Pickling

Pickling is the process of preserving food by anaerobic fermentation in brine to produce lactic acid, or marinating and storing it in an acid solution, usually vinegar (acetic acid). The resulting food is called a pickle. This procedure gives the food a salty or sour taste. In South Asia, edible oils are used as the pickling medium with vinegar.

Another distinguishing characteristic is a pH less than 4.6,[1] which is sufficient to kill most bacteria. Pickling can preserve perishable foods for months. Antimicrobial herbs and spices, such as mustard seed, garlic, cinnamon or cloves, are often added.[2] If the food contains sufficient moisture, a pickling brine may be produced simply by adding dry salt. For example, German sauerkraut and Korean kimchi are produced by salting the vegetables to draw out excess water. Natural fermentation at room temperature, by lactic acid bacteria, produces the required acidity. Other pickles are made by placing vegetables in vinegar. Unlike the canning process, pickling (which includes fermentation) does not require that the food be completely sterile before it is sealed. The acidity or salinity of the solution, the temperature of fermentation, and the exclusion of oxygen determine which microorganisms dominate, and determine the flavor of the end product.[3]

When both salt concentration and temperature are low, Leuconostoc mesenteroides dominates, producing a mix of acids, alcohol, and aroma compounds. At higher temperatures Lactobacillus plantarum dominates, which produces primarily lactic acid. Many pickles start with Leuconostoc, and change to Lactobacillus with higher acidity.

History

Pickling began 4000 years ago using cucumbers native to India. It is called "achar" in northern India. This was used as a way to preserve food for out-of-season use and for long journeys, especially by sea. Salt pork and salt beef were common staples for sailors before the days of steam engines. Although the process was invented to preserve foods, pickles are also made and eaten because people enjoy the resulting flavors. Pickling may also improve the nutritional value of food by introducing B vitamins produced by bacteria.[4]

Pickle etymology

The term pickle is derived from the Dutch word pekel, meaning brine. In the U.S. and Canada, the word pickle alone almost always refers to a pickled cucumber[citation needed] (other types of pickles will be
Pickling described as "pickled onion," "pickled cauliflower," etc.), except when it is used figuratively. In the UK, pickle (as in a "cheese and pickle sandwich") refers to Ploughman’s pickle, a kind of chutney.

**Popularity of pickles around the world**

**Asia**

**South Asia**

India has a large variety of pickles (known as Achar in Punjabi and Hindi, Uppinakaayi in Kannada, Lonacha in Marathi, Oorukai in Tamil, ooragaya in Telugu), which are mainly made from varieties of mango and lime; and Indian gooseberry (amla), chilli, vegetables such as egg plants, carrots, cauliflower, tomato, bitter gourd & green tamarind, ginger, garlic, onion, citron are also occasionally used. These fruits/vegetables are generally mixed with some ingredients like salt, spices, vegetable oils and is set to mature in moisture less medium.

In Pakistan, pickles are known locally as Achaar (in Urdu) and come in a variety of flavours. Amongst some of the most popular is the traditional mixed Hyderabadi pickle, a common delicacy and staple prepared from an assortment of fruits (most notably mangoes) and vegetables blended with selected spices.

**East Asia**

Indonesian and Malaysian pickles, acar are typically made out of cucumber, carrot, bird’s eye chilies, and shallots, these items being seasoned with vinegar, sugar and salt. Fruits, such as papaya and pineapple are also sometimes pickled. In the Philippines, achara is primarily made out of green papaya, carrots, and shallots, with cloves of garlic and vinegar. In Vietnam, vegetable pickles are called du'a muôi (salted vegetables) or du'a chua (“sour vegetables”).

In Sri Lanka, achcharu is traditionally prepared out of carrots, onions, and ground dates. Mixed with mustard powder, ground pepper, crushed ginger, garlic and vinegar, these items are seasoned in a clay pot.

China is home to a huge variety of pickled vegetables, including radish, baicai (Chinese cabbage, notably suan cai, la bai cai, pao cai, and Tianjin preserved vegetable), zha cai, chili pepper and cucumber, among many others.

Japanese tsukemono (pickled foods) include takuan (daikon), umeboshi (ume plum), gari & beni shoga (ginger), turnip, cucumber, and Chinese cabbage.

The Korean staple kimchi is usually made from pickled cabbage and radish, but is also made from green onions, garlic stems, chives and a host of other vegetables. Kimchi is popular throughout East Asia. Jangajji is another example of pickled vegetables.
Middle East
In Arab countries, pickles (called *mekhallal* in Arabic) are commonly made from turnips, peppers, carrots, green olives, cucumbers, beetroot, cabbage, lemons, and cauliflower.

Western Asia
In Iran, pickles (called *torshi* in Persian) are commonly made from turnips, peppers, carrots, green olives, cucumbers, cabbage, lemons, and cauliflower.

Turkish pickles, called *turşu*, are made out of vegetables, roots, and fruits such as peppers, cucumber, Armenian cucumber, cabbage, tomato, eggplant (aubergine), carrot, turnip, beetroot, green almond, baby watermelon, baby cantaloupe, garlic, cauliflower, bean and green plum. A mixture of spices flavor the pickles.

Europe

Central and Eastern Europe
Romanian pickles are made out of beetroot, cucumbers, green tomatoes (*gogonele*), carrots, cabbage, bell peppers, melons, mushrooms, turnips, celery and cauliflower. Meat, like pork, can also be preserved in salt and lard.

Polish and Czech traditional pickles are cucumbers and cabbage, but other pickled fruits and vegetables, including plums, pumpkins and mushrooms are also common.

Russian pickled items include beets, mushrooms, tomatoes, cabbage, cucumbers, ramsons, garlic, eggplant (which is typically stuffed with julienned carrots), custard squash, and watermelon.

In Ukraine, garden produce is commonly pickled using salt, dill, currant leaves and garlic and is stored in a cool, dark place.
Western Europe

In Britain, pickled onions and pickled eggs are often sold in pubs and fish and chip shops. Pickled beetroot, walnuts, and gherkins, and condiments such as Pickle and piccalilli are typically eaten as an accompaniment to pork pies and cold meats, sandwiches or a ploughman’s lunch. Other popular pickles in the UK are pickled mussels, cockles, red cabbage, mango chutney, sauerkraut, and olives.

Southern Europe

An Italian pickled vegetable dish is giardiniera, which includes onions, carrots, celery and cauliflower. Many places in southern Italy, particularly in Sicily, pickle eggplants and hot peppers.

In Albania, Bulgaria, Serbia, Macedonia and Turkey, mixed pickles, known as turshi or turshu form popular appetizers, which are typically eaten with rakia. Pickled green tomatoes, cucumbers, carrots, bell peppers, peppers, eggplants, and sauerkraut are also popular.

In Greece, pickles, called rougoi(α), are made out of carrots, celery, eggplants stuffed with diced carrots, cauliflower, tomatoes, and peppers.

Northern Europe

Pickled herring, rollmops, and salmon are popular in Scandinavia. Pickled cucumbers and red garden beets are important as condiments for several traditional dishes. Pickled capers are also common in Scandinavian cuisine.

North America

In the United States and Canada, pickled cucumbers (most often referred to simply as "pickles" in Canada and the United States), olives, and sauerkraut are most popular, although pickles popular in other nations are also available. Giardiniera, a mixture of pickled peppers, celery and olives, is a popular condiment in Chicago and other cities with large Italian-American populations, and is often consumed with Italian beef sandwiches. Pickled eggs are common in the Upper Peninsula of Michigan. Pickled herring is available in the Upper Midwest. Pennsylvania Dutch Country has a strong tradition of pickled foods, including chow-chow and red beet eggs. In the Southern United States, pickled okra and watermelon rind are popular, as are deep-fried pickles and pickled pig’s feet, chicken eggs, quail eggs and pickled sausage. In Mexico, chili peppers, particularly of the Jalapeño and serrano varieties, pickled with onions, carrots and herbs form common condiments. Various pickled vegetables, fish, or eggs may make a side dish to a Canadian lunch or dinner. It has become quite trendy across Canada to pickle vegetables at home in Bernardin mason jars.

Mexico & Central America

In the Mesoamerican region pickling is known as "encurtido" or "curtido" for short. The pickles or "curtidos" as known in Latin America are served cold, as an appetizer, as a side dish or as a tapas dish in Spain. In several Central American countries it is prepared with cabbage, onions, carrots, lemon, vinegar, oregano, and salt. In Mexico, "curtido" consists of carrots, onions, and jalapeño peppers and used to accompany meals still common in taquerias and restaurants. In order to prepare a carrot "curtido" simply add carrots to vinegar and other ingredients that are common to the region such as chilli, tomato & onions. Varies depending on the food, in the case of sour. Another example of a type of pickling which involves the pickling of meats or seafood is the "escabeche" or "ceviches" popular in Peru, Ecuador & throughout Latin America & the Caribbean. These dishes include the pickling of pig’s feet, pig’s ears,& gizzards prepared as an "escabeche" with spices & seasonings to flavor it. The ceviches consists of
shrimp, octopus & various fishes seasoned & served cold.

The pickling process

In chemical pickling, the jar and lid are first boiled in order to sterilize them. The fruits or vegetables to be pickled are then added to the jar along with either brine or vinegar or both, as well as spices, and are then allowed to ferment until the desired taste is obtained.

The food can be pre-soaked in brine before transferring to vinegar. This reduces the water content of the food which would otherwise dilute the vinegar. This method is particularly useful for fruit and vegetables with a high natural water content.

In commercial pickling, a preservative like sodium benzoate or EDTA may also be added to enhance shelf life. In fermentation pickling, the food itself produces the preservation agent, typically by a process that produces lactic acid.

Alum was once used as a preservative in pickling and is still approved as a food additive by the U.S. Food and Drug Administration, but alum in repeated small doses may cause brain damage.[6]

Health benefits

Traditionally manufactured pickles are a source of healthy probiotic microbes, which occur by natural fermentation in brine (salt+water), but pickles produced using vinegar are not probiotic. Beneficial bacteria grow in salt water and sour mixture and make traditional pickle probiotic.

Possible health hazards of pickled vegetables

The World Health Organization has listed pickled vegetables as a possible carcinogen, and the British Journal of Cancer released an online 2009 meta-analysis of research on pickles as increasing the risks of esophageal cancer. The report cites a potential two-fold increased risk of oesophageal cancer associated with Asian pickled vegetable consumption. Results from the research are described as having "high heterogeneity" and the study said that further well-designed prospective studies were warranted. However, their results stated "The majority of subgroup analyses showed a statistically significant association between consuming pickled vegetables and Oesophageal Squamous Cell Carcinoma".

The 2009 meta-analysis reported heavy infestation of pickled vegetables with fungi. Some common fungi can facilitate the formation of N-nitroso compounds, which are strong oesophageal carcinogens in several animal models. Roussin red methyl ester, a non-alkylating nitroso compound with tumour-promoting effect in vitro, was identified in pickles from Linxian in much higher concentrations than in samples from low-incidence areas. Fumonisin mycotoxins have been shown to cause liver and kidney tumours in rodents.
Further information

• Brining
• Indian pickle
• Lemon pickle
• Mixed pickle
• Pickled cucumber
• Pickled egg
• Pickled herring
• Pickled snakes
• Pickling salt
• Peter Piper
• Pickled pepper

Other home food preservation methods

• Drying
• Fermentation
• Home canning
• Smoking
• Sugaring
• Confit

References

[2] Antimicrobial Effects of Mustard Flour and Acetic Acid (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC154497/)

External links

• Fermented Fruits and Vegetables. A Global Perspective. (http://www.fao.org/docrep/x0560e/x0560e00.htm)
  Food and Agriculture Organization of the United Nations.
• National Center for Home Food Preservation: How do I...Pickle (http://www.uga.edu/nchfp/how/can6b_pickle.html)
• Pickles (BBC) (http://www.bbc.co.uk/dna/h2g2/A3100168)
• (http://www.nature.com/bjc/journal/v101/n9/full/6605372a.html) British Journal of Cancer Review of Research involving cancer risk from pickled vegetable consumption
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