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Office**Selecting slow cookers**

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**Quick Facts**

Slow-cooking appliances vary in design, wattage and price.

Some of the items to be considered when selecting a slow cooker include safety features, the types of heating systems, vessel materials and shell design, covers, ease of cleaning, size for intended use, economy of operation and price.

Because foods cook more slowly at high altitudes a cooker should be checked with an accurate thermometer to be sure safe cooking temperatures are reached within recommended time periods.

If a slow cooker does not reach the safe cooking temperature in the time it should, the time may be shortened by browning or boiling food first, or by cooking on "high" the first hour.

In adapting recipes, it should be remembered that liquids do not boil off, fats do not bake off, ground herbs and spices diminish in flavor, and whole herbs and spices intensify in potency with slow cooking.

There has been much recent interest in the slow-cooking method of food preparation, especially during these days of energy uncertainties. Slow cooking combines old-fashioned principles with new technology which can help add a relaxed and satisfying dimension to otherwise hectic meal preparation.

**General Considerations**

Slow cookers available on the market vary widely in design and price. The following items should be given some consideration when selecting an electric slow cooker.

One of the **SAFETY FEATURES** that should be included with the appliance is the Underwriters Laboratories (UL) certification seal. This seal indicates that the appliance meets the safety standards of the Underwriters Laboratories.

The pot should have heat-resistant handles and legs. The handles should be wide and deep enough to move the appliance easily and safely, especially when it is hot. One inch wide and one and one-half inches long (2.5 cm by 3.8 cm) is the minimum recommendation.

The exterior of the pot must remain cool or be far enough from the table surface to create no overheating problem; a clearance of at least one-half inch (1.3 cm) is recommended. For additional protection, an asbestos mat may be used under the slow cooker.

Two types of **HEATING SYSTEMS** are used in slow cookers. These are 1) sidewall or wrap-around and 2) base heat.

Sidewall heating provides a more indirect heating action and reduces the need to stir; however, foods do not brown. Sidewrapped heating element pots should have contents placed as far up as the elements to provide good heat transfer. The placement of the heating elements may be identified by rubbing the inside of the cooker with shortening, coating with flour and heating until a scorch pattern develops.

Base heat requires stirring periodically in order to prevent scorching on the bottom and will provide browning

capabilities if the wattage is sufficiently high (800 watts for a 7- to 9-inch [17.7-22.9 cm] diameter vessel).

Slow cookers designed with a removable pot on a hot plate-type base permit use of the base as a warmer and use of the pot on the range or in the oven if handles are heat resistant.

Slow-cooker vessels come in a variety of materials, each with advantages and disadvantages. Ideally, **VESSEL MATERIALS** should be cleaned easily, provide no taste reaction with foods, be heated quickly, and hold heat well. No one material can do all of these things.

Heat-resistant ceramics, glassware and porcelain enamel on steel help retain the natural flavor and juices of food and are good insulators of heat. However, they are not good conductors of heat and take longer to heat up to safe cooking temperatures. They also are vulnerable to damage from sudden temperature changes or sharp blows.

Aluminum is less vulnerable to breakage than ceramic or glassware and heats up more quickly; however, it does not retain heat as well.

**SHELL DESIGN.** Some slow cookers have an inner vessel that is sheathed by an outer vessel or shell. The cooker that incorporates this outer sheath will have less heat loss to the surroundings, safer exterior surface temperatures and added protection during use since it cannot be knocked off the base as easily as the nonsheathed type.

The outside may be aluminum, baked enamel on steel or plastic such as Lexan.

The use of an outer container may speed or slow initial temperature increase. If there is an air cell between the heating element and the inner vessel, the rate of heating will be decreased; however, if the heating element is attached to the inner vessel, the rate of heating will be increased.

A **TRANSPARENT GLASS COVER** is useful in checking for the development of steam associated with cooking without taking off the cover. Cooking progress, however, is difficult to judge without lifting the lid. Lifting the cover allows moisture and heat to escape. If the cover is lifted frequently enough, the heat loss will lengthen the cooking time.

**EASE OF CLEANING.** For convenience in cleaning the appliance, a removable inner vessel or an immersible appliance with a detachable heat control unit is desirable. While these features add convenience, they are not essential.

There is **SIZE** variety in slow cookers. These appliances range from two to six quarts (1.9-5.7 liters) or more. The size that best fits the individual's or family's needs should be considered when selecting a slow cooker. (The 3½-quart [3.3-liter] size usually is adequate for a family of four.) The larger the well of the cooker, the higher the wattage the vessel will require for safe cooking.

**ECONOMY OF OPERATION.** Low-wattage slow cookers are economical to operate. High-wattage slow cookers are less economical. Table 1 shows a cost and heat rise comparison of cooking in a conventional oven at 350°F (176.7° C) for one hour, a low-wattage (75-150 watts) wrap-around-heat slow cooker, and a high-wattage (1,600 watts) multipurpose slow cooker/deep fat fryer for eight hours when each was filled to the maximum quantity for that particular appliance.

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Table 1: Comparison of conventional oven, low- and high-wattage slow cookers.

Water at 40°F (4.4°C)	Temperature setting	Cooking time	Temperature reached	Electricity (kilowatt hours)	Cost**
30-inch (76.2 cm) self-cleaning electric oven (3,440-watt bake unit)	350°F (176.7°C)	1 hour	178°F (81.1°C)	.98 KWH	.025 cents
1,600-watt multipurpose slow cooker/deep fat fryer	200°F (93.3°C)	8 hours	3 hours/160°F (71.1°C) 8 hours/187°F (86.1°C)	1.24 KWH	.031 cents
75-150-watt slow cooker with wrap-around heat system	1 hour high; 7 hours low	8 hours	3 hours/161°F (71.7°C) 8 hours/189°F (87.2°C)	.70 KWH	.018 cents

\*\*Based on cost of 2.5 cents per kilowatt hour.

SOURCE: Average of three tests completed at CSU in the consumer sciences and housing department, March, 1976. Constant nameplate voltage use for all tests (240 volts for oven with 2.5 quarts [2.4 liters] of water in a covered 3-quart [2.8-liter] casserole; 120 volts for 4 quarts [3.8 liters] water in a 5-quart [4.7-liter] multipurpose cooker and 3 quarts [2.8 liters] of water in a 3.5-quart [3.3-liter] low-wattage cooker)

Higher purchase PRICES for slow cookers are associated with sheathed liners, immersible design, removable inner vessels, detachable heat control, larger size, higher wattage for the same design, added finishes—Teflon lining, porcelain exterior as opposed to baked-on enamel, and multipurpose of design.

Much concern has been expressed over the BACTERIAL SAFETY of slow cookers. The temperature range that favors growth of bacteria is 40° to 140°F (4.4°-60.0°C). This includes temperatures just above the usual refrigerator temperature up to warm serving temperature. The most rapid growth of bacteria takes place between 60° and 120° F (15.6°-48.9°C). Food should remain between 60° and 120° F (15.6°-48.9°C) for no more than two hours, and in the entire danger zone of 40° to 140°F (4.4°-60.0°C) for no longer than three hours.

NOTE: The time food stands within the "danger zone" is cumulative. For example, slow heating requiring three hours to reach 140° F (60° C), in addition to an hour of leaving the product out at room temperature after it is cooked, is comparable to four consecutive hours in the "danger zone."

Temperatures between 140° and 165° F (60.0°-71.1° C) stop bacterial growth and temperatures between 165° and 212° F (73.9°-100° C) destroy bacteria. Slow-cooked foods (particularly meats) should remain above 165° F (73.9° C) for at least two hours before serving.

It is important, especially at high altitudes where food generally takes longer to cook, to check the cooking temperature of a slow cooker with a thermometer to make sure that it reaches safe cooking temperatures within recommended periods of time.

The following test is a simple method for checking the cooking temperature of a slow cooker.

1) The slow cooker should be filled with refrigerated water (approximately 40°F/4.4° C).

2) The water should be heated on "low" for eight hours.

3) The water temperature should be checked with an accurate cooking thermometer at the end of the third and eighth hour. (This must be done quickly, as the temperature will drop when the lid is removed.)

For safe cooking, the temperature of the water should be above 140° F (60.0° C) at the end of three hours and between 180° and 200° F (82.2° and 93.3° C) at the end of eight hours. The minimum temperature at which bacteria are killed is 165° F (73.9° C).

If the slow cooker does *not* reach these temperatures, design of the cooker, voltage variations, or the cooking altitude may be to blame. The length of time the food in a slow cooker is in the danger zone can be reduced by browning or boiling the product before cooking, and/or by cooking the product on "high" for the first hour.

If these measures do not help, the appliance should be returned to the seller. Most slow cookers have good warranties and should be returned for repair or replacement if there are problems.

## Safety

To operate the slow-cooking appliance safely and correctly, all directions should be read and followed. The heating unit should not be immersed in water. The pot should be cooled before moving or storing, and it should never be plugged in except when in use.

As in all appliances, the cord should be attached to the appliance first, then plugged into an electrical outlet; the process should be reversed when unplugging the appliance. The pot should always be placed on a dry surface away from a sink. The electric unit should never be handled with wet hands or when touching a sink faucet.

The slow cooker should be filled with water to loosen food particles; abrasive cleaning compounds should never be used.

## Use and Care

There are several *advantages* in using a slow cooker in meal preparation:

—Constant watching during cooking is not required.

—Last minute preparation tasks usually are reduced.

—Foods can be held hot for extended periods of time without overcooking.

—Meat products generally shrink less than with conventional cooking; slow cooking is ideal for tenderizing tough cuts of meat.

—Low-wattage slow cookers usually use less electricity than ovens for comparable food preparation.

As with all methods of food preparation, there also are *disadvantages*:

—Low-wattage slow cookers are not suitable for broiling or browning foods.

—Milk and pasta products can be overcooked in a slow cooker.

—Some slow cookers are difficult to clean if they can't be submerged in water.

—High-wattage, thermostatically controlled slow cookers may use more electricity than conventional ovens for comparable food preparation.

## Adjusting Recipes

Many recipes can be adapted to slow-cooking methods. By comparing the recipe to be adapted to a similar recipe in the appliance recipe book or instruction booklet, the recipe can be prepared in the same way, with adjustments for altitude. High altitude generally extends the cooking time *one hour on low* for every 1,000 feet (304.8 meters) of altitude above 4,000 feet (1,219.2 meters).

Starting with warm, boiling or browned food, and/or cooking on "high" for the first hour also helps compensate for the slower cooking that occurs at higher altitudes.

The amount of liquid added usually can be reduced by one-half because evaporation is minimal. Whole spices increase in flavor and ground spices decrease in flavor during long cooking periods.

Browning meat and poultry first is not essential, but it does help in the development of a richer flavor in the food, removes some of the fat in the product and shortens the length of time the product will take to reach safe cooking temperatures.

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