pasta products and only a few values have been reported. When analytical values were not available the ascorbic acid content was assumed to be zero. Thiamin was determined chemically by the thiochrome procedure or by microbiological procedures. Fluorometric and microbiological methods were used to measure riboflavin.

Niacin values were obtained both chemically and microbiologically. The values for niacin do not include the niacin that could be derived from tryptophan, a niacin precursor. The sum of the preformed niacin and the amount that could be derived from tryptophan is called the "niacin equivalent." In estimating the amount of niacin available from foods, a mean value of 60 mg of tryptophan is considered equivalent to 1 mg of niacin (8).

Pantothenic acid and vitamin B-6 were determined microbiologically. Folacin values are total folate activity, in which bound folate is released by enzymatic treatment. Most analytical values shown for folacin were determined by the use of conjugase and *Lactobacillus casei*.

Vitamin B-12 is not present in cereal grain and pasta products except where an animal product (such as eggs) has been added. Vitamin B-12 values for cereal grains and pasta containing no dairy or egg products are assumed to be zero.

The vitamin A activity of cereal grains is due to the various provitamin A carotenoids that are present. Cereal grains, except for yellow corn, contain very low amounts of vitamin A. No preformed vitamin A (retinol) is present in cereal grain and pasta products unless a retinol-containing product, such as eggs, has been added. Vitamin A activity is expressed both as international units (IU) and as retinol equivalents (RE). One IU is equivalent to 0.3 mcg of retinol or 0.6 mcg of beta-carotene; one RE is equivalent to 1 mcg of retinol or 6 mcg of beta-carotene. One RE is equal to 3.33 IU of retinol or 10 IU of beta- carotene. Vitamin A values reported in the tables were obtained by the AOAC method (2).

Vitamin E values, if available, appear in the appendix as milligrams of alpha-tocopherol, the most active form of vitamin E. Vitamin E was determined by gas liquid chromatography and colorimetric methods.

Lipids.--Trivial or scientific names for the fatty acids have not been used because the values for the unsaturated acids include positional and geometric isomers. In the list of fatty acids, the first number is the number of carbon atoms, and the second is the number of double bonds in the chain. Only data from gas-liquid chromatographic analyses are included. The values shown are for the actual quantity of each fatty acid and do not represent fatty acid triglycerides. The number of samples refers only to the number of fatty acid observations, and no standard error is given.

Most fatty acid data were obtained as the percentage of fatty acid methyl esters. These data were converted to grams of fatty acid per 100 grams of total lipid by using the conversion factors given in the appendix. This conversion factor is defined as the weight of fatty acids in 1 gram of fat, and details of the derivation of lipid conversion factors have been published (17).

Values for total saturated, monounsaturated, and polyunsaturated fatty acids include individual fatty acids not reported in the table for many foods; therefore, they may exceed the sum of the individual fatty acids listed. If the actual sum of the individual fatty acids exceeds the stated

value for the total saturated, monounsaturated, or polyunsaturated fatty acids, the difference is due to rounding. Zero values for individual fatty acids should be understood to mean trace amounts of the individual fatty acid may be present. When grams of fatty acids per 100 grams of total lipid was converted to grams of fatty acids per 100 grams of food, converted values of less than 0.0005 were rounded to zero.

Cereal grain and pasta products, like all plant products, do not contain cholesterol unless products of animal origin are added. The cholesterol values in the table are means of data obtained by either colorimetric or gas-liquid chromatographic procedures. For cereal grains and pasta that contain only plant products, the value for cholesterol is assumed to be zero.

Amino acids.--The data were obtained primarily by ion-exchange chromatography. Amino acid contents of each item in grams per 100 grams were calculated by multiplying the mean amino acid contents per gram of nitrogen by the protein content divided by the nitrogen factor given in the table for that food item. The number of samples for an amino acid pattern on the per-gram-of-nitrogen basis is given the first time the pattern is used.

If amino acid values for an item with more than one protein containing ingredient were not available, amino acid values were calculated from the amino acid patterns of the various protein-containing ingredients. The amino acid contents for an item on a per-gram-of-nitrogen basis were calculated as the sum of the amino acids in each protein-containing ingredient multiplied by its proportion of the total nitrogen in the item.

Notes on Cereal Grains and Pasta

Federal Definitions and Standards of Identity have been promulgated for a number of cereal grain and pasta products appearing on the market today (14, 15).

Federal Enrichment Standards exist for farina, wheat flour, corn grits, cornmeal, rice, and macaroni and noodle products (14, 15). These standards do not mandate the enrichment of these items, but if the product is labeled as "enriched," specified nutrient levels must be present. Laws requiring enrichment of these products and other standardized foods are enacted at the State or territorial level rather than at the Federal level. Although many States do not require the enrichment of these products, national brands generally are enriched.

Federal standards specify enrichment levels or ranges for thiamin, riboflavin, niacin, and iron in most enriched products (14, 15). The Federal Enrichment Standard for riboflavin in enriched rice has been stayed since 1958, and hence riboflavin is not currently added to enriched rice.

Addition of calcium to most enriched products is optional, but if added must meet specified levels (14, 15). The current Federal Enrichment Standards are listed in the appendix.

In the tables, data are presented for the enriched forms of commonly enriched products. If available, values for thiamin, riboflavin, niacin, and iron in the unenriched forms of these products are footnoted.

Cooked items were prepared without added salt. If data were available for products cooked with added salt, the sodium value is given in a footnote.

Cereal grains.--The majority of the cereal grains included in the table are cultivated grasses belonging to the Gramineae family and are thus true cereals. Amaranth, buckwheat, and quinoa differ botanically from true cereals, and are referred to as pseudo cereals because they are grown and used like cereal grains (3). Arrowroot flour and tapioca, which are derived from non-cereal-grain plants, are also used in ways similar to cereal grains.

With the exception of corn (maize), which is native to the Americas, all true cereal grains originated in Europe and Asia (3). Buckwheat is native to central Asia. Amaranth and quinoa are native to Central and South America, respectively.

In the tables, cereal grain items are alphabetized by common name. The scientific name is given below the common name (at the top of the page) the first time the cereal grain appears. U.S. Department of Agriculture Handbook No. 505 (9) was used as the basic reference for the scientific names and preferred common names. Some common names are cross-referenced in the guide.

Data are presented first for the whole-grain, raw form of the cereal grain, followed by various products from that particular cereal grain from the least processed to the most processed form. Bulgur, couscous, farina, and semolina are all derived from wheat, but each is listed independently in the tables for ease of location by the user.

The term "whole-grain" refers to the entire cereal grain without the hull but with the bran, endosperm, and germ components intact. Although barley, oats, rice, and buckwheat are harvested with the hull intact, the hull is not edible and the initial listing is for the dehulled form. Although nutrient data were available for several cultivars of some cereal grains, the data base for any one cultivar was too small to justify giving separate entries by cultivar.

Cereal grains are not commonly consumed in the whole-grain, raw form, but usually undergo various degrees of milling or other processing. Nutrient data for different forms and products of each cereal grain were not obtained from the same sample. For example, a single sample of wheat was not analyzed in all forms given in the tables: whole-grain, bran, germ, and various flour products. The data were obtained from many sources and are affected by different variables: growing locations, crop years, cultivars, natural variability, milling and processing techniques, laboratories,

and possibly methods of analysis. Therefore, in a comparison of different forms and products of a cereal grain, nutritional differences may not measure precisely the effect of processing or preparation methods.

Kasha, a buckwheat product, originated in Russia. Buckwheat groats, which are roasted to develop a distinctive nutty flavor, may be packaged in the whole form or milled to either coarse, medium, or fine granulations. Kasha is usually cooked as a hot cereal or prepared in combination with other foods.

Corn and corn products appearing in this section are restricted to field corn varieties and do not represent the varieties (sweet corn) used mainly as a vegetable.

Corn and cornmeal products are available in white, yellow, and blue varieties. Yellow corn varieties have higher vitamin A values due to the presence of provitamin-A carotenoids. With the exception of vitamin A, the nutrient compositions of white and yellow corn are similar. Data presented in the tables for corn and cornmeal products represent both white and yellow varieties. Vitamin A values for yellow varieties are usually included in the tables, and values for white varieties are footnoted. Nutrient data for blue corn varieties are not currently available.

Self-rising cornmeals and wheat flours have more calcium, phosphorus, and sodium because of the addition of chemical leavening agents and salt. Sodium bicarbonate, monocalcium phosphate, sodium acid pyrophosphate, and sodium aluminum phosphate are the most commonly used leavening agents. Salt is also usually added to self-rising products for seasoning. Bolted cornmeal has had most of the bran removed during milling, but contains most of the germ present in the whole-grain corn.

Masa corn flour is milled from corn which has been steeped in a lime (calcium hydroxide) solution. This is done both to facilitate the removal of the outer hull of the corn grain and to impart the characteristic flavor of authentic corn tortillas and other related products. As a result of the use of lime in processing, masa corn flour is higher in calcium than other corn products.

Brown rice has the bran layers intact. Rice that has been milled to remove the bran layers is referred to as white rice in this publication.

Bulgur, a wheat product, has been produced in the Middle East and northern Africa since ancient times. Bulgur is produced by parboiling, drying, and then cracking wheat. It is usually consumed as a cooked cereal or as an ingredient in other dishes.

Couscous is coarse-ground wheat endosperm made from durum wheat or another hard wheat variety. Couscous is a popular food in northern Africa and in the Middle East. It is usually eaten as a hot cereal or combined with other foods.

Wheat flour tortilla mix is used for making flour tortillas and other related products. Components of the mix are footnoted in the table. This product is higher in calcium than other wheat flour products because calcium carbonate is added.

Bread flour is milled primarily from hard wheats. Cake flour is milled from soft wheats. Semolina is coarse-ground endosperm from durum wheat, and is used chiefly for making pasta.

Corn grits, farina, rolled oats or oatmeal, and toasted wheat germ were included in the Breakfast Cereals section of Agriculture Handbook No. 8 (10). Data for these items have been reprinted in this section for the user's convenience.

Pasta.--The first three items listed in the pasta section are not defined by Federal Standards of Identity and thus are listed independently from the other pasta items in the section.

Corn pasta is available on the market to meet the needs of those who are allergic to wheat and hence must avoid foods containing wheat ingredients. Corn pasta is made exclusively from corn flour. Since it contains no wheat flour ingredients, corn pasta is not required to meet Federal standards for macaroni or noodle products.

Fresh-refrigerated pasta has a higher moisture content than dry pasta and must be kept under refrigeration until prepared. Data are presented for plain and spinach types, both of which contain egg.

Interest in homemade pasta has increased in recent years. Data are presented for the cooked forms of both egg-containing and non-egg-containing homemade pasta. The recipe used for each item is footnoted.

The remaining pasta items in the tables are divided into three major sections: macaroni, noodles, and spaghetti. Within each section, the most common market form of the item is listed first. Various other forms of each item are then listed in alphabetical order.

Under Federal Standards of Identity, there are two broad categories of pasta products: macaroni and noodle products (15). Macaroni products are available in a variety of shapes and sizes including elbows, spirals, shells, twists, wheels, etc. Specific shapes of macaroni products have unique names such as rigatoni, manicotti, ziti, linguini, and spaghetti.

Although spaghetti is defined under Federal standards as a macaroni product, it is included as a separate category in this section due to its unique market identity. However, the nutrient composition of spaghetti and that of other forms of macaroni products are the same on an equal weight basis.

Noodle products are also available in a variety of sizes and shapes. Federal Standards of Identity specify that noodle

products must contain not less than 5.5 percent by weight of the solids of egg or egg yolk (15).

Various forms of vegetable macaroni and noodle products are available today. Federal standards specify that these products must contain a minimum of 3 percent by weight of the solids of tomatoes (red varieties), artichoke, beet, carrot, parsley, or spinach (15). Spinach noodles and tricolor-type (red, green, and regular) macaroni are the most commonly available products of this type on the market.

Protein-fortified macaroni products, both with and without added vegetable solids, are also available. These products usually contain wheat germ, dried yeast, or other ingredients which increase the protein content of the product. If a macaroni product is labeled as "with Fortified Protein," under Federal standards it must have a protein content of at least 20 percent on a 13-percent moisture basis and protein quality not less than 95 percent of that of casein (15).

Oriental noodles do not fall under Federal Standards of Identity. Although these products may be labeled as noodles, they usually do not contain eggs. Nutrient data for most Chinese-style pasta products are not currently available. Chinese cellophane noodles, also called long rice noodles, are made from mung bean flour and were included in the Legumes and Legume Products section of Agriculture Handbook No. 8 (11). Data for cellophane noodles are reprinted in this section for the user's convenience.

Several Japanese noodles are available on the U.S. market. Soba noodles are made with buckwheat flour. Somen is a thin wheat flour noodle.

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Appendix

List of Abbreviations

approx	approximately
c	cup
g	gram
IU	international units
kcal	kilocalories
kJ	kilojoules
lb	pound
mcg	micrograms
mg	milligrams
N	nitrogen
NDB	Nutrient Data Bank
No.	number
oz	ounce
pkt	packet
RE	retinol equivalents
tbsp	tablespoonful
tsp	teaspoonful

Standards For Enrichment[1]

Item	Thiamin	Riboflavin	Niacin	Iron	Calcium
		Milligrams per pound of product			
Enriched flour	2.9	1.8	24	20	[2]960
Enriched self-rising flour	2.9	1.8	24	20	960
Enriched farina	2.0-2.5	1.2-1.5	16-20	13-([3])	[2]500
Enriched cornmeal and grits	2.0-3.0	1.2-1.8	16-24	13-26	[2]500-750
Enriched self-rising cornmeal	2.0-3.0	1.2-1.8	16-24	13-26	[2]500-1,750
Enriched rice	2.0-4.0	[4]1.2-2.4	16-32	13-26	[2]500-1,000
Enriched macaroni and noodle products	4.0-5.0	1.7-2.2	27-34	13.0-16.5	[2]500-625

[1] A range of figures are minimum and maximum levels. A single figure is the minimum level, with overages left to good manufacturing practice.
[2] Calcium enrichment is optional for these products.
[3] There is no maximum enrichment level for iron in farina.
[4] The enrichment standard for riboflavin in enriched rice has been stayed since 1958.

Specific Factors Used for Calculating Energy Values

Food	Protein	Fat	Carbohydrate
		kcal/g	
Cereal Grains:			
Amaranth	3.47	8.37	4.07
Arrowroot flour	2.78	8.37	4.03
Barley	3.55	8.37	3.95
Barley, pearled	3.55	8.37	3.95
Buckwheat	3.37	8.37	3.78
Buckwheat groats, roasted	3.37	8.37	3.78
Buckwheat flour, whole-groat	3.37	8.37	3.78
Bulgur	3.59	8.37	3.78
Corn	2.73	8.37	4.03
Corn bran, crude	1.82	8.37	2.35
Corn flour, whole-grain	2.73	8.37	4.03
Corn flour, masa	2.73	8.37	4.03
Corn grits	3.46	8.37	4.16
Cornmeal, whole-grain	2.73	8.37	4.03
Cornmeal, degermed	3.46	8.37	4.16
Cornmeal, self-rising, bolted	2.73	8.37	4.03
Cornmeal, self-rising, bolted, with wheat flour added	3.13	8.37	4.06
Cornmeal, self-rising, degermed	3.46	8.37	4.16
Cornstarch	3.46	8.37	4.16
Couscous	4.05	8.37	4.12
Farina	4.05	8.37	4.12
Hominy, canned	3.46	8.37	4.16
Millet	3.87	8.37	4.12
Oats	3.46	8.37	4.12
Oat bran	1.82	8.37	2.35
Oats, rolled or oatmeal	3.46	8.37	4.12
Quinoa	3.47	8.37	4.07
Rice, brown, long-grain	3.41	8.37	4.12
Rice, brown, medium-grain	3.41	8.37	4.12
Rice, white, long-grain	3.82	8.37	4.16
Rice, white, medium-grain	3.82	8.37	4.16
Rice, white, short-grain	3.82	8.37	4.16
Rice, white, glutinous	3.82	8.37	4.16
Rice, white, with pasta and seasonings	3.87	8.37	4.14
Rice bran, crude	1.82	8.37	2.35
Rice flour, brown	3.41	8.37	4.12
Rice flour, white	3.82	8.37	4.16
Rye	3.05	8.37	3.86
Rye flour, dark	2.96	8.37	3.78
Rye flour, medium	3.23	8.37	3.99
Rye flour, light	3.41	8.37	4.07
Semolina	4.05	8.37	4.12
Sorghum	0.91	8.37	4.03
Tapioca, pearl, dry	2.78	8.37	4.03
Triticale	3.32	8.37	3.82
Triticale flour, whole-grain	3.32	8.37	3.82
Wheat, hard red spring	3.59	8.37	3.78
Wheat, hard red winter	3.59	8.37	3.78

Specific Factors Used for Calculating Energy Values--Con.

Food	Protein	Fat	Carbohydrate
		kcal/g	
Cereal Grains, con.:			
Wheat, soft red winter	3.59	8.37	3.78
Wheat, hard white	3.59	8.37	3.78
Wheat, soft white	3.59	8.37	3.78
Wheat, durum	3.59	8.37	3.78
Wheat bran, crude	1.82	8.37	2.35
Wheat germ	3.59	8.37	3.78
Wheat flour, whole-grain	3.59	8.37	3.78
Wheat flour, white, all-purpose	4.05	8.37	4.12
Wheat flour, white, bread	4.05	8.37	4.12
Wheat flour, white, cake	4.05	8.37	4.12
Wheat flour, white, self-rising	4.05	8.37	4.12
Wheat flour, white, tortilla mix	4.05	8.37	4.12
Wheat, sprouted	3.59	8.37	3.78
Wild rice	3.55	8.37	3.95
Pasta:			
Corn	2.73	8.37	4.03
Fresh-refrigerated, plain	3.93	8.41	4.09
Fresh-refrigerated, spinach	3.88	8.41	4.08
Homemade, made with egg	3.93	8.41	4.09
Homemade, made without egg	3.91	8.37	4.12
Macaroni	3.91	8.37	4.12
Macaroni, protein-fortified	3.91	8.37	4.12
Macaroni, vegetable	3.86	8.37	4.11
Macaroni, whole-wheat	3.59	8.37	3.78
Noodles, egg	3.93	8.41	4.09
Noodles, egg, spinach	3.88	8.41	4.08
Noodles, Chinese, cellophane or long rice, dehydrated	3.47	8.37	4.07
Noodles, Chinese, chow mein	3.93	8.37	4.12
Noodles, Japanese, Soba	3.37	8.37	3.78
Noodles, Japanese, Somen	3.91	8.37	4.12
Spaghetti	3.91	8.37	4.12
Spaghetti, protein-fortified	3.91	8.37	4.12
Spaghetti, spinach	3.86	8.37	4.11
Spaghetti, whole-wheat	3.59	8.37	3.78

Dietary Fiber Contents of Selected Cereal Grains and Pasta

Food item	Total Dietary Fiber (AOAC)
	g/100 g edible portion
Cereal Grains:	
Amaranth	15.2
Arrowroot flour	3.4
Barley	17.3
Barley, pearled, raw	15.6
Bulgur, dry	18.3
Corn bran, crude	84.6
Corn flour, whole-grain	13.4
Cornmeal:	
Whole-grain	11.0
Degermed	5.2
Cornstarch	.9
Farina:	
Dry	2.7
Cooked	1.4
Oat bran, raw	15.9
Oats, rolled or oatmeal, dry	10.3
Rice, brown:	
Long-grain, raw	3.5
Long-grain, cooked	1.7
Rice, white:	
Long-grain:	
Regular, raw	1.0
Parboiled:	
Dry	1.8
Cooked	.5
Precooked or instant:	
Dry	1.6
Cooked	.8
Medium-grain, raw	1.4
Glutinous, raw	2.8
Rice bran, crude	21.7
Rice flour:	
Brown	4.6
White	2.4
Rye flour, medium or light	14.6
Semolina	3.9
Tapioca, pearl, dry	1.1
Triticale	18.1
Triticale flour, whole-grain	14.6
Wheat bran, crude	42.4
Wheat germ:	
Crude	15.0
Toasted	12.9
Wheat flour:	
Whole-grain	12.6
White, all-purpose	2.7
Wild rice, raw	5.2

Dietary Fiber Contents of Selected Cereal Grains and Pasta, Con.

Food item	Total Dietary Fiber (AOAC)
	g/100 g edible portion
Pasta:	
Macaroni (see Spaghetti)	
Macaroni, protein-fortified, dry	4.3
Macaroni, vegetable, dry	4.3
Noodles, egg:	
Dry	2.7
Cooked	2.2
Spinach, dry	6.8
Noodles, Chinese, chow mein	3.9
Noodles, Japanese, Somen, dry	4.3
Spaghetti or macaroni:	
Dry	2.4
Cooked	1.6
Spaghetti, spinach, dry	10.6
Spaghetti, whole-wheat, dry	11.8

The Vitamin E Content of Selected Cereal Products

Food Item	Alpha-tocopherol
	mg per 100 g
Barley	0.57
Barley, pearled, raw	.02
Bulgur, dry	.06
Corn	.49
Corn grits:	
Dry	.12
Cooked	.02
Cornmeal, degermed	.15
Cornstarch	.00
Farina, dry	.11
Millet, raw	.05
Oats	1.09
Oats, rolled or oatmeal, dry	1.51
Rice, raw:	
Brown	.68
White	.11
Rye	1.28
Rye flour:	
Dark	1.41
Medium	.79
Light	.43
Semolina	.26
Triticale	.90
Triticale flour	.20
Wheat	1.01
Wheat bran	1.49
Wheat flour:	
All-purpose:	
Bleached	.03
Unbleached	.25
Cake	.04
Wheat germ	14.07