



SUMMER SQUASH

Where did Squash come from?

Squash originated in the Americas and it is one of the major and earliest plants domesticated in Mexico and North America, along with maize and beans. Remains of squash seeds, rind and stems were found in caves in Mexico and were dated to 8,000BC. The American colonists developed the word "squash" from several Native American terms meaning "something eaten raw."

These American Indians shared many varieties of squash with the European settlers, who took the seeds back to their countries and developed them over many generations. "Zucchini" were cultivated and improved in the very late 1800s in Italy, near Milan. Italian immigrants then bought the new improved version of squash back to the US in the early 1920s. This explains the strange name: "Zucca" is the Italian word for squash and "zucchina" means "little squash". In England, Ireland and France the same thing is called a Courgette, while in South Africa, they are called baby marrow. On a side note, in England many children have been tortured by being forced to eat Marrows, but although they look like overgrown Zucchini they are slightly different – completely tasteless, very soggy and often tough.

In the United States, squash was domesticated in Missouri, Florida, Pennsylvania, Kentucky, Tennessee and Maine. This wasn't the zucchini as we know it today, but a similar type of squash Cucurbita Pepo and its wild ancestor, the Ozark gourd, is still present in the area.

Today, squash are grown all over the world, and are very popular in many Eastern European countries. They can be found in almost all areas of California and grow in Spring and Summer. By Fall they tend to stop producing as they get damaged by aphid-transmitted diseases and other problems.

A little known fact is George Washington and Thomas Jefferson were avid horticulturalists who grew many varieties of squash.

TYPES OF SQUASH

Even though most people identify squash with vegetables, from a botanical standpoint, they're actually fruits because they contain the seeds of the plant.

Squash are divided into two categories -- summer and winter squash. Summer squash differs from fall and winter squash in that it is selected to be harvested before the rind hardens and the fruit matures. It grows on bush-type plants that do not spread like the plants of fall and winter squash and pumpkin.

Zucchini grows to maturity in about 60 days and have thin, edible skins and soft seeds. The fruit varies

greatly in length and colors. The three main types include the yellow either crookneck or straightneck; the white, saucer-shaped, scallop or pattypan; and the oblong green, grey or gold zucchini. Recommended varieties for disease resistance are:

Dark green types:

- ▲ Ambassador,
- ▲ Aristocrat,
- ▲ Burpee Fordhook,
- ▲ Gold Rush,
- ▲ Greyzini.

Yellow:

- △ Dixie (crookneck)
- ▲ Early Golden Summer (Crookneck),
- ▲ Early prolific straightneck
- ▲ Sundance (crookneck)

Scallop (pattypan) this type of squash is often referred to as "summer squash" by Spanish speaking people:

- ▲ Early white bush (white)
- ▲ Peter Pan hybrid (bush)
- ▲ Scallopini (bush)
- ▲ Sunburst (bright yellow)
- ▲ Trombocini or zucchetta rampicante.

WHERE TO PLANT SQUASH

Plant squash in a convenient location, where you can check it frequently. Choose an area near an abundant supply of water so you can water as needed easily. Vegetables do best if they receive full sunlight (at least 4 to 6 hours a day) and where they are not shaded by trees, fences, or walls. Try to plant away from areas that will be watered by lawn sprinklers.

Whenever possible, select a location that is not heavily infested with weeds, especially weeds such as field bindweed, nutsedge, and bermudagrass that can be hard to control with hand weeding. Also avoid areas that have had previous disease problems.

Try to plant on level ground as it's easier to work on than sloping ground. Vegetables will do well on a wide range of soils; they do best in well-drained soils. If your soil forms a clump when squeezed, then it is too wet; if the soil crumbles easily, it is a good soil to use. Soil amendments and adding organic matter (compost, peat moss, manure, sawdust, ground bark) can make clay and sandy soils easier to work with, and correct soil preparation can improve poor soil. The soil should be kept at a pH level of 6.0 to 6.5 and you can get kits to test this.

If your soil is extremely poor or salty, like Chalfant and Benton, you may be better off making raised beds, filled with purchased soil. A raised bed garden is a garden built on top of your native soil, sometimes incorporating native soil, sometimes not. Raised bed gardens can be contained, such as when you build a wood or stone structure to keep the bed intact, or they can be more free form, with soil and amendments merely piled several inches high.

PLANTING

Soil containing plenty of well-rotted manure or compost is ideal, although you can also grow crops in average soil that has been fertilized enough. Squash are a short-season, warm season crop so seedlings

can easily be damaged by frost and don't do well until the soil and the air temperature is above 60F. The best temperature for germinating (beginning to sprout) is 70-95 F and the maximum germinating temperature is 100F. They can be planted under cold protection (plastic tunnels) earlier than otherwise and the best growing temperature is 65-75F.

Squash seeds can be planted directly where they are to grow, or grown indoors and transplanted into the garden. Seedlings are very sensitive to transplant shock, so planting them where they are to grow is preferable. However, if you want to get an early start, plant them in peat pots indoors or in heated beds 3 weeks before the danger of frost has passed.

If planting seeds directly, plant more than necessary so as to make up for any that don't grow. Seeds are generally planted 1 to 1.5 inches deep every 9-12 inches and thinned to 12-15 inches between plants, but check the back of the seed packet for details. Plant seeds in rows 4 to 6 feet apart depending on which type you are planting. Push them into the soil 1 to 1.5 inch deep. Fill these holes by scratching the surface, firm the soil lightly, and cover with a thin mulch of organic material in order to hold soil moisture. Keep moist during the germination period. When the plants are about 3 inches high, thin plants to 12-15 inches.

For transplants, use young plants with 4 to 6 true leaves, wider than tall, stocky, succulent, and slightly hardened to outdoor conditions. Spread and mix organic amendments and a granular phosphorus fertilizer over the area. Make the hole deep enough to bury the stem as far as the first leaf. Place the plant deep into the hole. Press the soil firmly around the plant and water thoroughly to remove any air pockets. If transplanting in the summer, shade the plants in the middle of the day for the first week or use a floating row cover.

Squash like well-drained soil with pH 5.8-7.0. They also have a large root system, up to 4ft deep but the majority of the roots are in the top 12-18 inches of soil, so it is important to try to irrigate to avoid water stress (drying out) and excessive wetness. During harvest too little moisture results in misshapen fruit while too much water will aggravate root and stem diseases.

Sometimes squash ends up bitter, this is because a chemical is produced by the zucchini in response to environmental stress, including high temperatures, wide temperature swings or too little water. Uneven watering practices (too wet followed by too dry), low soil fertility and low soil pH can also contribute to the bitterness.

Squash seeds will store up to 4 years if you keep them in a cool dry place.

FERTLIZING YOUR VEGETABLES

Most vegetables require fertilizer for growth. Organic materials, such as manures and compost, and inorganic materials, such as chemicals, can be used to fertilize plants. Using both types of materials usually provides the best growth. Manures and compost can be used to increase soil fertility. They are usually applied at 1 pound per 4 or 5 square feet. These materials should be worked into the soil several weeks before planting in order to allow it to decompose. Manure that contains straw, sawdust, or similar materials should be applied with a commercial nitrogen fertilizer.

Generally, if the soil has been properly amended with compost or manures or other organic materials, the only nutrient needed is nitrogen, if anything. Some commercial nitrogen fertilizers available are urea, ammonium sulfate, calcium nitrate, and ammonium nitrate. Apply these fertilizers at rates of 0.5 to 1 pound of nitrogen per 100 feet of row.

If manure and other organic material have not been used, apply fertilizer that contains both nitrogen

and phosphorus before planting. All commercial fertilizers are labeled by the percentages of N-P-K; nitrogen (N), phosphorus (P), and potassium (K). Some common mixed fertilizers are 5-10-5, 5-10-10, 8-16-16, and 12-12-12. Apply these fertilizers at rates of 1 - 2 pounds per 100 feet of row. After plants are 3 to 4 inches tall, side dress (place two to four inches beside a row) nitrogen in narrow bands or furrows and water thoroughly after application, or apply through the drip system. Consider light but frequent applications of nitrogen fertilizer every 3 to 4 weeks. Avoid letting the fertilizer come into contact with the plant stems to avoid burning.

POLLINATION AND FRUIT SET

Both male and female flowers develop on the same plant. During the main growing season the ratio of male-female flowers is usually 3:1. The female flower has a miniature fruit at the base and is on a short stem whereas the male is on a longer stem. Pollen must be transferred to the female flowers from the male flowers for fruit to develop and this is mostly done by honey bees. If you need to use insecticides, use them late in the evening to reduce the risk of killing the honey bees.

While easy to grow, zucchini, like all squash, requires plentiful bees for pollination. Where bee populations are in decline or there is high pesticide use, such as mosquito-spray districts, gardeners often experience fruit abortion, where the fruit begins to grow, then dries or rots. This is due to not enough pollen grains delivered to the female flower. When no bees are present in the garden you can pollinate by hand. It can be tedious but is the only way to achieve fruits in the absence of bees. Pollen is yellow and is produced on the structure in the center of the male flower. Use a small artists paint brush to transfer the pollen or you can break off a male flower, remove the petals to expose the pollen bearing structure and roll the pollen onto the stigma in the center of the female flower. It is important to use only freshly opened flowers – they open early in the morning and are receptive for only 1 day.

Gardeners often become concerned when there are early flowers but they don't make fruits. All of the early flowers are males (except in hybrid varieties) and female flowers follow shortly.

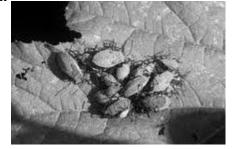
Poor pollination results in small young fruits that turn yellow, shrivel and fall off. Incomplete pollination may also cause misshapen fruit. Cross pollination between the same species of squash can occur (e.g. between crookneck and zucchini) but is not a problem unless you want to save the seeds. More information on growing squash is available from the UC Davis website http://www.ipm.ucdavis.edu/PMG/GARDEN/VEGES/squash.html

PEST MANAGEMENT

Thorough information on pest management for squash can be read at http://www.ipm.ucdavis.edu/PMG/GARDEN/VEGES/squash.html or by contacting your local Cooperative Extension officer, 207 West South St, Bishop, Tel. 760-873-7854; cjellis@ucdavis.edu

The most common pest seems to be squash bugs, they are about 5/8" long and 1/3 as wide. Bugs feed on plant leaves, sucking the sap so the plant wilts and dies. In spring, search for squash bugs hidden under debris, near buildings and in perennial plants. Inspect young plants daily for signs of egg masses,

mating adults, or wilting. Place wooden boards throughout the garden and check under them every morning, then destroy any squash bugs found. The eggs remain in soil or compost overwinter so do not compost infected plants, and plant next years seeds well away from previous infestations.



Problem Probable cause Deformed, curled leaves. Small, soft-bodied aphids insects on undersides of leaves. Sticky honeydew or black, sooty mold may be present. Comments Use insecticidal soap. Fine stippling on leaves; yellow or brown spider mites leaves; leaf undersides silver-gray with fine webbing and yellow, orange, or red dots. Comments Use oil or soap spray. Leaves turn yellow. Honeydew or sooty whiteflies mold present. Clouds of tiny white insects fly up when plant is disturbed. Comments Remove infested plants as quickly as possible. Remove lower, infested leaves of plants not totally infested. Coarse, white stippling on upper surface leafhoppers of leaves. Leaves may turn brown. Comments Consult UC IPM pest note series or Flint 1998 for management options. Blotches or tunnels on leaves. leafminers Consult UC IPM pest note series or Flint 1998 for management options. Angular necrotic areas on leaves. angular leafspot Comments

Caused by waterborne bacterium. Avoid wetting foliage with irrigation water.

Swelling, beads on roots. Wilted plants. Poor yields.

nematodes

Comments

Rotate crops. Use soil solarization.

Holes chewed in leaves. Scarring of runners, young fruit. Wilting. Beetles visible.

cucumber beetles

Comments

Beetles are yellow-green with black stripes or spots. Use pyrethrins.

Leaves have small specks that turn yellow, then brown. Vines wilt from point of attack to end of vine.

squash bug

Comments

Trap adults beneath boards in spring. Turn over boards in morning and kill bugs. Pick off adults, young, egg masses.

White, powdery spots on leaves and stems. powdery mildew Spots may enlarge and completely cover leaf. Defoliation may occur. Yields reduced.

Comments

Spores of powdery mildew fungus are spread by wind and air currents. Disease is less severe in hot, dry weather. Plant resistant varieties. Dusting with sulfur can be effective. Remove old plant debris.

For information on pests check out the UC Davis website http://www.ipm.ucdavis.edu/PMG/P ESTNOTES/pn74144.html

HARVESTING

Because the fruits are harvested when still immature, they bruise and scratch easily. Handle with care and use immediately after picking. Be careful, as the leafstalks and stems are prickly and can scratch and irritate unprotected hands and arms. Use a sharp knife or pruning shears to harvest and wear gloves if possible.

Squash fruit grow about 3/4 to 1 inch per day. Because they develop very rapidly after pollination, they are often picked when they are too large and overmature. The fruit should be harvested when the skin is tender and the seeds immature. Depending on the variety, harvesting can be 4-8 days after pollination.

Pick Zucchini types about 6-8 inches and 1 1/2" in diameter, Pattypan types when 3-4" across, yellow crookneck when 4-7". If you leave the fruit on too long, not only will you have massive, tough fruits, but the plants will set fewer fruits. If the rind is too hard to be dented by a thumbnail, it will not be good to eat. Remove the old fruit and allow a new fruit to develop. Harvest every other day and you can do this for several months.

Slightly larger fruit may be salvaged by hollowing out and using them for stuffing. These larger fruits may also be grated for baking in breads and other items.

Squash Blossoms

Squash blossoms are edible flowers,

raw or cooked. Although summer squash has both male and female flowers, only the female flowers produce fruits so male flowers can be eaten. Harvest only the male blossoms unless the goal is to reduce production. Male blossoms are easily distinguished from the female blossoms. The stem of the male blossom is thin and trim. The stem of the female blossom is very thick. At the base of the female flower below the petals is a small bulge, which is the developing squash.

Always leave a few male blossoms on the vine for pollination purpose. There are always many more male flowers than female.

Use pruning shears or a sharp knife to cut squash blossoms at midday when the petals are open, leaving one inch of stem. Gently rinse in a pan of cool water and store in ice water in the refrigerator until ready to use. The flowers can be stored for up to 1 or 2 days.

Nutritional Value & Health Benefits

Generally, there is little variation in nutritional value between varieties. The peel is where many of the nutrients hide, so never peel summer squash.

Squash are also very low in calories – there are about 16 calories in a cup of raw zucchini, and they are high in vitamins A and C, and niacin while containing useful amounts of folate, potassium. Half a cup of zucchini also contains 19% of the recommended amount of manganese. Nutrition Facts (1 cup sliced, raw zucchini)

Calories 16
Protein 1.31 grams
Carbohydrates 3.27 grams
Dietary Fiber 1.36 grams
Calcium 16.95
Potassium 280.24
Vitamin A 384 IU
Folate 24.93 mcg

STORING SQUASH

Once off the plant, Zucchini will only last briefly, so use within two to three days. They will keep well refrigerated in a plastic bag for no more than five days.

To store summer squash, harvest small squash and place, unwashed in plastic bags in the crisper drawer of the refrigerator. Wash the squash just before preparation as water droplets promote decay during storage.

If you've ever seen them in the supermarket with little sunken pits in the surface of the skin, that's because of chilling damage caused by being brought up to room temperature after cold storage.

Freezing

The best way to preserve squash for the winter is to freeze it. It is one of the cheapest ways to have a ready supply of vegetables for the supper table as long as you have room in the freezer.

The quality of your frozen vegetables can only be as good as the produce that you begin with so the quicker that you freeze them, the more flavor and nutrients that they will have. Wash in cool water, and trim the ends, then slice them in evenly sized pieces – generally quarter them.

To properly freeze vegetables, they need to be blanched in boiling water or steam. This stops the enzyme action that takes place to ripen, or mature the produce. If you simply freeze your squash, the enzyme action continues, causing degrading in color, flavor, and texture.

Prepare a large pot of water and bring it to a rolling boil (when you stir it, the water keeps boiling). Either lower a basket of squash pieces into the water, or carefully pour your squash directly into it. Different vegetables take varying amounts time to properly blanch, but a good rule of thumb is five minutes. The water does not have to return to a rolling boil, but it needs to at least simmer well. Your squash pieces will change from pale to a much brighter shade.

When your squash have blanched, take the basket and plunge it into a waiting ice water bath, or pour the squash and water through a colander, and then place the colander in the ice water. The ice water will stop the vegetable from cooking further, and you can then freeze it in a semi-raw state. The squash need to finish cooling completely for a couple of hours before bagging up for the freezer. Bag them in serving portions that will best suit your family, or a certain recipe. Press out as much air as possible, label your containers with contents, date and amount in the bag. Place flat in the freezer in a single layer until they are frozen. Sometimes a cookie sheet will help with this task.

To use your frozen squash, simply thaw a bag in your refrigerator overnight and use it the next day. An uncomplicated recipe that is great for frozen squash is a basic Squash Casserole.

Dehydrating

This is an easy way to preserve squash, sprinkled with some flavored salt (onion, chili or garlic powder etc) they make excellent snacks for kids and can be taken in a backpack for munching on. During the winter, use the dehydrated squash in casseroles and soups. You can dehydrate slices, but you can also shred them if you are going to add them to soups and casseroles.

Canning squash

There is some debate about preserving squash: This is from the <u>National Center for Home Food</u> <u>Preservation/Canning FAQs</u>

Recommendations for canning summer squashes, including zucchini that appeared in former editions of So Easy to Preserve have been withdrawn due to uncertainty about the determination of processing times. Squashes are low-acid vegetables and require pressure canning for a known period of time that will destroy the bacteria that cause botulism. Documentation for the previous processing times cannot be found, and reports that are available do not support the old process. Slices or cubes of cooked summer squash will get quite soft and pack tightly into the jars. The amount of squash filled into a jar will affect the heating pattern in that jar. It is best to freeze or pickle summer squashes, but they may also be dried.

Pickling squash

Summer squash can be pickled, and relishes made from it. See the recipe section.

COOKING

Squash blossoms

Especially the female blossoms, with tiny fruit attached, are a delicacy when dipped in a batter and fried, however both flowers are edible, and are often used to dress a meal or garnish the cooked fruit.

Firm and fresh blossoms that are only slightly open are cooked to be eaten, with pistils and stamens (little stems on the inside of the flower) removed from the flowers. You can keep the stem on the flowers to hold on to while cooking as the petals are very delicate. Otherwise remove the stems before cooking or serving. There are a variety of recipes in which the flowers may be deep fried as fritters or tempura (after dipping in a light tempura batter), stuffed, sautéed, baked, or used in soups.

In Mexico, the flower is often used as an ingredient for soup, sopa de flor de calabaza, and it is quite popular in a variation of the traditional quesadillas, becoming quesadillas de flor de calabaza. Zucchini is also used in a variety of other dishes (rajas), and as a side dish.

Summer squash

These can be eaten raw on its own, as an appetizer with a dip, in salads, or on sandwiches. They have a high water content (95%) and a sweet and mild flavor that requires little cooking. Some summer squash, such as zucchini, can be grated and added to breads, cakes and muffins. Summer squash can also be added to other vegetables, stews, casseroles, and soups. If using it in a casserole it can be a good idea to steam it or salt it first (see draining below) to remove some of the moisture or the result may be a runny casserole.

Zucchini is best cooked when it's fresh and small as it has more moisture and is less tough. If they are larger they can also have stuffing added to them and then baked.

Draining Squash

Summer squash has a high water content and will sometimes need to be drained, otherwise the dish you are preparing may become too watery. Drain the squash by cutting it into slices, arranging them in a shallow dish, and sprinkling with salt. After 20 to 30 minutes, rinse the slices under cold running water and pat dry.

Boiling

Boiling is not recommended because of the tendency of the squash to become watery and lose much of its flavor. If you really want to, try it one of two ways:

Whole Uncut Squash: Use as little water possible to boil an uncut, unpeeled squash. Poke holes into skin, and boil covered for up to 1 hour. Boil just until tender when poked with a fork.

Cubed Squash: Leave squash unpeeled and cut into 3/4 inch cubes. Place in a pan with very little water and cook for approximately 10 minutes. Cook until just tender.

Baking

- 1. Cut squash in half, remove seeds. The skin should remain on the squash.
- 2. Add a bit of butter to open cavity of each half.
- 3. Place the squash cavity side up in a baking dish with 1 inch of water.
- 4. Bake for 20 minutes to 1 hour, until desired tenderness.

Steaming

Steaming is a good method to use for cooking summer squash.

- 1. Cut the squash in half and remove seeds.
- 2. Cut squash to the desired size and then place them on the steam rack in a saucepan.
- 3. Steam until tender, which will generally take 20 to 45 minutes. The amount of time will vary depending on the quantity and size of pieces being steamed.

Sauté

- 1. Cut top and bottom off and slice squash in quarter inch rounds
- 2. Heat 2tbsp. of olive oil, let the pan fully heat but not until the oil is smoking.
- 3. Begin to brown your squash, tossing it occasionally with a wooden spoon. Sprinkle with seasonings like garlic or onion powder and when it's nearly done, salt and pepper.
- 4. Cook it until it is done as you like it, anywhere between 5 and 10 minutes. Test it to make sure it isn't too firm.
- 5. Don't overcook. A common mistake is letting it cook for too long, leaving you with soggy squash, so keep an eye on it.

Microwaving

- 1. Cut squash in half, remove seeds.
- 2. Place squash cavity down on a microwave safe plate.
- 3. Poke skin once or twice to allow some steam to escape.
- 4. Cover with damp paper towel. Microwave on high for 5 to 20 minutes, until desired tenderness.

Grilling

- 1. Cut squash into 3/8 to 1/2 inch thick slices and then place on bamboo skewers that have been soaked in water for at least 30 minutes.
- 2. Brush squash with melted butter or cooking oil on both sides before placing on the grill.
- 3. Place squash on the grill over direct medium heat.
- 4. Cook for 4 to 5 minutes on each side. Turn when first side is browned.
- 5. The squash is done when it is nicely browned on each side and is tender when poked with a fork. Serve while hot.



Probably the most well-known variety of summer squash. It has dark green or yellow skin covering an off-white flesh. The skin often contains some lighter colored specks or stripes. It is much like a cucumber in size and shape. They are harvested at 7 to 8 inches long, when they are the most flavorful. Large zucchini lose their tenderness and are much less flavorful than the smaller, younger zucchini. Zucchini can be steamed, fried, sautéed, or baked and they are excellent when sliced and grilled. Also referred to as a courgette.

Clockwise: Mature Green Zucchini: Flowered or baby zucchini: Yellow Zucchini



Pattypan Squash

A round flat summer squash that has scalloped edges and is light green, white or yellow in color. The pale green variety turns to white in color if allowed to mature longer. This variety is harvested when it is 3 days to a week old, so the skin, white flesh, and seeds remain tender and edible. Pattypan squash are usually available in sizes ranging from over 1 inch to 4 inches in diameter. The smaller squash are often steamed or braised and served as part of a vegetable dish, providing a slightly sweet, nutty flavor. When they are larger, the top can be sliced off, the flesh scooped out, and the remaining section becomes a bowl that can be stuffed with various meats, vegetables, onions, cheese, or other ingredients and baked.



Crookneck Squash

This has a bulbous rounded shape at the bottom with a tapering curved neck at the top or vine end. It is light yellow with slightly bumpy skin when young, turning to deep yellow and bumpier as it matures. It has a pale meaty flesh that when cooked or eaten raw, provides a slightly sweet flavor. Crookneck squash will be 8 to 10 inches long but are best if picked when they are young at about 6 inches long. It can be used in soups, stew, and side dishes, raw, baked, steamed, broiled, or sautéed. Fresh crookneck squash can be stored in the refrigerator for only about four days or frozen if kept for a longer period of time.



A very small acorn shaped summer squash that has a smooth outer skin accented with a scalloped edging around the middle outside of the squash. When steamed, sautéed or boiled, the flesh provides a delicately mild flavor. This squash is often used as an appetizer with dip, or as an ingredient to be added to salads, soups and stews.



A type of summer squash that comes in crookneck and straightneck varieties. It is much like a zucchini in shape, flavor, and texture, except that the color is yellow. Younger squash have the best flavor and are a bit sweeter than large, overripe squash.



Chayote Squash



A mild flavored, pear-shaped squash. It has a pale green, creased rind and a single soft seed in the center. The chayote's pleasant, mild flavor makes it a versatile vegetable that can be boiled, fried, sautéed, added to soups, stuffed or served as a salad. They are also called Mirlitons. Chayotes are available all year round, but the best time for them is September through December. When selecting, choose those that are about 6 inches long and weigh no more than 4 ounces, with smooth skins that do not have blemishes or soft spots. They will keep 3 to 4 days when wrapped in plastic and stored in the vegetable drawer of the refrigerator.

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