

Pickling

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Pickling is the process of preserving or expanding the lifespan of food by either anaerobic fermentation in brine or immersion in vinegar. The resulting food is called a *pickle*, or, to prevent ambiguity, prefaced with the adjective *pickled*. The pickling procedure will typically affect the food's texture and flavor. In East Asia, vinaigrette (vegetable oil and vinegar) is also used as a pickling medium. Foods that are pickled include meats, fruits, eggs, and vegetables.^[1]

Another distinguishing characteristic is a pH 4.6 or lower,^[2] 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.^[3] 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.^[4]

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.^[4]

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History

Pickling began 4000 years ago using cucumbers native to 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.^[5]

Etymology

The term *pickle* is derived from the Dutch word *pekel*, meaning *brine*. In the U.S. and Canada, and sometimes Australia and New Zealand, the word *pickle* alone almost always refers to a pickled cucumber, except when it is used figuratively. It may also refer to other types of pickles such as "pickled onion", "pickled cauliflower", etc. In the UK, pickle, as in a "cheese and pickle sandwich", may also refer to Ploughman's pickle, a kind of chutney.

Popularity of pickles around the world

Asia

South Asia

South Asia has a large variety of pickles (known as *achar* in Assamese, Punjabi, Hindi, Bengali, *uppinakaayi* in Kannada, *lonacha* in Marathi, *uppilittathu* or *achar* in Malayalam *oorukai* in Tamil, *ooragaya* in Telugu), which are mainly made from varieties of mango, lemon, lime, goongura(a sour leafy shrub), tamarind and Indian gooseberry (amla), chilli. Vegetables such as brinjal, carrots, cauliflower, tomato, bitter gourd, green tamarind, ginger, garlic, onion, and citron are also occasionally used. These fruits and vegetables are generally mixed with ingredients like salt, spices, and vegetable oils and are set to mature in a moistureless medium.

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

In Sri Lanka, *achcharu* is traditionally prepared from carrots, onions, and ground dates that are mixed with mustard powder, ground pepper, crushed ginger, garlic, and vinegar, and left to sit in a clay pot.

Southeast Asia

Singapore, Indonesian and Malaysian pickles, called *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. Other versions could include ginger, bell peppers, white radishes, cucumbers or bamboo shoots. Separately, in some provinces, unripe mangoes or *burong mangga*, unripe tomatoes, green apple guavas, jicama turnips, bitter gourd and other fruit and vegetables are also pickled. Siling labuyo, sometimes with garlic and red onions, are also pickled in bottled vinegar. The spiced vinegar itself is a staple condiment in Filipino cuisine.

In Vietnam, vegetable pickles are called *dưa muối* ("salted vegetables") or *dưa chua* ("sour vegetables"). In Burma, tea leaves are pickled to produce lahpet, which has strong social and cultural importance.

East Asia

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 cucumbers, 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 napa 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.

Western Asia

In Iran, Turkey, Arab countries, the Balkans, and the Caucasus, pickles (called torshi in Persian, *turşu* in Turkish language and *mekhallel* in Arabic) are commonly made from turnips, peppers, carrots, green olives, cucumbers, cabbage, green tomatoes, lemons, and cauliflower.



Kimchi is a very common side dish in Korea.

Europe

Central and Eastern Europe



Coriander seeds are one of the spices popularly added to pickled vegetables in Europe.

In Hungary the main meal (*lunch*) usually goes with some kind of pickles (*savanyúság*) but they are commonly consumed at other times of the day too. The most commonly consumed pickles are sauerkraut (*savanyú káposzta*), the different kinds of pickled cucumbers and peppers and *csalamádé* but tomatoes, carrots, beetroot, baby corn, onions, garlic, certain squashes and melons and a few fruits like plums and apples are used to make pickles too. Stuffed pickles are specialties usually made of peppers or melons pickled after being stuffed with a cabbage filling. Pickled plum stuffed with garlic is a unique Hungarian type of pickle just like *csalamádé* and leavened cucumber (*kovászos uborka*). *Csalamádé* a type of mixed pickle made of cabbage, cucumber, paprika, onion, carrot, tomatoes and bay leaf mixed up with vinegar as the fermenting agent. Leavened cucumber, unlike other types of pickled cucumbers

that are around all year long, is rather a seasonal pickle produced in the summer. Cucumbers, spices, herbs and slices of bread are put in a glass jar with salt water and kept in direct sunlight for a few days. The yeast from the bread, along with other pickling agents and spices fermented under the hot sun, give the cucumbers a unique flavor, texture and slight carbonation. Its juice can be used to make a special type of spritzer (*Újházy fröccs*) instead of carbonated water. It is common for Hungarian households to produce their own pickles. Different regions or towns have their special recipes unique to them. Among them all the Vecsési Sauerkraut (*Vecsési savanyú káposzta*) is the most famous.

Romanian pickles (*murături*) are made out of beetroot, cucumbers, green tomatoes (*gogonele*), carrots, cabbage, garlic, sauerkraut (bell peppers stuffed with 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 sauerkraut, but other pickled fruits and vegetables, including plums, pumpkins and mushrooms are also common.

Russian, Ukrainian and Belarusian pickled items include beets, mushrooms, tomatoes, sauerkraut, cucumbers, ramsons, garlic, eggplant (which is typically stuffed with julienned carrots), custard squash, and watermelon. In these countries garden produce is commonly pickled using salt, dill, blackcurrant leaves, bay leaves and garlic and is stored in a cool, dark place.

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.

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.

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

Northern 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 Branston 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. Rollmops are also quite widely available under a range of names from various producers both within and out of the UK.



Torshi, traditional pickles in Southeast Europe, Western Asia and the Caucasus



Pickled tomatoes are common in CIS

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.

United States and Canada

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.

Canadian pickling is similar to that of Britain. Through the winter, pickling is an important method of food preservation. Pickled cucumbers, onions, and eggs are very popular. Chow Chow is a tart vegetable mix popular in the Maritime Provinces and the Southern United States, similar to picalily. Pickled fish is very popular, as in Scotland. Meat is often also pickled or preserved in different brines throughout the winter, most prominently in the harsh climate of Newfoundland.

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, pickled chicken eggs, pickled quail eggs, pickled Garden vegetables and pickled sausage.^{[6][7]} 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.

In the United States, National Pickle Day is a popular food holiday every year on November 14.^[8]

Mexico, Central America, and South 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, and 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, and throughout Latin America and the Caribbean. These dishes include the pickling of pig's feet, pig's ears, and gizzards prepared as an "escabeche" with spices and seasonings to flavor it. The ceviches consists of shrimp, octopus, and various fishes seasoned and served cold.

Process

In traditional pickling fruit or vegetables are submerged in a brine (20-40 grams/L of salt (3.2–6.4 oz/imp gal or 2.7–5.3 oz/US gal)) or shredded and salted as in sauerkraut preparation and held underwater by flat stones layered on top.^[9] Alternatively a lid with an airtrap or a tight lid could be used if the lid is able to release pressure which might result from carbon dioxide build up. When using an open container it should be covered with cloth to keep insects away.

^[10] Mold or (white) kahm yeast may form on the surface and should be removed. Kahm yeast is mostly harmless but can impart an off-taste.^[11]

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 brine, vinegar, or both, as well as spices, and are then allowed to mature 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.



A dish of giardiniera



Vase by Bát Tràng porcelain for pickling

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 involving *Lactobacillus* bacteria that produce lactic acid as the preservative agent.

Alum is used in pickling to promote crisp texture and approved as a food additive by the United States Food and Drug Administration.

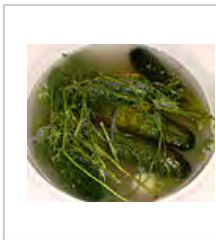
"Refrigerator pickles" are unfermented pickles made by marinating fruit or vegetables in a seasoned vinegar solution. They must be stored under refrigeration or undergo canning to achieve long-term storage.^[12]

Possible health hazards of pickled vegetables

The *British Journal of Cancer* released an online 2009 meta-analysis of research on pickles as increasing the risks of esophageal cancer. The report, citing limited data in a statistical meta analysis, indicates 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.^[13]

Some common fungi can facilitate the formation of N-nitroso compounds, which are strong oesophageal carcinogens in several animal models.^[14] Roussin red methyl ester,^[15] 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.^[13]

Gallery



Pickled cucumbers



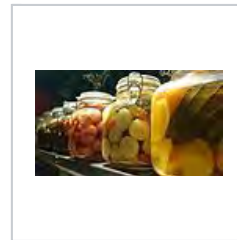
Pickled herring



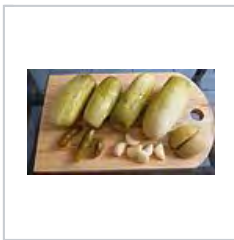
Pickled mushrooms



Pickled olives



Pickled vegetables



Fermented homemade pickled cucumber, chili pepper, garlic, and apple in the hot climate of Indonesia

Further information

- Brining
- Fermentation
- Home canning
- List of pickled foods
- Marination
- Pickling salt

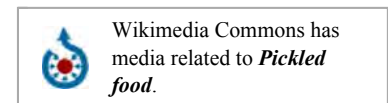
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 - Pickled Pigs Feet Recipe (<http://www.soulfoodandsoutherncooking.com/pickled-pigs-feet-recipe.html>)
 - <http://www.food.com/food-holidays/pickle-day-1114>
 - Fermentations weights (<http://www.makesauerkraut.com/fermentation-weights/>) on MakeSauerkraut.com
 - Discussion (<http://www.wildfermentation.com/aerobic-vs-anaerobic-fermentation-controversy/>) of aerobic versus anaerobic fermentation on WildFermentation.com
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External links

- [1]



(http://rbth.com/multimedia/video/2014/10/08/delicious_tv_salted_porcini_mushrooms_vs_marinated_milky_cap_40443.html) Pickling mushrooms

- 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>)

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Categories: Food preparation | Food preservation | Cooking techniques | Pickles | World cuisine | Culinary terminology

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