

## College of Agriculture and Life Sciences Extension Publications

---

The Extension Publications collections in the UA Campus Repository are comprised of both current and historical agricultural extension documents from the College of Agriculture and Life Sciences at the University of Arizona.

**This item is archived to preserve the historical record. This item may contain outdated information and is not intended to be used as current best practice.**

Current extension publications can be found in both the UA Campus Repository, and on the CALS Publications website, <http://cals.arizona.edu/pubs/>

If you have questions about any materials from the College of Agriculture and Life Sciences collections, please contact CALS Publications by sending an email to: [pubs@cals.arizona.edu](mailto:pubs@cals.arizona.edu)

---

**UNIVERSITY OF ARIZONA COLLEGE OF AGRICULTURE**  
**EXTENSION SERVICE**  
 E. P. TAYLOR, DIRECTOR  
 TUCSON, ARIZONA

---

**THE PRINCIPLES OF COOKERY**

By

EDITH C. SALISBURY,

State Leader in Home Economics Extension.

A knowledge of the fundamental principles of foods and their preparation is essential as a guide to better cooking and right living. The complaint that ordinary cooking is drudgery and the preparation of three meals a day a task unworthy the real ability of the house-keeper has not been uncommon in the past. Even to-day when the Nation is looking to the women whose duty it is to select, prepare and save food, to help in a very material way to win liberty for the world there are those who question, "Is there nothing more important I can do?"

If everyone would realize that the efficiency of the individual depends largely upon what he eats everyone would, perhaps, see more opportunity for true service in the homely task of cooking food.

It matters very little whether a man's house has a Gothic window or a Queen Anne Roof. It adds nothing to his health whether his shoes are of patent leather or plain calf, whether his coat is lined with satin or cotton or what kind of hat he wears. None of these things increases his physical strength or aid him in transacting business. But the kind of breakfast he has served to him morning after morning and the good he is able to extract from it for his particular needs determine largely the way in which he fights his battles in the world.

Women are always longing for a career, some of them turn envious eyes towards the field of medicine and learn to relieve suffering by their skill. If they could be convinced that they would accomplish much in keeping sickness away—call it preventive medicine if you will—by serving good meals at reasonable cost, the world would be better and the laborer would have done her part.

To bring into concise form some of the essential facts of the art and science of cooking this circular had been prepared.

The chief reasons for cooking are:

1. To make some foods more digestible
2. To make some foods more palatable and to develop flavors
3. To kill germs,

The foods made more digestible by cooking are:

1. All starchy foods such as cereals.
2. All kinds of flours and breads.
3. Potatoes and other starchy vegetables.

Foods made more palatable are:

Meat and eggs, flavors are developed.

Milk and Cheese are more difficult to digest after cooking.

Butter and fats digest more readily uncooked, though the fat of meats is unpalatable before cooking.

All starchy food, as rice, oatmeal, macaroni and potatoes, should be started to cook in boiling water and kept at boiling temperature long enough to break the wall of the starch granules and to thoroughly cook the starch within.

All starch no matter how finely ground is composed of many minute granules, each surrounded by a shell or wall of woody fibre. This requires at least boiling temperature to break.

An illustration: Making laundry starch If the housekeeper attempts to make starch before the water is boiling the mixture of starch and water remains thin and milky in appearance. When boiling point is reached the liquid thickens considerably and becomes transparent. The starch cell has been ruptured and the starch is cooked.

The general principle of cooking meats, eggs and other tissue-building foods is a moderate temperature and no longer than necessary; this to avoid hardening and toughening the albumen present in each of the foods.

Fats of different kinds melt and burn at varying temperatures. They should always be cooked below the temperature at which they begin to smoke. Above their burning points fats split up into glycerine and fatty acid. This accounts for the bitter, acrid taste of burned fat.

#### TIME TABLE FOR COOKING MEATS.

##### BOILING

Leg of Mutton.....	2 to 3 hours.
Ham (12 to 14 pounds) ..	4 to 5 hours
Turkey (9 pounds).....	2 to 3 hours.
Chicken (3 pounds).....	1 to 1½ hours.

##### BROILING

Steak (1 inch thick)...	8 to 10 minutes.
Steak (1½ inches thick).....	12 to 15 minutes.
Fish (slices) .....	15 to 20 minutes.

##### ROASTING

Rib of Beef per pound.....	10 to 15 minutes
Leg of Mutton per pound.....	10 to 15 minutes
Lamb per pound.....	15 to 20 minutes
Veal per pound.....	15 to 20 minutes.
Pork per pound.....	25 to 30 minutes.
Chicken per pound.....	15 minutes.
Goose per pound.....	18 minutes.
Turkey (8 pounds).....	2 to 3 hours.
Large Turkey.....	3 to 4 hours.

#### GENERAL RULES FOR COOKING MEATS.

Too high heat and heat too long applied hardens protein.

For Steak: Sear meat to retain the juices then cook at a lower temperature until meat is tender.

For Boiled Meat: In order to retain flavor and keep meat from getting too dry, plunge into boiling water and let boil ten minutes, then lower

temperature and allow to simmer until the connective tissue is softened and muscle fibers have become softened and gelatinized.

**For Roast:** Place the roast in an oven in which the temperature is between 450 and 500 degrees F. This will coagulate the protein and keep the juices from escaping. After 15 minutes lower the temperature to about 350 degrees; the inside temperature of the meat should be from 160 to 180 depending on whether the meat is desired rare or well done. A temperature of 160 degrees will kill most of the germs that may be in the meat.

**For Broth:** Put the meat on in cold water, adding salt, and allow the meat to simmer—never boil—for a long time. This gives a nutritious broth.

**For Fat Meat:** Cook fats slowly (bacon, pork chops etc.) Remove fat as fast as it fries from the meat.

#### **TEST FOR GOOD MEAT.**

**Color**—Beef, bright red after standing.

**Texture**—Fine grained, firm.

**Juicy**—Not dry.

**Fat**—Abundant, distributed through tissues of meat; beef fat should be straw colored.

**Odor**—Slight but pleasant.

**Connective tissue**—not abundant.

**Bone**—small in proportion to meat.

Veal varies in color from pale pink to light red and is best when a dull pink.

Mutton is a dull brick red color and lamb a light pink or grayish red according to the age of animal.

The lean meat or muscle of pork when young is nearly white, that from an older animal is rose color.

#### **DEEP FAT FRYING.**

1. The best fats to use for frying are olive or other vegetable oils; lard, beef drippings or Crisco. Butter cannot be used for deep fat frying because of its low burning point. Raw food will burn in butter before it is cooked through.

2. An iron or heavy granite kettle is the best for deep fat frying. The kettle should never be filled within three inches of the top when frying.

3. A frying basket to hold the food to be fried is convenient. Absorbent paper is necessary for draining the food after it is fried.

4. After using, the hot fat should be taken immediately from the fire, a few slices of raw potato cooked in it to clarify and remove the flavor of food and when cool should be strained through a fine sieve to keep for future use.

#### **Egging and Crumbing.**

1. Dip article into fine bread crumbs and let dry thoroughly.

2. Dip into beaten egg to which 1 tablespoon of cold water has been added for each egg.

3. Dip into fine bread crumbs and let dry before frying.

#### **Tests for Temperature.**

Heat fat until a faint blue smoke arises.

Test temperature by dropping in a small portion of the food to be cook-

ed, or a cube of bread. For uncooked mixtures the bit of bread should brown in one minute, for cooked mixtures the bread should brown in 40 seconds.

Doughnuts should cook in hot fat from 3 to 5 minutes  
Croquettes should cook in 1 minute.  
Fish balls should cook in 1 minute  
Fritters should cook from 3 to 5 minutes.  
Raw potatoes should cook from 4 to 8 minutes.

#### POINTS ON COOKING EGGS.

For general use it is sufficient to remember that a temperature of 150 degrees or 180 degrees is suitable for any dish which is chiefly composed of eggs and milk. When starch also is used as in making some kinds of cornstarch puddings, it is necessary to have a higher temperature and so whenever possible the greater heat should be applied before the eggs are added.

When a custard curdles or "wheys" or settles in the center it is because it has been cooked too long or in too hot an oven. This can be prevented by setting the baking dish containing the custard on a folded paper in a pan of water. This lowers the temperature, preventing the heat of the custard reaching boiling point.

One egg will thicken one cupful of milk when cooked in it, but this custard will not be stiff enough to hold its shape in a mold. For this consistency, one and one-half to two eggs to a cupful of milk are necessary.

The yolks of eggs alone make a rich but thin custard. The white alone makes a firm custard of very delicate flavor and texture.

Gelatine or cornstarch is frequently used to assist in thickening milk when eggs are expensive, but these combinations, while perfectly wholesome, are not real custards.

There is a variety of puddings made by adding rice, tapioca, cornstarch, sago, etc., to a custard. In all such it is well to have the starchy ingredients cooked in milk or water previously to adding the eggs. Bread and cracker crumbs may be combined directly with the egg, as in these ingredients the starch has already been cooked.

The nutritive value of egg is not changed by the method of cooking, provided no other foods are added. One form may appeal to the palate more than another and the digestibility in one form of cooking may be accomplished in less time than in another, but the final absorption will be as complete.

The poached egg has no greater nutritive value than the egg cooked in the shell, but the food value is slightly increased by the addition of the small amount of butter which is added to the scrambled egg or omelet.

Fresh eggs should always be used, a bad egg is not only unwholesome, but will spoil all the other materials with which it may be combined.

When eggs are high priced do without them entirely, or make dishes requiring only a few, and give them a place in the dietary in which they can be combined with other food materials.

#### GENERAL RULES FOR COOKING VEGETABLES.

1. Wash all vegetables thoroughly in cold water before putting on to cook.
2. If a vegetable has lost its freshness and crispness soak in very cold water until it becomes plump and crisp.

3 Soak head vegetables such as cabbage and cauliflower, head down in salted water to which a very little vinegar has been added.

4. Cook all vegetables in boiling water. In cooking vegetables that have become old and tough (peas and string beans) or if the water is hard, add a pinch of soda.

5 Sweet flavored vegetables such as peas, beans, potatoes and squash should be cooked in a covered vessel in a small quantity of water to avoid loss of flavor.

6. Strong flavored vegetables, such as onions, cabbage and turnips should be cooked in an uncovered vessel in a large quantity of water. If the flavor is very strong these vegetables should be cooked in two waters.

7. Boil greens—as spinach, beet tops and asparagus—rapidly. Tubers and roots should be boiled less rapidly to avoid breaking the vegetable. Green peas and beans should be cooked gently.

8 Remove all vegetables from the fire as soon as tender. Overcooking causes the vegetable to become tough, bitter and dark colored.

9 Put green corn to cook in boiling water, set on back of stove or away from direct flame and cook gently about five minutes. Over cooking toughens the corn and destroys delicacy of flavor.

#### **MINERALS FOUND IN VEGETABLES AND THEIR USE IN THE BODY.**

- 1 Calcium builds bones.
- 2 Magnesium builds nerves.
3. Potassium builds cells.
- 4 Sodium aids digestion
- 5 Sulphur useful in building tissue
6. Iron builds red blood cells
- 7 Calcium salts help to coagulate the blood.
8. Phosphorus is found in every cell of the body.
- 9 Chlorides help to produce hydrochloric acid in the gastric juice.
10. Sodium, potassium and calcium help to make the blood alkaline.
11. Sodium and potassium help to dissolve carbon dioxide.
12. Sodium, potassium and calcium help in removing poisonous wastes from the body.

#### **BATTERS AND DOUGHS**

Different kinds and grades of flour vary so much in moisture that it is impossible to always give exact recipes for doughs, but there are certain general directions and proportions that can be given and from these experience must teach how they may be modified.

A. batter is usually defined as a mixture of flour and some liquid that will either drop from a spoon in a lump, pour readily or be of a consistency between the two. To be classed as a dough the mixture must be stiff enough to be handled with the fingers.

One measure of flour to one of liquid gives a pour batter.

Two measures of flour to one of liquid gives a batter suitable for biscuits.

Three measures of flour to one of liquid makes a soft dough.

Four measures of flour to one of liquid makes a dough suitable for biscuits or cookies.

Batters of various kinds are stirred with a spoon. Doughs are mixed more thoroughly and easily with a spoon.

Thin batters require a hotter oven than thick, in general muffins and gems baked in the ordinary pan will require to bake 25 minutes in a moderate oven.

When a small quantity of shortening is used in batters it may be melted and beaten in at the end of the process, but if a large proportion is required it should be rubbed in till creamy and blended with the sugar as in cake making or mixed into the flour as in pastry making.

For stiff doughs which are to be rolled it is necessary that the shortening should be cold and stiff since even a small quantity, if warm, will make the dough soft and sticky. It requires more shortening to make doughs made of flour rich in gluten, "short" and "tender" than it does the soft pasty flour.

A dough will be made elastic and spongy by the addition of several eggs but if baked too quickly will be tough.

The following table will give general directions for the proportions of the chief ingredients to use in making quick doughs, that is doughs made light with baking powder.

	Flour	Baking powder	Liquid	Shortening	Sugar	Eggs
Pop-overs	1 cup	-	1 cup	-	-	1
Griddle Cakes	1 pt.	3 tsp	2 cups	2 tbs-p	1 tbs-p	1-2
Muffins	1 pt	1 t-s-p	1 cup	2 tbs-p.	2 tbs-p	1-2
Cake	1½ cups	1 tsp	½ cup	4 tbs-p	¼ cup	1-2
Doughnuts	1 pt	2 tsp	½ cup	-	½ cup	1
Cookies	1 pt	2 t-s-p	¼ cup	2 tbs-p	½ cup	1
Tea Biscuit	1 pt	3 t-s-p	¾ cup	1 tbs-p	-	-
Short Cake	1 pt.	1 t-s-p	¾ cup	2 tbs-p	-	-
Pastry	1 pt	-	½ cup	¼ cup	-	-

### GENERAL RULES FOR COOKING CEREALS.

Start cereals to cook in boiling water.

Starch is made more accessible to digestive fluids when granules are broken open by heat.

Cooking improves the flavor of cereals.

Heat softens woody fibre (cellulose.)

Long cooking improves the flavor of vegetables.

Add salt to boiling water before cereal is added.

The fireless cooker or pressure cooker provide the ideal method for cooking cereals. A high temperature is maintained for a long time with a minimum amount of fuel. The cooking is slow and gentle and kernels of grains are kept whole and distinct.

### Time Table for Cooking Vegetables.

Kind	Amount	Water	Salt	Time
Rice.....	1 cup	2 $\frac{1}{2}$ cups	1 tsp.	1 hr.
Oatmeal.....	1 cup	3 cups	1 $\frac{1}{4}$ tsp.	3 hrs.
Cornmeal.....	1 cup	3 $\frac{1}{2}$ cups	2 tsp.	4 hrs.
Cream of Wheat.....	1 cup	4 cups	2 $\frac{1}{4}$ t.p.	30 mins.
Rolled Oatmeal.....	1 cup	2 $\frac{1}{2}$ cups	1 tsp.	1 hr.
Hominy Grits.....	1 cup	4 cups	2 $\frac{1}{2}$ tsp.	3 hrs.

When steaming in fireless or pressure cooker use a little less water as there is no evaporation. The time of cooking under 5 or 10 lb. pressure is reduced one-third. In the fireless cooker the cereal may cook for hours over time without injuring it in any way.

#### Essentials to Success in Cooking.

1. Accuracy in methods and measurements.
2. A knowledge of the effect of heat on food materials.
3. A knowledge of the correct combining of materials.
4. Good materials.
5. Interest in the work.

#### TABLES OF WEIGHTS AND MEASURES.

2 cups butter packed solidly.....	1 pound
4 cups pastry flour.....	1 pound
2 cups granulated sugar.....	1 pound
2 2-3 cups powdered sugar .....	1 pound
3 $\frac{1}{2}$ cups of confectioner's sugar.....	1 pound
2 2-3 cups brown sugar.....	1 pound
2 2-3 cups oatmeal.....	1 pound
4 $\frac{1}{2}$ cups rolled oats.....	1 pound
2 2-3 cups cornmeal.....	1 pound
1 $\frac{1}{2}$ cups rice .....	1 pound
4 $\frac{1}{2}$ cups graham flour.....	1 pound
4 $\frac{1}{2}$ cups coffee .....	1 pound
2 cups of finely chopped meat.....	1 pound

In the above ingredients if tablespoon is used instead of cup the weight in ounces will be given.

8 eggs weigh.....	1 pound
1 square of chocolate.....	1 ounce
3 teaspoons equals.....	1 tablespoon
16 tablespoons equal .....	1 cup
2 cups equal .....	1 pint
1 cup equals.....	8 ounces

#### NECESSARY COOKING UTENSILS.

It is unnecessary to have all the appliances on the market in order to have success in cooking, but certain articles are essential for the best results in the finished product, and the time and labor spent upon it.

Among the articles which should be included in the ordinary cooking equipment the following, with approximate prices, are listed:

	Price each.
Mixing Bowls .....	30 to 40 cents
Measuring spoons—table and tea.....	.10 cents
Granite or wooden mixing spoon.....	.10 cents
1 glass measuring cup.....	.10 cents
1 aluminum measuring cup .....	.25 cents
1 spatula .....	.25 to 50 cents
1 Dover egg beater.....	.15 cents
1 wire egg whisk .....	.10 cents
1 pastry board.....	.45 cents
1 rolling pin .....	.20 cents
1 granite double boiler.....	\$1.45
1 biscuit cutter.....	.5 cents
1 steel frying pan (heavy).....	\$1.00
1 steel fry pan (light).....	.35 cents
1 nutmeg grater .....	.5 cents
1 can opener and cork screw combined.....	.15 cents
1 meat grinder .....	\$1.50
1 potato ricer .....	.25 cents
Saucepans of different sizes.....	.50 cents up
Pie tins (aluminum) .....	20 cents up
Bread tins (aluminum) .....	.40 to 50 cents
Cake tins (aluminum).....	.15 to 20 cents
1 savory roaster .....	\$1.25
1 muffin set, tin or aluminum.....	30 to 90 cents
Vegetable knife.....	.10 cents
Case knives .....	.15 to 25 cents
1 lemon squeezer (glass) .....	.15 cents
1 coarse grater .....	.15 cents
Strong wire sieves.....	.20 cents
Pair of scales .....	\$1.50

The following articles are not listed as absolutely essential but they are extremely desirable and should be added to the equipment of the efficient housekeeper as soon as possible:

1 fireless cooker .....	\$15.00 to \$35.00
1 pressure cooker .....	\$15.00
1 bread mixer .....	\$2.00
1 cooking thermometer .....	\$1.25

Whatever fuel is used the range and oven should be in perfect condition.