

= Deep frying =

Deep frying (also referred to as deep fat frying) is a cooking method in which food is submerged in hot fat , most commonly oil , rather than the shallow oil used in conventional frying , done in a frying pan . Normally , a deep fryer or chip pan is used for this ; industrially , a pressure fryer or vacuum fryer may be used . Deep frying may also be performed using oil that is heated in a pot . Deep frying is classified as hot @-@ fat cooking method Typically , deep frying cooks foods quickly : all sides of a food are cooked simultaneously as oil has a high rate of heat conduction .

The term " deep frying " and many modern deep @-@ fried foods were not invented until the 19th century , but the practice has been around for millennia . Early records and cookbooks suggest that the practice began in a few European and Arabian countries before other countries adopted the practice .

Deep frying is popular worldwide , with deep @-@ fried foods accounting for a large portion of global caloric consumption . Many foods are deep @-@ fried and cultures surrounding deep frying have developed , most notably in the Southern United States , where many events dedicated to deep frying food and non @-@ edible items are held .

= = History = =

Although the nouns " deep @-@ fried " , " deep @-@ frying " , and the verb " deep @-@ fry " were not documented until 1916 , 1932 , and 1933 (respectively) ; the practice of deep frying food has been around much longer . One of the earliest known practices of deep frying came from the Egyptians in the 5th millennium BCE . Later developments included the Greeks deep frying food in olive oil in the 5th century BCE . In the 1st century CE , a Roman cookbook , Apicius , appears to list the ancient Romans ' first use of deep frying to prepare Pullum Frontonianum , a chicken dish . The practice of deep frying spread to other parts of Europe and Arabia in the following centuries . Deep @-@ fried foods such as funnel cakes arrived in northern Europe by the 13th century , and deep @-@ fried fish recipes have been found in cookbooks in Spain and Portugal at around the same time . Falafel arrived in the Middle East from population migrations from Egypt as soon as the 14th century . The deep frying of food in Japan was likely introduced by Portuguese the 16th century . Evidence of potato frying can be found as early as the late 17th century in Europe .

Modern deep frying began in the 19th century with the growing popularity of cast iron , particularly around the American South which led to the development of many modern deep @-@ fried dishes . French fries , invented in the late 18th century , became popular in the early 19th century western Europe . Doughnuts were invented in the mid @-@ 19th century , with foods such as onion rings , deep @-@ fried turkey , and corn dogs all being invented in the early 20th century . In recent years , the growth of fast food has expanded the reach of deep @-@ fried foods , especially French fries .

= = Technique = =

Deep frying food is defined as a process where food is completely submerged in hot oil at temperatures typically between 350 ° F (177 ° C) and 375 ° F (191 ° C) . One common method for preparing food for deep frying involves adding multiple layers of batter around the food , such as cornmeal , flour , or tempura ; breadcrumbs may also be used . After the food is submerged in oil , the surface of it begins to dehydrate and it undergoes Maillard reactions which break down sugars and proteins , creating the golden brown exterior of the food . Once the surface is dehydrated , it forms a crust which prevents further oil absorption . The heat conducts throughout the food causing proteins to denature , starches to undergo starch gelatinization , and dietary fiber to soften .

While most foods need batter coatings for protection , it is not as necessary for cooked noodles and potatoes because their high starch content enables them to hold more moisture and resist shrinking . Meats may be cooked before deep frying to ensure that they are done inside while keeping juiciness .

When performed properly , deep frying does not make food excessively greasy , because the

moisture in the food repels the oil . The hot oil heats the water within the food , steaming it ; oil cannot go against the direction of this powerful flow because (due to its high temperature) the water vapor pushes the bubbles toward the surface . As long as the oil is hot enough and the food is not immersed in the oil for too long , oil penetration will be confined to the outer surface . Foods deep @-@ fried at proper temperatures typically absorb " no more than a couple of tablespoons per 2 1 ? 2 cups of oil " used . This oil absorption rate is around the same as occurs with shallow frying , such as in a pan .

However , if the food is cooked in the oil for too long , much of the water will be lost and the oil will begin to penetrate the food . The correct frying temperature depends on the thickness and type of food , but in most cases it lies between 350 ? 375 ° F (177 ? 191 ° C) . An informal test for a temperature close to this range involves adding a tiny amount of flour into the oil and watching to see if it sizzles without immediately burning . A second test involves adding one piece of food to deep fry and watching it sink somewhat and rise back up . Sinking without resurfacing indicates that the oil is too cold ; not sinking at all indicates that the oil is too hot .

It is recommended that deep fryers be cleaned often to prevent contamination . The process of cooking with oil can also contaminate nearby surfaces as oil may splatter on adjacent areas . Oil vapors can also condense on more distant surfaces such as walls and ceilings . Supplies such as dish detergent and baking soda can effectively clean affected surfaces .

= = Tools = =

Deep frying is done with a deep fryer , a pan such as a wok or chip pan , a Dutch oven , or a cast @-@ iron pot . Additional tools include fry baskets , which are used to contain foods in a deep fryer and to strain foods when removed from the oil , and cooking thermometers , used to gauge oil temperature . Tongs , slotted spoons , wooden spoons , and sieves may be used to remove or separate foods from the hot oil .

Japanese deep frying tools include long metal chopsticks ; the agemono @-@ nabe deep frying pot , which is heavy for retaining heat and deep for holding oil ; the ami @-@ shakushi net ladle used for scooping out batter debris ; and the abura @-@ kiri oil drying rack pan .

Deep frying tools

= = Dishes , foods , and culture = =

Deep @-@ fried foods are common in many countries , and have also been described as " a staple of almost all street cuisines on all continents " . There are hundreds of dishes that are associated with deep frying as most foods can be deep @-@ fried . Examples of food that can be deep @-@ fried include meat , poultry , fish and vegetables . Fish and chips , for instance , combines deep @-@ fried fish and deep @-@ fried potatoes . French fries , doughnuts , onion rings , and hushpuppies are common deep @-@ fried foods . Other common deep @-@ fried foods include Chinese You Bing deep @-@ fried pancakes , Southeast Asian Jin deui , and Japanese tempura . Less common deep @-@ fried foods include maple leaves , peanut butter and jelly sandwiches , pizza , and Snickers bars .

In the United States , the Chicago Tribune notes that " you can deep fry almost anything " . The American South has been noted as a modern center of innovation in the area of deep @-@ fried food . According to the owner of a deep frying restaurant in the South , " If something is edible , you can bet that someone south of the Mason @-@ Dixon line has tried to cook it in oil .

= = = Africa = = =

In Northern Africa , deep @-@ fried dishes are a part of the cuisine . A common food in this region is the deep @-@ fried fritter , also referred to as " sponges " . In areas of Southern Africa , street foods include deep @-@ fried potato and cassava chips . Deep @-@ fried foods in the country of South Africa include fish and chips , vetkoek and koeksisters , among others .

== Asia ==

Japanese tempura is a popular deep @-@ fried food that generally consists of battered and fried seafood and vegetables . Japanese deep @-@ fried dishes , or Agemono , include other styles besides tempura , such as Karaage , Korokke , Kushikatsu , and Tonkatsu . In areas of south @-@ east Asia such as Thailand , insects are commonly deep @-@ fried for human consumption . Western @-@ style fast food items such as donuts , deep @-@ fried chicken , and deep @-@ fried potatoes are also becoming popular in Asia .

Deep @-@ fried fish , tofu , and ch? giò are commonly eaten in Vietnamese cuisine . Deep frying is also used to make several kinds of bánh , including bánh rán (fried rice ball) , bánh cam (sesame ball) , bánh tiêu (hollow doughnut) , bánh r? (sweet potato pancake) , bánh chuối chiên (banana fritter) , H? Tây ? style bánh tôm (shrimp fritter) , and bánh gối (pillow cake) .

Deep @-@ fried sticks of dough , known as youtiao in Chinese , are eaten in many East and Southeast Asian cuisines .

In Hong Kong , deep @-@ fried intestine of pigs is a popular food .

== Europe ==

Many countries in Europe use pure or hydrogenated rapeseed oil for deep @-@ frying . The deep @-@ fried Mars bar originated in Scotland , with The Carron Fish Bar in Stonehaven claiming to have invented it in the early 1990s . Fish and chips is a very popular deep @-@ fried dish in England since it originated in London in the 19th century and became popular among the working class . Its popularity continues with 229 million portions of fish and chips being sold annually in England .

There is an annual trade fair devoted to deep @-@ fried foods called the International Symposium on Deep @-@ Fat Frying which features discussions on deep fat frying as well as exhibitions by companies involved with the process .

Belgian tradition requires French fries to be deep @-@ fried in filtered fat of cattle , locally called blanc de boeuf or ossewit .

== North America ==

In the United States , soybean oil is often used for deep @-@ frying . Beignets , originally a French dish , are a popular deep @-@ fried pastry in the U.S. city of New Orleans . Deep @-@ fried food has been a core part of the culture of the American South with many restaurants solely serving deep @-@ fried foods . The owner of one such restaurant has said that the deep @-@ fried food , " in the South it 's a way of life " . Fast food is one of the most common ways to consume deep @-@ fried food in North America .

Novelty deep @-@ fried foods are popular today in American fairs , especially those in the American South . Hundreds of items are served at these fairs . Some of them include deep @-@ fried beer , butter , and bubblegum . Additionally , deep frying can be used as a form of artwork by frying non @-@ edible objects , such as electronics . Artists such as Henry Hargreaves have deep @-@ fried replicas of electronic items such as iPads , Game Boys , and laptops .

Deep @-@ fried food contests are frequently held at fairs such as the Texas State Fair , where they hold an annual contest for the most creative deep @-@ fried food . Notable past winners have included fried Coke and deep @-@ fried butter , both invented by Abel Gonzales . Since 2013 , an American reality competition show called deep @-@ fried Masters , produced by Discovery Networks , holds deep frying competitions at several state fairs across the country .

== Oceania ==

Milk bars in Australia may purvey several types of deep @-@ fried foods , along with other food

types .

== South America ==

The buñuelo , a fried dough ball popular in Central America and Greece , is a popular deep @-@ fried snack and street food in South America . Picarone , a Peruvian dessert originated in the colonial period , are deep @-@ fried cakes made with pumpkin and sweet potatoes , popular in Peru and Chile , especially during harvest festivals .

== Oil deterioration ==

Overheating or over @-@ using the frying oil leads to formation of rancid @-@ tasting products of oxidation , polymerization , and other deleterious , unintended or even toxic compounds such as acrylamide (from starchy foods) . Recent research suggests fat deterioration may be worse when fat or oil is fried with food than when fat or oil is tested on its own in a laboratory . Deep @-@ frying under vacuum helps to significantly reduce acrylamide formation , but this process is not widely used in the food industry due to the high investment cost involved .

Some useful tests and indicators of excessive oil deterioration are the following :

Sensory ? darkening , smoke , foaming , thickening , rancid taste and unpleasant smell when heating . This is the most unreliable way to decide when to change oil because those are very individual factors and can depend on different causes .

Testing strips ? decide when to change oil depending on FFA (free fatty acids) only

Oiltester ? measurement tool to exactly define the point of change oil by TPM / TPC (Total polar material / compounds)

Laboratory ? acidity , anisidine value , viscosity , total polar compounds , polymeric triglycerides .

Instruments that indicate total polar compounds , currently the best single gauge of how deep @-@ fried an object is , are available with sufficient accuracy for restaurant and industry use .

== Hazards ==

Cooking oil is flammable , and fires may be caused by it igniting at too high a temperature . Further , attempts to extinguish an oil fire with water cause an extremely dangerous condition , a boilover , as they cause the water to flash into steam due to the high heat of the oil , in turn sending the burning oil in all directions and thus aggravating the fire . This is the leading cause of house fires in the United Kingdom . Instead , oil fires must be extinguished with a non @-@ water fire extinguisher or by smothering . Other means of extinguishing an oil fire include application of dry powder (e.g. , baking soda , salt) or fire fighting foam . Most commercial deep fryers are equipped with automatic fire suppression systems using foam .

Spilled hot cooking oil can also cause severe third degree burns , In the worst @-@ case scenario , severe burns can be fatal . The higher temperatures and tendency of oil to stick to the skin make spilled hot cooking oil far more dangerous than spilled hot water . Children can accidentally place their hands on top of the stove , playing with the materials while being cooked , or accidentally pull the pot down , which can cause significant injury . The utmost care should be used when deep frying when children are present , to protect their safety at all times .

== Effects ==

== Environmental ==

Deep frying produces large amounts of waste oil , which must be disposed of properly . Waste oil can overflow sewage systems , bind to the walls of sewage pipes , and interfere with sewage treatment . Waste oil from deep frying is increasingly being recycled and refined into biodiesel .

Potatoes that are stored in artificially humidified warehouses contain more water , which makes the time required to deep fry them into chips longer . This increases the carbon dioxide footprint of commercially producing chips because more energy is required for frying over a longer time . According to one source , an average home appliance deep fryer draws 2 @, @ 000 watts .

= = = Health = = =

The process of deep frying food is generally detrimental to its nutritional value . The oils that foods absorb in their batter typically contain large amounts of fats , especially saturated fats and trans fats . Consumption of large amounts of saturated and trans fats has been linked to a higher risk for some cancers including prostate cancer . Eating deep @-@ fried foods has also been linked to higher cholesterol levels , obesity , heart attacks , and diabetes . Deep @-@ fried foods cooked at certain temperatures can also contain acrylamide , a possible carcinogen . Additionally , fat degradation processes during deep frying results in the loss of nutritional value in deep @-@ fried foods .

Some studies have found that deep frying in olive and sunflower oils has been found to be less of a detriment to health and in some cases have positive effects on insulin levels . Oil can be reused a few times after original use after straining out solids . However , excessive use of the same oil can cause it to break down and release compounds into the food that may be carcinogenic , affect liver health , or influence the body 's ability to absorb vitamins . Some European countries have set public health standards for the safety of frying oil .