

POTATO CHIPS

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Materials Needed

potatoes, any type including Idaho, russet, or eastern. washed and dried (Allow one medium potato per person - these are usually eaten quickly.)
oil for frying
salt (sodium chloride) Popcorn salt (very finely ground salt) recommended.
paper towels
bowl
colander
deep-fat fryer or electric frying pan
food processor with thin slicing blade (1 mm or 2 mm) recommended. NOTE: Food processor must have a safety lock if it is to be used in a teaching environment.

Safety

Safety glasses or goggles must be worn in the laboratory at all times.

If this experiment is performed in a chemistry laboratory, all work surfaces must be cleaned and free from laboratory chemicals. After cleaning work surfaces, it is advised to cover all work areas with aluminum foil or a food-grade paper covering.

All glassware and apparatus must be clean and free from laboratory chemicals. Use only special glassware and equipment, stored away from all sources of laboratory chemical contamination, and reserved only for food experiments is recommended.

Food processor blades, or other cutting instruments are sharp. Safe handling of any sharp cutting device is necessary.

The oil used in heating will be very hot. Make sure food is dry to avoid spattering. The fryer or frying pan must be placed in the middle of a stable table and the electric cord arranged so that it cannot be pulled or snagged.

There are no safety hazards associated with the food materials used in this experiment.

Disposal

Generally, all waste materials in this experiment can be disposed in the trash or poured down the drain with running water. All disposal must conform to local regulations.

Procedure

Preheat oil in a deep-fat fryer or an electric frying pan to 177-190°C (350-375°F)

If desired, potatoes may be peeled.

Slice the potatoes thin. (If a food processor is used, use a 1 mm or 2 mm slicing blade.) Place the sliced potatoes in a bowl of cold water for five minutes to remove excess starch.

Drain the potatoes in a colander, rinse, then spread on paper towels and pat dry.

Fry the potato slices, a few at a time, so they are not crowded, in the hot oil until they are lightly browned. It may be necessary to turn them while cooking.

Allow the cooked potato chips to cool and drain on paper towels.

Sprinkle lightly with popcorn salt to taste.

Store in an air-tight container.

Variation: Sweet Potato Chips

Preheat oil in a deep-fat fryer or an electric frying pan to 177-190°C (350-375°F)

Peel the potatoes.

Slice the potatoes thin. (If a food processor is used, use a 1 mm or 2 mm slicing blade.) Sweet potatoes are not starchy like white-type potatoes, thus they do not have to be soaked in water to remove excess starch.

Fry the potato slices, a few at a time, so they are not crowded, in the hot oil until they are golden to brown in color. It may be necessary to turn them while cooking.

Allow the cooked potato chips to cool and drain on paper towels. (Note: Sweet potato chips tend to crisp slowly while cooling. They will not be as crispy as potato chips from white potatoes.)

Sprinkle lightly with popcorn salt to taste.

Store in an air-tight container.

Explanation

Potatoes are starchy vegetables. When cooked, the starch becomes gelatinized at about 66°C (150°F). As the temperature rises the surface becomes brown and crisp. Since the potato chip is thin, both the inside and outside are cooked quickly.

For french fried potatoes, the potatoes have to be cooked once at a lower temperature to cook the entire potato strip and then, later, after they have cooled to room temperature, at a higher temperature to crisp the outer layer. The gelatinized starch layer formed on the outside of the potato strip during the first cooking slows absorption of oil during the second cooking.

The sweet potato is not actually a potato which is a relative of the tomato and tobacco. It is the root of a member of the morning glory family. In the US, sweet potatoes are called yams.

Potato crisps are made from potato flour or dehydrated potatoes such as potato flakes for instant mashed potatoes. They are essentially composed of dehydrated potatoes, potato starch, and water. The dough is rolled thin and they are fried in hot oil. A brand such as Pringles, has the dough pressed onto a saddle-like form so that the final product has a distinctive shape and can be stacked into a cardboard tube. Frying takes only a few seconds and a small amount of oil is absorbed during the cooking process.

The author attempted to make potato crisps by making dough from potato flour, potato starch, corn meal, and water. A number of different combinations were tried. In all cases, although the taste of the final product was similar to that of Pringles potato crisps, the main problem encountered was the inability to make the potato crisp rounds thin enough to make a thin chip or crisp. When the rounds were placed in the hot oil, they puffed like small pita breads. This resulted in trapped moisture inside the puff and tended to reduce the crispness of the final product.

Attempts to make a baked potato crisp, similar to Baked Lays, was unsuccessful. The main difficulty was making the dough thin enough and to prevent them from rising or puffing during the baking process.

References

McGee, Harold, *On Food and Cooking*, Charles Scribner's Sons, 1984.