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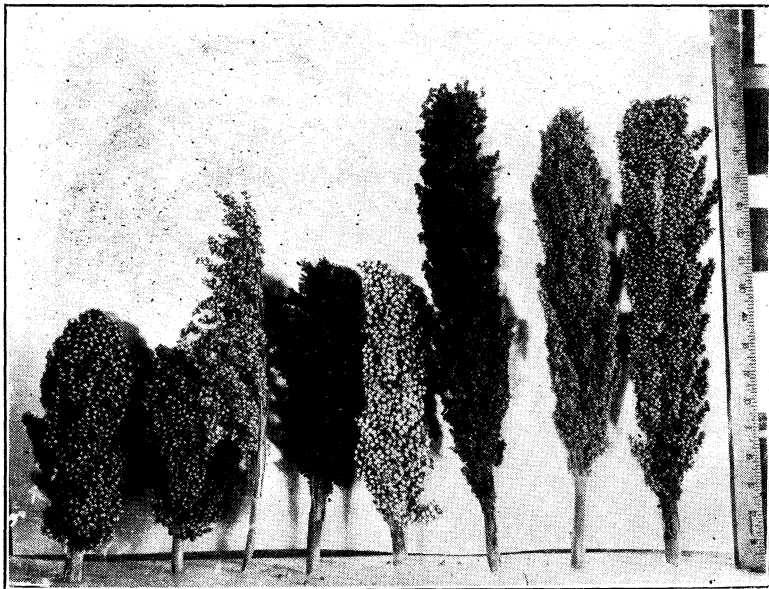
JAS. A. WILSON, DIRECTOR OF EXTENSION AND STATE AGENT

**FOODS FROM THE GRAIN SORGHUMS**

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The extraordinary scarcity of food materials at this time suggests the importance of using all crops to the greatest advantage. The International Institute of Agriculture at Rome reports that the grain supply of all countries now engaged in commerce is 130,000,000 bushels below normal, and recent estimates from the United States Department of Agriculture place the wheat crop of this country at least 50,000,000 bushels short. For many



1 1 2 2 3 4 5 6

SOME OF THE GRAIN SORGHUM FAMILY

1, White and Yellow Milo; 2, White and Brown Kaoliang; 3, Feterita; 4, Red Kafir; 5, Pink Kafir; 6, Black-Hull White Kafir

years Oklahoma, Kansas and Texas have produced large crops of valuable grains which have been but little used in the home. These crops are collectively known as the grain sorghums.

The best known grain sorghums are kafir, milo and feterita. These are especially suitable for the preparation of meal and other valuable food products. For several years the Oklahoma Agricultural Experiment Station has conducted experiments which have had to do with the preparation of foods from these grains for the table. Some results obtained with kafir have been mentioned in the daily press of the State, and a special circular\* describing some feterita products was published in 1914. A bulletin\*\* of the United States Department of Agriculture has shown the value of kafir for preparing several food articles.

Kafir, a native of semi-tropical Africa, was probably the first grain sorghum to be introduced into the United States by the United States Department of Agriculture, about 1885. In a few years it became an important crop, and the quantity planted has increased each year. The success of kafir in the semi-arid sections stimulated the importation of other grain sorghums so that at this time several varieties are grown. The State of Oklahoma produces as much or more grain from the grain sorghums as it does wheat. The combined yield of kafir and milo in Oklahoma in 1915 was more than 30,700,000 bushels, valued at \$12,600,000.00. No statistics are available showing the yields of feterita, darso, kaoliang and other grain sorghums.

### COMPOSITION AND FOOD VALUE

The grain sorghums have a high food value and compare very favorably with corn and wheat. The table below gives analyses showing the comparative values:

Analyses Showing Comparative Values

	Feterita	Corn***	Kafir	Wheat	Milo
Moisture .....	10.82	10.90	9.73	12.94	10.42
Ash .....	1.48	1.50	1.70	1.62	1.37
Crude protein .....	11.50	10.50	12.69	13.94	14.38
Carbohydrates (ex fiber) .....	71.71	69.60	70.98	67.70	69.43
Crude fiber .....	1.15	2.10	1.38	2.24	2.10
Crude fat .....	3.34	5.40	3.52	1.56	2.30

The above analyses of feterita and kafir represent the composition of the grains from one head of each. No doubt a large number of analyses would lower the high quality indicated. However, the data show that feterita and kafir resemble corn in composition, and that they have a high nutritive value. Milo has a similar composition, and the white milo makes an especially good meal. Feterita is somewhat softer than kafir, and for this reason would probably give better results in a digestion experiment.

\*Circular No. 27, Oklahoma Agricultural Experiment Station, March, 1914.

\*\*Farmers Bulletin No. 559.

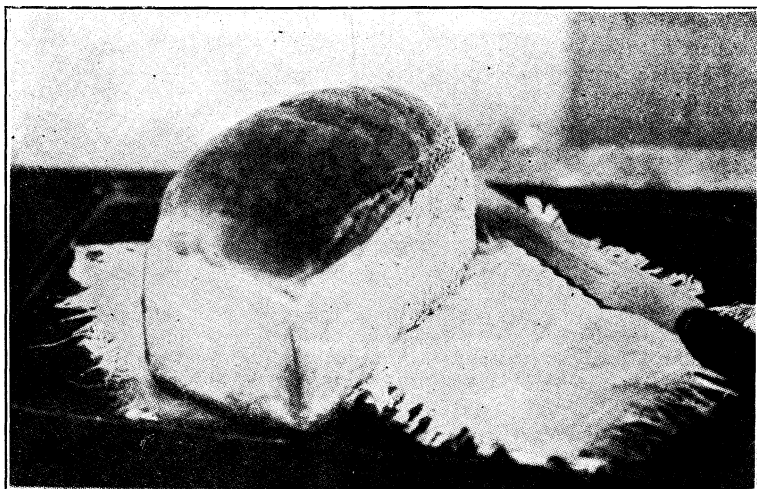
\*\*\*Average of all varieties. Bulletin No. 125, Office of Experiment Stations, U. S. Department of Agriculture.

Mix and sift dry ingredients. Add milk into which soda is well beaten, gradually, then the egg well beaten, and the melted grease. Bake in hot oven in greased muffin pans twenty-five minutes. Serve hot.

### Boston Brown Bread

1½ cups feterita meal	1½ cups graham flour
1 cup rye meal	2½ cups sour milk
1 cup molasses	1 heaping teaspoonful soda
1 teaspoonful salt	1 cup chopped raisins

Mix and steam four hours, as directed under Oklahoma Brown Bread.



### FETERITA BREAD

#### Feterita Bread\*

(Quantity, one brick loaf, 1 pound)

1 cup milk	½ cake compressed yeast
½ teaspoonful salt	Feterita meal and flour, equal parts
½ tablespoonful butter	(1¼ to 1½ cups each)
½ tablespoonful sugar	

Scald the milk, add salt, butter and sugar, and when lukewarm add yeast cake which has been dissolved in 3 tablespoonfuls of warm water. Beat in enough flour and meal to make the mixture the consistency of thick cream. Let stand in a warm place until light and full of bubbles, then add flour and meal enough to knead. Let stand in a warm place until it doubles in bulk, then form into a loaf. When nearly double in bulk, put into oven and bake forty-five minutes.

#### Muffins or Gems

(Quantity eight to twelve)

2 rounding tablespoonfuls lard	2 level tablespoonfuls sugar
2 eggs	1 cup milk
2 teaspoonfuls baking powder	½ cup flour
1½ cups milo meal	1 teaspoonful salt

\*Recipe by Domestic Science Department, Oklahoma Agricultural and Mechanical College.

tion of a bread closely resembling our common corn bread. It must not be thought that articles made from these meals are in any way unpleasant to the taste; on the other hand, they are palatable and have a peculiar, nut-like flavor.

The well-dried seed is ground in a mill and then passed through a 40-mesh sieve. This produces a very fine meal, slightly brownish in color and having a pleasant nut-like flavor. A further treatment on bolting cloth gives a fine flour-like meal.

Meals prepared from kafir or milo may be substituted in the recipes given below. The taste of the feterita product is much sweeter than the same article prepared from kafir. Milo makes a very good meal.

### Grain Sorghum Breakfast Mush

(Quantity for four persons)

1 quart boiling water	1 teaspoon salt
$\frac{1}{2}$ scant cupful feterita meal	

Mix well with boiling water. Stir occasionally to prevent burning. Keep at the boiling temperature at least thirty minutes. Sweeten with sugar and serve with cream or rich milk.

### Golden Bread

$\frac{3}{4}$ cup feterita meal	$1\frac{1}{4}$ cups flour
$\frac{1}{4}$ cup sugar	5 level teaspoonfuls baking powder
$\frac{1}{2}$ teaspoonful salt	1 cup milk
1 egg	1 or 2 tablespoonfuls butter (melted)

Mix and sift dry ingredients. Add milk, egg well beaten, and butter. Bake in shallow, buttered pan in hot oven twenty minutes.

### Griddle Cakes

2 cups flour	$1\frac{1}{2}$ teaspoonfuls salt
$1\frac{1}{2}$ teaspoonfuls baking powder	$\frac{1}{3}$ cup sugar
$1\frac{1}{2}$ cups water (boiling)	$1\frac{1}{4}$ cups milk
1 egg	2 tablespoonfuls butter (melted)
$\frac{1}{2}$ cup feterita meal	

Add meal to boiling water; boil five minutes. Turn into bowl, add milk and remaining dry ingredients mixed and sifted, then the egg well beaten, and butter. Drop by spoonfuls on greased, hot griddle. Cook on one side. When puffed, full of bubbles, and cooked on edge, turn and cook other side. Serve with butter and syrup. A good syrup may be made from  $\frac{1}{2}$  cup sugar,  $\frac{1}{2}$  cup hot water and  $\frac{1}{2}$  teaspoonful vanilla extract, added when cold.

### Oklahoma Brown Bread

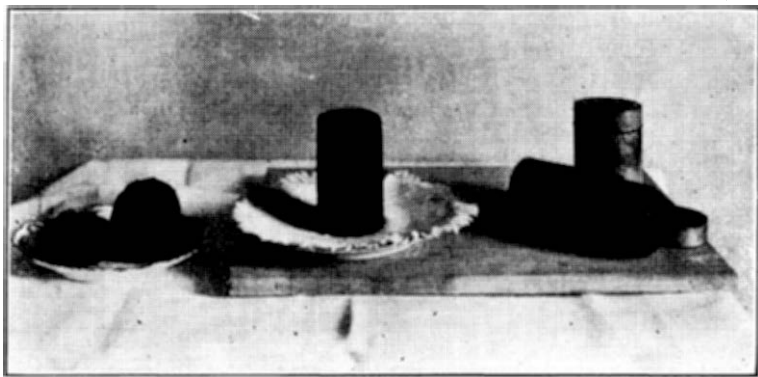
(Quantity for four loaves)

1 cup milo or kafir meal	1 teaspoonful salt
* $\frac{1}{2}$ cup cottonseed flour	1 tablespoonful sugar
1 cup white flour	1 cup molasses
$1\frac{1}{2}$ cups graham flour	$2\frac{1}{2}$ cups sour milk
1 cup chopped raisins (floured)	1 heaping teaspoonful soda

\*Any prime cottonseed meal passed through an ordinary flour sifter and then bolted through cheese cloth will answer for this purpose.

The soda should be beaten into the milk just before adding to dry ingredients.

Sift dry ingredients all together into mixing bowl, stir in sour milk and molasses, then beat thoroughly.



OKLAHOMA BROWN BREAD

Steam three and one-half or four hours in well greased, one-pound baking powder tins. These tins should be filled two-thirds full and tightly closed and placed in kettle with well-fitting lid. Water should come up half way on cans. Water should be boiling the whole cooking period. If necessary to add water, be sure that it is boiling.

The most valuable substance in any food is protein, because it is the chief muscle-producing and strengthening ingredient. Cottonseed meal contains a large amount of protein—from 30% to 48%. When used as suggested here, cottonseed meal improves the color and flavor, and increases the nutritive value to a great extent.

Good beefsteak, when cooked, contains 23% protein, but all steaks will not average that much. Wholesome Oklahoma Brown Bread containing about 16% protein has been prepared. This article, then, closely approaches beef in food value.

The Oklahoma muffins, prepared according to the next recipe, and as shown in the picture, contained 10.4% protein, 8.8% fat and 43½% carbohydrates. This analysis indicates a food exceptionally nutritious. The cottonseed flour, if not obtainable, may be omitted.

#### Oklahoma Muffins

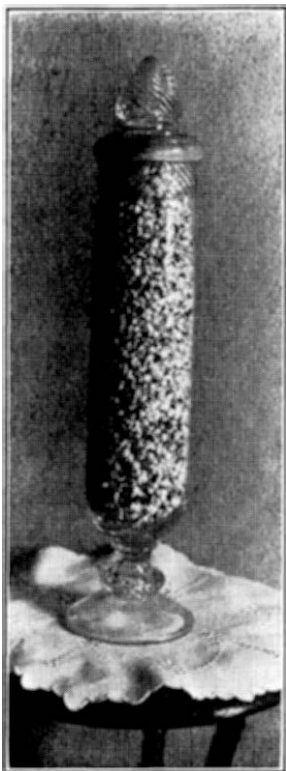
(Quantity for eight persons)

- 1 cup feterita meal
- 1 or 2 tablespoonfuls cottonseed flour
- 1 cup white flour
- 1 tablespoonful melted butter and lard mixture
- 1 tablespoonful sugar
- 1 teaspoonful salt
- 1 cup sour milk
- ½ teaspoon soda
- 1 egg



GRAIN SORGHUM MUFFINS

Feeding experiments show that kafir has a feeding value of about 90% of that of corn, and there is every reason to believe that feterita and milo would at least equal this.



POPPED KAFIR

tain about 20%, peanuts 25%, and wheat bread ranges from 6% to 15% with an average of 9% protein. Combinations of meals from feterita, milo or kafir and cottonseed, together with some wheat flour and other proper constituents, may be made so as to produce an article of food superior to meat in actual food value.

The harder grains, such as kafir and milo, will pop when heated sufficiently, and the popped kernels have a very pleasing flavor.

### PREPARING FOODS

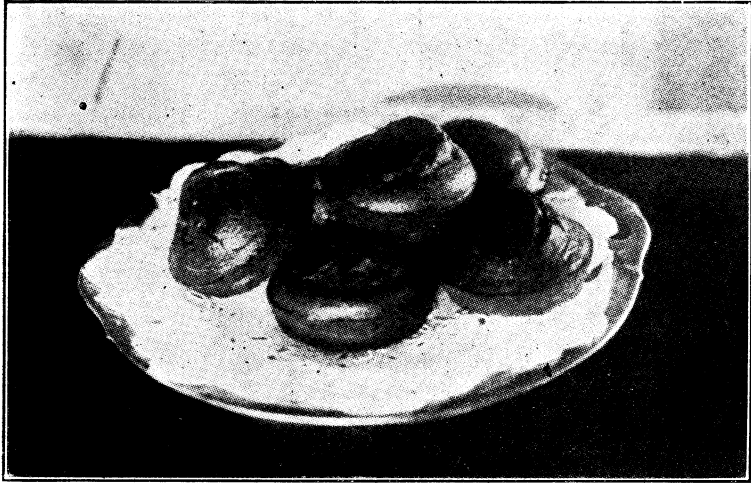
It should be noted that the articles described have been prepared and eaten without injurious results. The author has had the Oklahoma brown bread, containing a comparatively large quantity of cottonseed flour, served in his home for over five years. Members of the family are fond of it, and a number of neighbors have also had success with it.

The grain sorghums are used in Africa by the natives for the prepara-

As indicated in the table of analyses showing the comparative values, corn and grain sorghums are rich in the food elements known as carbohydrates; these include the sugars, starches and gums, and, together with the fats and oils, furnish the body with heat-making materials. The muscles and nerves are built up from protein. A common substance seldom used as a human food, but rich in protein, is cottonseed meal. There is no reason why cottonseed meal should not be used occasionally with other substances in food articles, and for this reason it is included in some of the recipes.

The use of cottonseed products is ever widening. Cottonseed meal has been fed to livestock of all kinds and with excellent results. Cottonseed ranks higher in the percent of protein than any other product grown in Oklahoma. It is so high in protein that it must be fed judiciously to livestock so as not to be injurious. The same thing holds true of its use as a human food. Any product from cottonseed ought to be used as a food only as directed by experts; then there will be no danger. Cottonseed meal, as found on the market, contains from 30% to 48% protein. Beefsteak contains from 12% to 16% protein. Beans contain

Cream the lard and sugar, then beat in the eggs. Add the milk, sift in the other ingredients and beat all into a smooth batter, thinning with water if too stiff. Put a good tablespoonful in each gem pan and bake in a hot oven for twenty-five minutes. Serve hot.



MILO MUFFINS

### Oklahoma Oat Meal Cookies

1 egg	$\frac{1}{4}$ cup milk
$\frac{1}{4}$ cup thin cream	$1\frac{1}{4}$ cups milo meal
$\frac{1}{2}$ cup oat meal (fine)	2 level teaspoonfuls baking powder
$\frac{1}{2}$ cup wheat flour	$\frac{1}{4}$ cup cottonseed flour
$\frac{1}{4}$ cup sugar	1 teaspoonful salt

Beat eggs until light, add sugar, cream and milk. Then add dry ingredients, mixed and sifted. Toss on a floured board, roll, cut in shape and bake in a moderate oven.

### Indian Pudding

(Quantity for six persons)

Place 1 quart of milk on the fire, heat to near boiling, and while this is heating, prepare—

$\frac{1}{4}$ cup molasses	1 egg
1 cup milo or feterita meal	$\frac{1}{2}$ teaspoonful cinnamon
$\frac{1}{2}$ teaspoonful soda	$\frac{1}{4}$ teaspoonful salt

Mix the above and stir into the hot milk until the mixture thickens, then remove from the fire and pour into a well-buttered earthen dish. When nearly cold add 1 cup of cold milk and bake at a moderate heat about three hours. Serve with cream.

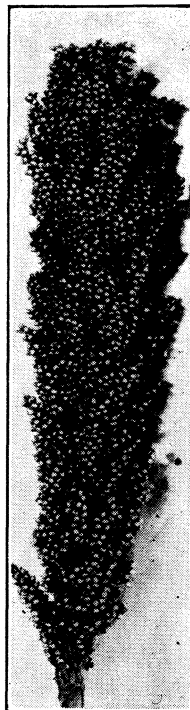
The preparation of the articles of food described here will naturally suggest others. There are numerous dishes prepared from corn, and similar ones may be prepared with meals made from the grain sorghums, especially *feterita*, *milo* and *kafir*. They are rich starch foods.

Methods have been developed in the Chemical Department of the Oklahoma Agricultural Experiment Station for the extraction of starch from the grain sorghums. A quantity has been prepared and tested, and found to have properties very similar to cornstarch.

The grain sorghums having the largest grains such as *milo* and *feterita*, are suitable for the preparation of small hominy. If it is not desirable to serve the prepared hominy in the usual way, it will be found adapted to a slight toasting and may then be served as a breakfast cereal.

The popped grains make a good breakfast cereal. Excellent brittle bars may be prepared by mixing the popped grains in taffy and molding into bars. The taffy syrup should be boiled until it becomes quite brittle, when a few drops are placed in cold water.

The superior quality of these foods may be indicated by the following table, which includes similar articles of food:



A FINE HEAD OF KAFIR

#### Analyses of Grain Sorghum Foods Compared with Corn and Wheat Products

Article	Water Percent	Ash Percent	Protein Percent	Carbohydrates Percent	Fat Percent
Corn bread .....	39	2	7	46	4
White bread .....	32	1	9	55	1
Boston brown bread.....	44	2	5	47	2
Oklahoma muffins .....	32	3	10	45	9
Oklahoma brown bread .....	37	2	8	52	2

The Chemistry Department of the Oklahoma Agricultural Experiment Station has distributed to many people directions for preparing certain articles of food, and all of the reports received indicate that the meals prepared from the grain sorghums, especially those mentioned in this circular, may be used for all foods which ordinarily call for corn meal or corn products.