8-1928

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The Health Value of Whole Grains
(Quick Breads and Cookies)

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The grains are more widely distributed than any other one food. Thirty-five to forty-five per cent of the diet of Americans and Europeans is made of grain products. In this country grains vie with potatoes for a place on the menu. About 35 per cent of the diet of the Chinese and Japanese is rice. The southern negro's main food is cornmeal. The grains are truly the "staff of life."

The importance of the grains as a food staple was emphasized at the time of the World War. The supply of grains, especially wheat, was carefully guarded. Its control and use for food by the warring nations was an important factor in winning the war. Everyone remembers how grain products, particularly white flour, were rationed.

Importance of Grains as Food

During the early history of this country grains were eaten almost entirely as a whole or coarsely ground meal. They were produced in comparatively small amounts. The country was thinly populated. The modern milling industry was not developed.

As population has increased there has been greater demand for grain, and better agricultural methods have produced great grain crops. The milling industry has grown along with the increased demand and supply. Grain can now be shipped and stored for long periods without deterioration.

The first manufactured whole grain products were often a complete loss. This was because the germ of the grain, particularly that of corn, contains oil. The oil would become rancid and very shortly the whole lot would be useless as food. Insects also were more likely to infest the whole grain products. Milling interests carried on many experiments in an attempt to meet these conditions. They found that by removing the bran and germ they could increase the keeping quality of grain products. As a result better shipping and storage facilities have been developed so that products can now be handled without a great chance of loss.
Other factors influenced the development of the grain refining processes, but one which perhaps had the most far reaching effect was the demand of the public for white flour. The market now supplies white flour, white rice, white cornmeal. There are two kinds of white flour, although they are commonly used interchangeably. There is yeast bread flour, which has a high per cent of gluten, and pastry flour, which has a high per cent of starch. The former is placed on the market after the careful blending of high gluten flours, chemical and baking tests. White flour, macaroni and rice have reached a high state of perfection as refined cereal products. None of these contains either bran or germ. White cornmeal is another refined cereal but it does contain some bran.

Grain Foods and Health

At the time this cereal refining was going on, men and women were studying food in relation to health. In the last 10 to 15 years research in this line has been intensive. It will continue to be, as great colleges, universities and the federal government appropriate money for the work. The facts are being determined by hundreds of experiments on animals, varying in size from the white rat to cattle, through successive generations in order to find how animal tissue responds to certain food combinations in the maintenance of life, high standards of health and reproduction of the species. These results are likely to hold true with humans. Whenever it has been possible without jeopardizing life or health and chances for improvement are great the facts determined on experimental animals have been tried on people. New authentic diet recommendations are the result of this kind of laboratory research.

The grains have been subjected to such tests and the following discussion gives some of the facts brought to light. These facts have a direct bearing on the well being of the family and therefore the alert homemaker will try to put them into practice in her home.

Manufactures have been quick to respond to the new discoveries of nutrition research workers. They are putting on the market whole grain products. Graham flour contains the bran and no germ, whole wheat flour contains both bran and germ. Part bran and all bran breakfast foods can be bought. Canned whole wheat, whole wheat crushed and shredded, are other forms. Entire wheat flour does not contain the germ but some bran. Generally oatmeal contains the bran and germ. Barley which is used in soups is the whole grain while pearl barley is only the inside of the grain.

White flour is a staple energy food in America and Europe. A greater quantity of it is consumed than of any other. There are, however very few foods that are as deficient in vitamins and minerals as white flour unless they be sugar, fat and starch.

Content and Food Value

The grains contain very little water.

The grains are rich in starch which is readily used by the body for heat and energy. Hundred-calorie portions of the more common grain products are as follows: graham and whole wheat bread, one thick slice;
Grains contain proteins which are valuable in body nutrition. Each grain contains a number of kinds of protein but not all grains contain the same kind. They are not complete proteins. McCollum found in experiments on cattle that corn protein was better than wheat protein. White flour protein is even more deficient than that of the whole grain.

Grain proteins cannot be used alone as the only source of protein food. A number of grain proteins used together will not make up the deficiencies of each other. It is necessary to go to other classes of food to do this. Milk is excellent to combine with grains to make up the protein deficiency of the latter. There are many grain and milk combinations which we accept without realizing how valuable they are from a nutrition standpoint: breakfast food and milk, bread and milk, bread made with milk.

The mineral supply in grains is found largely in the outer husk. Milling of the grains into refined cereals removes the husk and so reduces the amount of available mineral. Sherman found that three-fourths of the mineral was lost in milling of wheat into white flour. The whole grain has very little calcium but it is rich in phosphorous. It is rich also in iron but milling reduces the supply. Liberal use of the whole grain in the diet will serve as a valuable source of minerals. Sherman found in a study of 98 dietaries that one-half the iron needed was supplied from grain products. Rose found from a study of actual dietaries that the whole grains must be included if the diets were to be economical and contain a "liberal amount of iron."

Protein and iron are found combined in the bran and germ of the whole grain. Much of this is removed in milling. To test the value of grain iron in the development of the young the following experiment was carried out. A litter of eight white rats was divided into two groups of four. One was fed bread from white flour, the other bread from white flour and bran. At the end of four consecutive weeks a rat from each group was killed. It was found that those on the bread with bran increased in weight and that the amount and per cent of haemoglobin (where iron is used) increased in the blood.

The grain products, arranged in order of richness, yielding the greatest amounts of iron per 100-calorie portion are entire wheat grain, shredded wheat, oatmeal, whole wheat bread (milk and water), rice (brown).

The grain products, arranged in order of richness, yielding the greatest amount of calcium per 100-calorie portion are oatmeal, entire wheat grain, shredded wheat, buckwheat flour, whole wheat bread, white flour.

The products, arranged in order of richness, yielding the greatest amount of phosphorous per 100-calorie portion are entire wheat grain, oatmeal, shredded wheat, rye flour, whole wheat bread (milk), buckwheat flour, rice (brown).
The whole grains cannot be relied upon to furnish vitamins to the diet in large quantity because they are poor in them. The amount that is present is found mostly in the bran layer and in the germ which is removed in the milling. Whole grains are poor in Vitamin A and they contain no Vitamins C and D. Vitamin B is found in abundant amount in the whole grain. Vitamin E is found in the germ oil.

Dietary studies of inexpensive meals nearly always show that refined cereals are given a most prominent part. This means that the calories, protein and phosphorous are increased but not the calcium and iron, since the latter are found in the bran and germ. The use of whole grains will increase the amount of those in the diet. However, there will still be a calcium deficiency. Probably no diet has sufficient calcium without milk.

It is interesting to note conditions among people and animals that seem to show the effect of a one-sided grain diet. Records indicate that the grain eaters of Egypt had caries of the teeth. The Icelanders, until 50 years ago, had no grain in their diet. It was a monotonous diet, but they had sound, well built teeth. Within the last 50 years their food habits have been changed by the addition of grain to their diet. The condition of the teeth since then has become very bad. The non-civilized American Indian has suffered from decayed teeth since he received rations from the government which was a very one-sided diet of grains, potatoes, sugar and meat. The faulty diet seems to have made him susceptible to such diseases as tuberculosis. This trouble is not as prevalent among the citizen Indians who eat a better balanced diet.

Experiments on animals show that they will not develop normally, live a long life and reproduce on a diet of refined cereal, potatoes, meat and sugar. Many families in the United States attempt to live on a diet almost as limited as this. There is a question whether malnutrition among children, susceptibility to respiratory diseases, rickets and tooth decay is not due partly to the use of too much refined cereal product to the exclusion of other food which can be used to make up the deficiencies of the grains. The grains, whole and refined, are good food if their actual value is known and they are given their proper place in the diet.

Quick Breads and Cookies

There are two types of quick breads, batters and doughs. The batters are divided into pour batters and drop batters. The proportion of flour to liquid in pour batters is about equal; in drop batters, two to one. The proportion of flour to liquid in doughs is three to one or four to one.

Quick breads are cereal products since the main ingredient is flour. Although fat, eggs and milk increase the nutritive value, not enough of any one is used in a recipe to make quick breads serve as a well balanced diet.

All flours are not alike in their bread making qualities. Those that contain a high percent of gluten are the best for yeast bread. Those containing more starch are best for quick breads. While the two kinds of flour are on the market as bread and pastry flour, the tendency in many homes is to use one flour for most of the baking. As a result there are flours which are the result of the blending of the two kinds of flour in the mill. These flours are not so high in gluten or starch but that they will make excellent yeast bread and quick breads.
When barley, rye, cornmeal or graham flours are used for quick breads it may be necessary to change the plain recipe because these flours contain more cellulose and the quality of the gluten is not as good for bread purposes. These flours contain more moisture.

White flour is always sifted once for quick breads.

The amount of liquid used in bread making depends upon the kind of quick bread made, the amount of moisture in the flour and the kind of liquid. Milk makes a richer quick bread.

There are a few simple rules for the use of leavening agents which, if followed, will aid in a clearer understanding of different recipes and prevent failures. Use two level teaspoons of baking powder for every cup of flour if eggs are omitted from the recipe. Cut down the amount of baking powder one-half a teaspoon for every egg used after two eggs. Use one teaspoon of baking powder for every cup of flour when soda is used with sour milk, or molasses if no eggs are used. Use one-fourth to one-half teaspoon of soda to a cup of sour milk depending upon whether the milk is slightly turned or very sour.

Air and steam are leavening agents when incorporated in a dough mass. Example: popovers. Eggs are an aid in leavening a mixture because of the air that is incorporated with them and because of the elasticity they give to the dough. The whole egg may be beaten or the yolks and whites may be beaten separately and folded in. If eggs are not beaten they help to make a bread light because they make the cell walls of the mixture strong and so prevent the escape of some of the gas. Popovers are an example. Eggs increase the food value and improve the flavor of quick breads.

A quick bread which has only one tablespoon of fat to a cup of flour will not be rich. The fat may be increased two or three tablespoons. Pie crust dough is very rich and generally contains four tablespoons to a cup of flour. A pastry flour will make a more tender biscuit than a bread flour because it contains a small amount of gluten and a high percent of starch. The result is a “short” quick bread when a small amount of fat is used. Fat gives a more flaky biscuit if used cold. Fat increases the food value and flavor of quick breads.

One-fourth teaspoon of salt is used for every cup of flour for quick breads. If an unsalted fat is used the amount of salt may be increased to one-half a teaspoon.

There are two general methods of mixing quick breads. For the muffins method, sift the dry ingredients, add the liquid and the melted fat last. For the biscuit method, sift the dry ingredients, cut in the fat and add the liquid last.

Care must be used not to add too much liquid. It is easier to add liquid if the dough is too thick than to add flour if it is too thin, because the amount of baking powder is based on the flour and eggs (if used).

Biscuits are always more light if the ingredients are cold. Dough may be prepared in the morning, cut into biscuit, and placed in the ice box or cold basement until dinner time. Bake just in time to serve. The biscuit will have risen slightly while standing and will be very light when baked.

Quick breads require a hot oven in order to get quick action of the leavening agent before the heat sets the dough. After the quick bread has risen and started to brown the heat can be reduced. Popovers are put in hot iron pans in a hot oven. Waffles and cakes are cooked on hot griddles. The small breads bake quicker than the loaf breads. Bake muffins and biscuit 15 to 20 minutes, loaf breads 35 to 60 minutes. The quick breads are baked when they are well browned, are loose from the pan, and the inside is not sticky.
Quick Bread Recipes

Popovers

\[
\begin{align*}
\frac{1}{2} \text{ c. white flour} & \quad 2 \text{ eggs} \\
\frac{1}{2} \text{ c. whole wheat flour} & \quad 1 \text{ T. sugar} \\
\frac{3}{4} \text{ c. milk} & \quad 1 \text{ t. melted butter} \\
\frac{1}{4} \text{ t. salt} & \\
\end{align*}
\]

Combine ingredients. Beat mixture. Bake 15 minutes in hot greased cups. Popovers may be opened and filled with fresh fruit, jelly or whipped cream just before serving.

Plain Muffins

\[
\begin{align*}
2 \text{ c. flour} & \\
1 \text{ c. milk} & \\
2 \text{ T. melted fat} & \\
1 \text{ egg} & \\
\end{align*}
\]

Combine dry ingredients. Add beaten egg, milk and melted fat. Bake 20 minutes.

Muffin variations:
1. One cup rye, bran, whole wheat, graham or cornmeal flour may be used in place of one cup of white flour.
2. Fruit muffins: Add one-half cup of dates, figs or raisins with nut meats. One-half cup fine chopped apples, berries, cooked prunes or apricots may be used.
3. Chocolate muffins: Add one or two squares of melted sweet chocolate, or one-fourth cup cocoa.
4. Jelly muffins: Drop teaspoon of jelly on top of each muffin before baking.
5. Cheese muffins: Add one-half cup of grated cheese to the batter.
6. Corn muffins: Add one-half cupful of drained corn to the batter.

Graham Biscuit

\[
\begin{align*}
1 \text{ c. white flour} & \\
1 \text{ c. graham} & \\
\frac{3}{4} \text{ c. milk} & \\
4 \text{ T. baking powder} & \\
2 \text{ T. fat} & \\
\frac{1}{2} \text{ t. salt} & \\
\end{align*}
\]


Graham Biscuit Variations

1. Brown sugar loaf. Spread dough an inch thick in pan. Press into the top of the dough a layer of brown sugar, cinnamon and ground nuts. Bake 12 to 15 minutes.
2. Orange biscuit. Use orange juice in place of the liquid in the recipe. Add one tablespoon of grated orange rind. On top of each biscuit place a lump of fine-grained sugar dipped in orange juice, also gratings of the rind. Bake 12 to 15 minutes.
3. Parker House rolls surprise. Cut dough into individual biscuit. Fold the biscuit as for Parker House rolls. Place fried sausage in the fold. Bake 12 to 15 minutes. Serve hot.
4. Pan biscuit. Place individual biscuit in hot pan with small amount of fat. Brown biscuit on both sides. Cover while baking. Method to use in camping.

—Home Economics Department, State College.

Fruit Filling for Graham Biscuit

\[
\begin{align*}
1 \text{ c. brown sugar} & \\
3 \text{ T. butter} & \\
\frac{1}{2} \text{ c. water} & \\
\frac{1}{2} \text{ c. nuts (chopped)} & \\
\frac{1}{2} \text{ c. raisins or prunes} & \\
\frac{1}{2} \text{ t. cinnamon} & \\
\end{align*}
\]

Make a paste of ingredients. Spread on dough and roll and cut dough as for cinnamon buns.

Boston Brown Bread No. 1

\[
\begin{align*}
1 \text{ c. cornmeal} & \quad \frac{1}{2} \text{ c. sugar or 1 c. molasses} \\
1 \text{ c. graham} & \\
1 \text{ c. white flour} & \\
2 \text{ c. milk} & \\
1 \text{ c. chopped walnuts} & \\
2 \text{ T. fat} & \\
\end{align*}
\]

Sift baking powder with white flour. Combine sour milk. Melt the fat. Combine all ingredients. Place in a greased mold. Steam about two hours.
Brown Bread No. 2
2 c. sour milk or buttermilk  
1/2 c. brown sugar  
1/4 c. molasses  
3 c. graham flour  
2 c. white flour  
1 t. soda  
1 1/2 c. milk  
1 c. raisins  
Mix dry ingredients and add liquid. Steam.  
—Home Economics Department, State College

Date Bread
1 c. chopped dates  
3/4 c. boiling water  
3/4 c. sugar  
1 T. butter  
1/2 c. chopped walnuts  
1 egg  
1 1/2 t. soda  
1 1/2 t. salt  
1 1/2 t. vanilla  
1 1/2 c. flour  
Combine first two ingredients. Combine rest of ingredients as for graham bread. Bake slowly one hour.  
—Home Economics Department, State College

Graham Bread
2 c. graham flour  
2 c. white flour  
2 c. milk  
Beat the egg and add it to the milk and sugar. Sift the baking powder, salt with the white flour. Combine all ingredients. Bake one hour in hot oven. Makes two small loaves. Variations:
1. Add 1 1/2 cups of raisins.  
2. " 1 1/2 cups English walnuts or peanuts.  
3. " three-fourths cup each of raisins and walnuts.  
4. " one cup chopped floured dates.

Prune Nut Bread
3 c. graham flour  
1 c. white flour  
3/4 c. sugar  
1 1/4 t. salt  
6 t. baking powder  
1 egg (beaten)  
1-1/2 c. milk or water  
5 T. fat  
3/4 c. walnuts or peanuts  
Sift dry ingredients together, except graham flour. Cut in the fat. Add the liquid with egg. Dust the fruit and nuts with flour and add last.

Cookies
Bran Cookies
1 c. bran  
1/2 c. flour  
1/4 t. cloves, cinnamon, salt and soda  
1/4 c. molasses (sorghum)  
1 1/4 c. sugar  
1/2 c. fat  
1/2 c. milk  
Combine dry ingredients, add the milk and melted fat. Drop from spoon on greased cookie sheet. Bake.  

Bran Fudge Squares
1/2 c. white flour  
1/2 c. bran  
1/3 c. butter  
4 squares chocolate  
2 eggs  
1 1/4 c. sugar  
1 1/4 c. nut meats  
Bake 20 minutes in moderate oven.

Cocoanut Drops
1 c. shredded cocoanut  
2 c. corn flakes  
1/2 c. chopped nuts  
2 egg whites  
1/2 c. sugar  
Fold ingredients into stiffly beaten whites. Add nuts. Drop onto greased pan and bake in slow oven.  

Cocoanut Cream Cookies
1/2 c. white flour  
3/4 c. graham flour  
2 eggs (beaten)  
1 c. sugar  
1 c. cream (thick)  
1/2 c. shredded cocoanut  
1/2 t. salt  
Sift all dry ingredients together except graham flour and cocoanut. Combine ingredients. Bake in slow oven.
Graham Cracker Cookies

\[
\begin{align*}
\frac{1}{4} \text{ c. butter} & \quad \frac{1}{8} \text{ c. milk} \\
1 \text{ c. sugar} & \quad \frac{1}{2} \text{ c. flax} \\
\frac{1}{4} \text{ t. baking powder} & \quad \frac{1}{2} \text{ t. vanilla} \\
\frac{1}{4} \text{ c. nuts} & \quad 2 \text{ eggs}
\end{align*}
\]


Nut Squares

\[
\begin{align*}
\frac{3}{4} \text{ c. brown sugar} & \quad 1 \text{ c. chopped nuts} \\
\frac{3}{4} \text{ c. bran} & \quad 1 \text{ egg} \\
\frac{1}{4} \text{ t. soda} & \\
\end{align*}
\]

Beat the eggs, add rest of ingredients. Bake in thin layer. Cut in squares while hot.

Oatmeal Drop Cookies

\[
\begin{align*}
1 \text{ c. sugar} & \quad 2 \text{ c. oatmeal} \\
2/3 \text{ c. fat} & \quad 2 \text{ c. flour} \\
\frac{1}{2} \text{ c. milk} & \quad 1 \text{ t. baking powder} \\
2 \text{ eggs (beaten)} & \quad 1 \text{ t. cinnamon} \\
1 \text{ t. lemon flavoring} & \quad \frac{1}{4} \text{ t. cloves} \\
1 \text{ c. chopped raisins} & \quad 1 \text{ c. nuts}
\end{align*}
\]

Mix oatmeal and milk. Add it to the creamed fat and sugar. Add the other ingredients. Drop from spoon onto greased cookie pan. Bake 10 minutes.

Oatmeal Macaroons

\[
\begin{align*}
1\frac{1}{2} \text{ c. rolled oats} & \quad 1 \text{ T. butter} \\
1 \text{ egg (beaten)} & \quad 1 \text{ t. baking powder} \\
\frac{3}{4} \text{ c. brown sugar} & \quad \frac{1}{4} \text{ t. salt}
\end{align*}
\]

Cream butter and sugar. Add egg and rest of the ingredients. Drop from spoon onto greased pan. Bake 12 minutes.

Peanut Cookies

\[
\begin{align*}
\frac{1}{4} \text{ c. graham flour} & \quad \frac{1}{8} \text{ c. syrup} \\
\frac{3}{4} \text{ c. white flour} & \quad \frac{1}{2} \text{ c. sugar} \\
\frac{1}{4} \text{ c. shortening} & \quad 1 \text{ c. peanuts} \\
4 \text{ t. baking powder} & \quad 1 \text{ egg}
\end{align*}
\]

Cream the fat and sugar. Add the beaten egg. Combine dry ingredients. Add milk to make a stiff dough if cookie is to be rolled. Increase the amount of milk for a soft dough if cookie is to be dropped from spoon. The dropped cookies are cooked longer and at lower temperature. Cornmeal may be used in place of graham flour.

Cookie Decorations

1. Plump raisins, dates, nuts may be pressed into the top of cookie before baking. Sprinkle with sugar.
2. Frost cookies with boiled fondant in different flavors such as chocolate, maple, caramel.
3. Add chopped nuts, coconut, chopped dried fruit to fondant.
4. Make a paste of dried fruit (raisins, figs, dates) cream and sugar, spread over the surface of the cookie. Dust with powdered sugar.
5. Cut marshmallows. Partially melt pieces in small amount of cream in double boiler. Add cut dried fruit, coconut or nuts. Use as frosting.
6. Candied fruit or sweet chocolate may be sliced and combined with frosting.
7. Tiny bright colored candies may be used for decorations. Sliced gum drops in small flower designs may be used on top of frosting for special occasions.

Fillings for Cookies

Cookies may be made thin, dampened at the edges, two put together with one of the following fillings, or the filling may be used between baked cookies.
1. Grind or chop a package of figs, two cups dates or raisins. Add one cup of water, one-half cup sugar, one-half teaspoon salt, one tablespoon lemon juice. Heat through.
2. Plum, current, orange jelly and raspberry jam.
3. Ground nuts may be added to suggestions 1 and 2.
4. Whipped cream with nuts, grated sweet chocolate or marshmallows for baked cookies.
5. One-half cup orange juice; one cup sugar, one tablespoon each of flour, butter and grated orange rind, one cup prunes.

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