The Quality of Cereal Grains

L. P. REITZ AND M. A. BARMORE

The bread you ate as toast this morning, as a sandwich this noon, and bread this evening—was it good or just average?

If it was so nondescript you paid it no notice, that is too bad, for bread has come to be an exciting item in the past few years in this country as it has been in other countries for many years.

The story of bread—and of other good foods derived from cereal grains—begins on the farm. The choice of the right type and variety of seed, preparation of a seedbed, and timely sowing and care of the crop affect the quality and cost of foods prepared from cereal grains.

Maintenance of the quality of the grain as it moves through channels of commerce and ways to identify quality in grain are unseen factors in the merchandising of cereal grains.

The kind of seed the farmer sows places definite limits on the quality of the crop. If he plants a variety suitable only for animal feed, the crop will compete in the coarse-grain market—not in the food market.

Processors and consumers are particular about the quality of products they buy. For example, we know of no red durum wheat from which a good loaf of bread can be baked. Certain red and amber durums produce a grayish macaroni. There is no way to overcome the low popping expansion a poor popcorn may have.

The environment in which the crop is grown and the conditioning of the grain for processing profoundly affect quality. A variety that otherwise would be good for making bread will not be regarded favorably if it is grown under conditions that cause its protein content to be below 10 percent. A good popcorn variety will not pop satisfactorily unless the moisture content in the grain is between 13 and 15 percent. Shriveled grain, caused by diseases or adverse weather, will not mill well.

High quality depends also on other factors: Choice of land, tillage and rotation practices, fertilizers, control of weeds and insects, time of sowing, treatment of seed to control seedborne diseases, timely harvesting, proper
Farmers strive to obtain high yields and high quality at the same time, and they succeed for the most part. They do a remarkably effective job in safeguarding their crops from the major hazards.

Protein content is a varietal characteristic in most cereals, but it is influenced even more by the environment. Early preparation of the seedbed, the use of legumes in the rotation, summer fallow, and applications of nitrogenous fertilizer and manure tend to raise the protein content of the grain.

An application of nitrogenous fertilizer relatively late in the season almost always results in higher protein content. Higher protein means changes in the grain. Usually it will be harder in texture and darker in color. Phosphate fertilizer tends to hasten maturity, increase the plumpness of the grain, and raise the starch content more than the protein.

Abundant moisture tends to produce a more starchy grain. Dry weather, especially during the filling period, is conducive to hard grain of a high content of protein.

Weather conditions affect quality in various ways.

High temperatures during the time the kernels of rice are being formed may cause chalky kernels that mill poorly and are less good in cooking quality than kernels formed during cooler weather. Dry, hot weather during kernel formation induces hardness and shriveling in other grains. Shriveling leads to poor milling quality and low yield of mill products in all grains.

Temperatures above 90°F during the last 15 days of kernel formation are detrimental to gluten quality in wheat. The result is shorter dough development time and smaller loaves of bread.

Barley grown in dry regions tends to be steely, or hard, slender, and too high in protein and too low in starch for best malting quality.

Only a small percentage of defective seeds can be tolerated in good malting barley because the release of diastase and other enzymes will be reduced or altered, the starch may not be fully converted, or the aroma and flavor of the malt will be adversely affected.

Grain should have less than 25 percent moisture when it is ripe and harvestable. It cannot be stored safely until the moisture is reduced to about half that amount. Wheat, barley, and oats generally are left standing in the field until the grain is dry enough to store. Corn and rice may be left also, but they are generally harvested when much higher in moisture and dried subsequently. Ear corn cures well in a ventilated crib, or it may be dried with forced unheated or heated air.

Rice that is to be dried is subjected to warm (100°F to 130°F), dry air to bring the moisture content down to 13 or 14 percent within 12 to 36 hours. The heated air is applied intermittently for a total time of 90 minutes to 3 hours.

Drying temperatures that are too high (above 100°F) for a long time may destroy the germination of cereal grains. The quality may be damaged by temperatures above 130°F. Temperatures above 90°F are unfavorable for drying popcorn.

Insects may damage the growing plant and thereby cause the kernels to be shrunken. Stored grain is much more subject to insect damage. Dry, cool, sound grain is more resistant to insect invasion, but often it is necessary to fumigate the grain to preserve its quality.

Diseases may adversely affect the growing plant and developing kernels, or they may be directly associated with the grain that is marketed.
Rusts, mildew, root rots, and virus diseases are examples of diseases that weaken or kill the plant, indirectly reduce kernel plumpness, and alter the chemical composition of the grain.

Stem rust of wheat may cause so much shriveling that the grain is worthless for milling.

Stalk rots of corn may kill the plant before the grain is mature; that results in badly shrunkened grain.

Barley stripe, stinking smut, and some molds reduce yield and quality on the farm and, when they are in or on the grains, make them unsuitable for processing or suitable only after special treatment, such as washing wheat to remove the smut.

Stem rot and blast of rice cause shrunkened and chalky kernels.

White tip causes the grains to be deformed and low in milling quality.

Control of diseases therefore is of extreme importance not only in obtaining a large volume of food but in maintaining the quality. Chemical seed treatments are relatively effective in controlling smut, stripe, and some root rots. Breeding resistant varieties is the best control, and the only practical control for diseases such as stalk rot, rust, and mildew.

Weed seeds sometimes become a part of the grain that is marketed from the farm. Some of the seeds are so near the shape and size of cereal grains that separation is difficult. Garlic bulblets in wheat cause difficulties in milling and taint the flour. Some seeds impart colored specks to the flour; they are harmless, but they detract from the appearance. Red rice, black barley, and black oats detract from the appearance of the whole-grain cereal product.

Farm producers and commercial handlers and processors of grain take elaborate pains to deliver weed-free, insect-free, clean food products. In doing so they use a number of tested chemical weedkillers, insecticides, and rodenticides. Federal laws, administered by the Food and Drug Administration, and State laws are strict about tolerable residues of any poisonous chemical that is used. Severe penalties are provided for marketing products that exceed the established tolerances, and the grain or product in question must be removed from food and feed channels.

The cereal grains are the edible seeds produced by certain plants of the grass family. They provide 20 to 80 percent of the food energy in different countries of the world.

The per capita consumption of cereal grains in the United States is: Wheat, 121 pounds; corn, 25.8 pounds; rice, 5.3 pounds; oats, 3.4 pounds; rye, 1.4 pounds; and barley, 1.3 pounds.

Cereal grains have many natural advantages as foods. They are nutritious. One or another can be grown almost anywhere on earth. The grains are not bulky. They can be stored for long periods and transported cheaply over long distances. They are readily processed to give highly refined raw foods. They are bland foods that skilled and unskilled cooks can use in thousands of recipes.

Four general groups of foods are prepared from the cereal grains, and these must be kept in mind by the grower and processor when quality is considered.

Baked products, made from flour or meal, include pan breads, loaf breads, pastries, pancakes, and flatbreads.

Milled grain products, made by removing the bran and usually the germ (or embryo of the seed), include white rice, farina, wheat flour, cornmeal, hominy, corn grits, pearled barley, bulgor (from wheat), semolina for making macaroni products, prepared breakfast cereals, and soup, gravy, and other thickenings.

Whole-grain products include rolled oats, brown rice, popcorn, shredded and puffed grain, breakfast foods, and home-ground meals made from wheat, corn, sorghum, and millet.

Beverages are made from fermented grain products (distilled or undistilled)
and from boiled, roasted grains. Beverages made from cereals are as old as recorded history.

Preference for a cereal depends on the form and flavor of the food made from it, its amount of nourishment and contribution to health, cost, its general availability, and the food habits of a people.

Wheat flour and milled rice are the leaders the world over. Only limited and local substitution of the other grains occurs, but impressive amounts of them are eaten nevertheless.

Large quantities of wheat are produced and consumed in China. The Indians of North America and South America did very well on corn for 40 centuries and still regard it highly. Rye is used by millions of northern Europeans as the principal cereal grain; barley and oats also contribute to the diet. Millets and sorghum are important components of the diet of some groups in China, India, and Africa.

ALL CEREAL GRAINS have high energy value, mainly from the starch fraction but also from the protein and fat. The fiber content of the edible portion is low—1 percent or less in most milled products.

The mineral and vitamin composition varies considerably among the cereals and among varieties within species. It reflects the places where they are grown, the conditions of storage, and the portion of the kernel that is utilized.

Enriched cereal foods of today very nearly supply their share of nutrients in the diet in proportion to their caloric content. The main exceptions are the amino acids lysine, threonine, and methionine; vitamins A, C, and D; and the minerals phosphorus and calcium. But there is no reason why cereals should be complete foods. They are seldom eaten alone. They should be eaten—and are—with meat, fish, vegetables, milk, and other foods.

The food value of cereals depends on their chemical composition and the availability of the constituents for use by the human body.

But there is more to quality than that. Acceptability, ease of processing, adaptability, and value to the user also are important. The terms "high quality" or "low quality" may be meaningless.

High quality exists only as an attribute that prevails after a certain level has been reached and in a recipe where it may find expression. For example, the amount of protein in wheat is a quality factor, but it is not ordinarily a mark of high quality in the usual range of 10 to 12 percent of protein. Somewhat higher levels are desired for bread flour production, and lower levels are desired for pastry flour. Some aspects of quality thus become contradictory because of the diverse uses.

Quality testing therefore may be largely a matter of determining whether a variety of grain qualifies for a particular use and gives attractiveness to the end product. Chemical composition, digestibility, and other measurable attributes of varieties and grains can be ascertained, however, and are useful to producers, tradesmen, home economists, and consumers.

QUALITY STANDARDS in cereal grains have to do with the nature of the raw product, the ease of processing a wholesome food from it, and the intended use. Some standards of quality are observed in all countries, albeit some are the simple requirement that grain should be "clean, sound, and dry."

Official grain standards have been established in the United States and Canada for most of the cereals. A sample of grain that passes inspection is certified as meeting certain limits of cleanliness, purity, plumpness, and soundness.

Consideration is given to the moisture content, color and texture, shriveled kernels, cracked kernels, weight per bushel, foreign material and dockage, mixtures of other classes, heat damage, red and chalky kernels (rice only), skinned and broken kernels
(barley only), garlic, smut, ergot, blight, stones and cinders, weevil or other insects, animal filth, objectionable odors, and chemical treatment.

Each class or subclass of grain is divided into several grades, which are based primarily on the minimum allowable weight per bushel and maximum limits of moisture, mixtures of various kinds, and damaged kernels.

Wheat is divided into seven market classes according to the botanical type, the area where it is grown, or the major use. They are hard red spring (the usual protein content is 12–14 percent) and hard red winter (9–13 percent protein), the bread wheats; durum (about 11–14 percent protein), for macaroni products; soft red winter (10 percent protein) and white (8–11 percent protein), the pastry wheats; red durum (any others on an optional basis), used as feed; and mixed wheat, the use of which depends on its composition.

Wheat in some countries is made into a coarse flour that includes most of the bran. White wheat is preferred for such coarse flour, as the bran is lighter in color than from the red wheats and the flour and chapatties are more attractive.

Corn is classed as yellow, white, and mixed. There are special grades for flint corn. Both yellow and white corn are utilized for cornmeal. White corn is favored for hominy and breakfast foods. Starch, sirup, sugar, and oil made from the different classes are similar in quality.

Popcorn is graded on the basis of popping expansion, uniformity, and degree of maturity. Popcorn to be caramelized should pop into a smooth, mushroom-shaped grain in contrast to the larger “butterfly” type most popular for buttering. Yellow popcorn has become more popular than white.

Barley classes distinguish among eastern- and western-grown six-rowed barley. Subclasses for malting barley and special grades for two-rowed barley further specify market samples for uses requiring special qualities.

Oats are classified by color of the hull as white, red, gray, black, and mixed oats. White oats are preferred for milling, but yellow and red oats also are used. The grain should have heavy weight per bushel, high purity, and soundness.

Plump, clean rye of uniform kernel size is desired for milling as well as for making distilled liquors.

Rice is graded as rough rice (50 percent or more of the grains in the hulls); brown or cargo (more than 50 percent of the hulls removed); and milled rice (the hulls and practically all of the embryos and bran layers are removed).

There are special grades for unpolished milled rice, sometimes called undermilled rice; the parboiled milled rice, which was processed before milling by soaking, steaming, and drying; and coated milled rice, which receives a coating of glucose and talc. Four grain types can be clearly identified—the long, slender-grain Rexoro and Patna varieties; the Bluebonnet long-grain type; the medium-grain Magnolia and Zenith types; and the short-grain Pearl or Caloro type. Most long-grain varieties break more readily in the milling process than do short- and medium-grain varieties. The grain standards of the United States have made the merchandising of rice highly specific; usually there is only one variety in a market class.

Grain quality, then, has two general meanings—physical quality, which pertains to cleanliness and freedom from foreign seeds and trash, and processing quality, which means suitability for the use for which the grain is intended.

Physical quality sometimes partly describes the processing quality. Certain market classes are more suitable for the production of consumer foods than others.

Grain that has been stored for many years, or for a shorter period under poor conditions, may be less suitable
THE QUALITY OF CEREAL GRAINS

for food. A reduction in yield of products manufactured from this grain, slightly objectionable flavor or odor, and high fat acidity commonly occur.

The fat in such grain begins to break up into simpler compounds, fatty acids and glycerol. The free fatty acids can be measured by chemical methods, and the amount contained is a measure of the deterioration or biochemical age of the grain.

A short maturing period after harvest is considered by some users to be beneficial in rice, wheat, and other grains, because important changes in enzymatic activity occur then.

FLOUR is made from the endosperm, the central part of the wheat kernel. Seventy to 75 pounds of flour are commonly obtained from 100 pounds of wheat. The amount of flour depends on the percentage of flour-forming material in the grain and on the ability of the milling machines to separate it from the bran and shorts.

The miller is concerned about the amount of flour he obtains, because flour sells for 6 to 8 cents a pound, depending on the grade, and bran and shorts for 2 to 3 cents a pound. As his cost per hour of milling is constant, he is concerned about the rate at which he can process the grain. Therefore he considers the yield of flour, its grade and composition, and the number of bushels that can be milled per hour to be most important.

Varieties of wheat may differ markedly in millability. The white club wheats as a group are perhaps the easiest to mill, and they produce a high yield of flour. This quality may be determined readily in a laboratory mill from a few pounds of grain.

Ease of separation of the endosperm from the bran is related to the thickness of the walls of the endosperm cells, especially those near the bran layer, which hold the endosperm in place. Since the cell wall material is made up of pentosans (a polysaccharide composed of five-carbon sugar molecules), a determination of the pentosan content indicates milling quality.

White flour may be divided into two major classes—bread flour and pastry flour. Bread flour is used to make rolls and vienna bread, as well as the common sliced, wrapped white bread. Pastry flour is used for cakes, cookies, piecrusts, doughnuts, crackers, and biscuits.

Bread flours are made from hard red or hard white wheats that contain at least 11.5 percent protein. Pastry flours are made from soft wheats of a protein content of 10 percent or less. Bread flours are known as strong types. Pastry flours are weak by comparison.

Flours for crackers, general purposes, and biscuits are intermediate in strength. Their protein content also is intermediate, commonly 9 to 10.5 percent.

Flours made from the hard or bread wheats give a coarser, or more granular, flour than pastry flour. The strength of bread flour is measured by its ability to develop into a dough as the water and other constituents are mixed with the flour. The changes in resistance to mixing as the dough is being formed and further mixed is one of the best measures of strength. The best bread flours can absorb a high percentage of water in making a dough.

Another measure is its ability as a dough to hold the carbon dioxide gas liberated by the yeast during fermentation. The gas-retaining ability is probably best measured by the size of the loaf of bread produced. Fine structure and an elastic, soft texture of the bread slice are good measures of the gas-holding properties of the dough.

The protein content can be measured easily—but not the quality—by standard laboratory methods. Some varieties of wheat may yield flour that looks good and is high in protein, but the flour is unsuited for bread production, even when the varieties are grown under favorable conditions. The only explanation we have is that such flour
A Grain of Wheat

Bran—Coat of the grain and associated tissues and usually the aleurone:
- b—brush
- c—cuticle
- oe—outer epidermis
- p—parenchyma
- cl—crosslayer
- ie—inner epidermis
- ei—outer integument
- ii—inner integument
- en—epidermis of nucellus
- a and a'—aleurone

Endosperm—The starchy interior of the grain:
- se and se'—starch and gluten parenchyma
- cr—exposed endosperm section
- d—crushed endosperm cells

Germ—Embryo or seedling plant within the grain:
- sc—scutellum
- es—epithelium of scutellum
- v—vascular bundle of scutellum
- co—coleoptile
- l1—first foliage leaf
- l2—second foliage leaf
- g—growing point
- n2—second node
- n1—first node
- e—epiblast
- r—primary root
- rs—coleorhiza or root sheath
- rc—root cap

Point of attachment:
- b—placenta

(Drawn by M. N. Pope)

lacks strength—and that is no real explanation at all. The deficiency seems to be due to some difference in the proteins.

Pastry flours have almost the opposite characteristics of bread flours. They are low in protein, fine, soft and smooth, and very weak, compared to bread flours. They have about 6 percent to 9 percent of protein. They are made
from softer wheats compared to those used for bread flours. They generally are made from soft wheats in order to obtain the low-protein type necessary to make pastries and rich cakes.

The strength of the soft-wheat flours may be measured by the amount of water they absorb in a slightly acid or weakly alkaline solution. Strength appears to be proportional to the amount absorbed. There is little resistance to mixing at any stage when soft-wheat flour and water are mixed. Quality of pastry flours may be judged by the feel of a flour-water dough. A good pastry flour dough will be short—one whose dough will stretch relatively little but breaks instead.

The cookie baking test is a reliable test to measure strength of pastry flours. Good quality in a cookie flour is measured by (and is directly proportional to) the diameter of the cookies produced.

Cake baking tests are used for testing cake flours, but they are less standardized, and the cakes must also be judged or scored for grain and texture. Grain and texture appear to be of about equal importance to ability of a cake to rise.

Semolina, a granular middlings or meal, is used to make spaghetti and macaroni products and noodles. It is made from a very hard wheat (durum), which is suitable mainly for this purpose. Its desired protein level is at least 11.5 percent. Macaroni quality is measured by mixing and kneading the semolina with water, forming the shape of a typical macaroni, or a flat thin sheet, and drying it slowly. Acceptability is judged photometrically—utilizing a color analyzer—or by visual means according to the transparency and general color. The best semolinas produce a translucent, golden, or amber product. The yellow color is not known to be important nutritionally, however.

Cooking quality is judged by the water uptake, volume of cooked rice, starch and other solids in the residual liquid, degree of cohesiveness, cooking time, color, flavor, and aroma.

Tests are being developed to measure the swelling characteristics, the temperature at which rapid absorption of water begins, type of disintegration that takes place after cooking, the amount of undissolved solids or starch lost in the cooking water, and the content of the amyllose starch (the straight-chain type of molecule).

Americans generally seem to prefer the fluffy, long-grain types, which are dry when cooked and do not tend to stick together.

The rice kernel in unprocessed rough rice is enclosed in a tough, fibrous hull. The product when the hull is removed is called brown rice. Part of the germ and bran is removed in undermilled or unpolished rice. Further milling removes the bran and germ, and the product is marketed as white or polished rice. Many kernels may be broken in the vigorous milling process. The broken pieces may lower the grade. The smaller pieces sometimes are separated and marketed as screenings or brewer’s rice.

Varieties of rice and conditions of growing them affect the amount of breakage and so determine market quality. The amount of head rice and total milled rice is determined with a laboratory milling machine, and the percentage of each is used to determine the market value of the rough rice.

Rice fresh from the combine harvester usually is high in moisture and requires prompt and careful drying. A few hours in a truck or bin in a damp condition may cause souring or fermentation.

Processors of rice prefer different textures for different products. Those who package quick-cook rice and who produce canned products prefer the fluffy, dry, whole-grain cooking types. Manufacturers of breakfast and baby foods prefer the firm, or chewy, cooking types, in which the grains tend to stick
together. Near-perfect kernels are needed for puffed rice.

Parboiled rice is produced by soaking rough rice, steaming or cooking it, and drying and hulling and milling. For this rice, vitamin and mineral content are factors of quality, because 70 to 90 percent of such nutrients in the rough rice are retained in the parboiled rice after milling.

The selection of the most suitable new commercial varieties by rice breeders used to be based on such factors as adaptation to climatic conditions, disease resistance, yield, harvestability, and drying properties. Plant breeders now also apply standardized cooking, processing, and taste-panel tests to judge the possible value of new varieties.

Corn is processed by the wet milling process to make oil, starch, and sirup for food purposes. Considerable amounts also are dry milled for the production of cornmeal, hominy, grits, and ready-to-eat breakfast foods. The most important quality characteristics of the grain are full maturity; freedom from any type of mold, spoilage, and animal or insect contamination; and, if dried artificially, drying at temperatures below 135°. Yellow corn contains appreciable amounts of vitamin A. White corn contains only a trace. Immature, heat-damaged, or frosted corn yields less starch and oil, requires more processing to produce high-quality products, and increases the amount of byproducts to be sold at reduced prices and for animal feeds. Moldy or soured corn increases the percentage of fatty acids in the oil, which, in turn, requires additional processing.

Moldy or sour corn cannot be permitted in any grain processed into breakfast cereals or cornmeal, because the resulting products have an objectionable flavor. Improperly dried corn is also undesirable for this purpose, as it exhibits considerable cracking and checking, which lead to an increase in bacterial contamination and prevents the production of large, uniform grits. Animal and insect contamination cannot be removed completely and is therefore intolerable.

The changes that occur during high-temperature drying reduce the solubility of the protein and probably cause other changes that cannot be determined readily by laboratory tests. This type of damage has become a serious problem for the manufacturers of cornstarch, oil, and sirup. More and more corn is artificially dried, partly because mechanical picker-shellers may be used to harvest corn when it is too high in moisture content for safe storage.

High-quality oats is mature, ungerminated, unweathered, free from foreign material and other grains, and of high weight per bushel. Manufacturers of rolled oats believe that grain high in protein and low in fat makes the best product. Rolled oats with a high fat content are chunky, become rancid easily, and produce pasty, watery porridge when cooked.

Rye flour, generally mixed with relatively large amounts of wheat flour, is used to make specialty bread.

The starch-liquefying enzyme (α-amylase) must be present in the proper amount, especially when relatively pure rye bread is baked. Too little results in a dry, brittle crumb and a cracked, torn crust. Too much results in a wet, soggy crumb and large hollow spaces. It is determined by measuring the thickness or viscosity of hot flour-water pastes. Small-scale bread-baking tests may be used to evaluate the flour. The bread is scored for general appearance, size, and crust color of the loaf and grain and texture of the crumb.

Changes in the quality of cereals can be made to some degree if consumers demand it. Several illustrations have already been given, such as content of protein and vitamin A, in which diverse forms of the same cereal grain are available. Further genetic changes in content and quality
of protein can be brought about in oats, wheat, barley, and rice.

The amount of oil and protein in corn can be lowered or raised by breeding varieties high and low in oil.

The starch in cereals is of two types—amylose, made up of long, unbranched molecules, and amylopectin, composed of large branched molecules. The usual ratio of these starches is about 27 percent of amylose and 73 percent of amylopectin. That ratio is altered to approximately 100 percent amylopectin in the waxy endosperms of corn, sorghum, barley, and rice.

A newly developed form of corn
has more than 70 percent of amylose. Waxy starch has cooking properties resembling tapioca, but the high-amyllose starch is especially suited for industrial films and fibers.

The vitamin content of cereal grains may be modified also by breeding. Research has begun to develop a sorghum grain with high levels of vitamin A and to raise the amount of vitamin A in corn. Likewise, niacin, thiamine, and some other vitamins can be increased in oats.

Grain producers can modify the chemical content (except protein) of grain only slightly. Experiments have demonstrated that protein in wheat can be increased 4 to 5 percent by a single spray application of nitrogen fertilizer at flowering time. Several spray applications have increased protein as much as 10 percent. Such spraying is not considered practical, but it is an example of one possibility.

Grain processors modify the grain and divide it into fractions to suit various outlets. Many products can be produced in a wide variety to suit customer needs—within limits. A new process enables millers to produce flours from a single lot of wheat that range from 6 to 20 percent in protein content. More kinds of food products with different properties can be made from wheat as a result of this discovery.

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**Food Purchased**

By Farm Families, North Central Region

*Families buying in a week*

<table>
<thead>
<tr>
<th>Product</th>
<th>1936</th>
<th>1952</th>
<th>1955</th>
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<tbody>
<tr>
<td><strong>BREAD</strong></td>
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<td>77%</td>
<td>91%</td>
<td>88%</td>
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<td><strong>BUTTER</strong></td>
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<td>53%</td>
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<td><strong>PEANUT BUTTER</strong></td>
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<td><strong>FLOUR MIXES</strong></td>
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<td>cake, pancake, muffin, etc.</td>
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<td>27%</td>
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<td><strong>MARGARINE</strong></td>
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<td><strong>CHEESE</strong></td>
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<td><strong>CAKE</strong></td>
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<td><strong>ICE CREAM</strong></td>
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<td><strong>LUNCH MEATS</strong></td>
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<td><strong>CRACKERS</strong></td>
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<td></td>
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