



Vegetable Fermentation Safety Tips

For safe vegetable fermentations make sure to use fresh, good quality vegetables grown using good food safety practices. Ensure vegetables did not contact manure or improperly cured compost that may contain pathogens like *E. coli* or *Salmonella*. Wash hands, equipment, surfaces, vegetables and containers and follow a tested recipe.

Fermentation and pH

pH of food is the measurement of how much acid or base is in a particular food. The more acidic a food is the lower its pH. During fermentation the pH of a food is lowered as lactic acid bacteria convert sugars to acid. This acidity is what provides a preservation affect on the food.

To produce a safe fermented product it is important that the pH drop from around pH 7 to pH 5.2 or lower in the first 24 hours, and then to below pH 4.6 within 48 hours. For this to occur, it is critical that a food's environmental conditions be manipulated to select for optimum growth of lactic acid bacteria. These conditions include:

- Acidity
- Temperature
- Oxygen
- Moisture
- Salt
- Nutrients

Fermentation Temperature

Fermentation temperature allows for pathogens to be destroyed, while inhibiting growth of organisms that can spoil the food. Fermentation temperatures lower than 60°F may not ferment. Temperature above 75°F may result in fermented food being too soft.

Salt

The type and extent of microbial activity is affected by the salt. Salt level also prevents vegetables from becoming soft by aiding in the selection of lactic acid bacteria rather than other bacteria that can break down the vegetable creating softness. It is important to measure salt carefully by weight and use non-iodized salt without anti-caking agents.

Equipment for Fermenting

Make sure you have the proper equipment on hand for fermenting. Aluminum, copper, brass, galvanized or iron containers are not recommended. You will need large stoneware crocks, large glass jars, food grade containers, and weights.

Contamination

After the fermenting process, ensure that the fermented foods do not come into contact with foods that need strict time and temperature for safety, unwashed hands, and unclean food contact surfaces.

Storage

Store fermented foods in the refrigerator (41°F or below) for up to 3 months or process in a boiling water bath canner for shelf stable storage. Sauerkraut can be frozen in freezer bags.

For more information contact ncsafeplates@ncsu.edu