[Template:About](/wiki/Template:About" \o "Template:About)

[thumb|225px|Kombucha including the culture](/wiki/Image:Kombucha_Mature.jpg) **Kombucha** is a variety of [fermented](/wiki/Fermentation), lightly [effervescent](/wiki/Effervescent) sweetened [black](/wiki/Black_tea) or [green tea](/wiki/Green_tea) [drinks](/wiki/Fermentation_(food)) that are commonly intended as [functional beverages](/wiki/Functional_beverage) for their supposed health benefits. Kombucha is produced by fermenting tea using a "symbiotic 'colony' of bacteria and yeast" ([SCOBY](/wiki/SCOBY)). Actual contributing microbial populations in SCOBY cultures vary, but the yeast component generally includes [*Saccharomyces*](/wiki/Saccharomyces_cerevisiae) (a probiotic fungus) and other species, and the bacterial component almost always includes [*Gluconacetobacter xylinus*](/wiki/Gluconacetobacter) to oxidize yeast-produced alcohols to [acetic](/wiki/Acetic_acid) and other acids.

The geographic origin of kombucha is unknown and its [etymology](/wiki/Etymology) is uncertain.<ref name=Algeo97/> Historically, kombucha has been home-brewed or locally brewed, but in the late 1990s, commercially bottled kombucha became available in North American retail stores. It is known in Chinese as chájūn (茶菌), Japanese as kōcha-kinoko (紅茶キノコ), Korean as hongchabeoseotcha (홍차버섯차), Vietnamese as tra nam and Russian as chaynyy grib (чайный гриб). These names translate literally to "tea fungus" or "tea mushroom."

Kombucha has been claimed to have various health benefits, but there is little [evidence](/wiki/Evidence-based_medicine) to support such claims.<ref name=Ernst2003/><ref name=mskcc/> There are several documented cases of serious [adverse effects](/wiki/Adverse_effect), including fatalities, related to kombucha drinking, possibly arising from contamination during home preparation.<ref name=mskcc/><ref name=acs/> Since the mostly unclear benefits of kombucha drinking do not outweigh the known risks, it is not recommended for [therapeutic use](/wiki/Therapeutic_food).<ref name=Ernst2003/>

## Contents

* 1 Health claims[[edit](/index.php?title=(none)&action=edit&section=1)]
* 2 Adverse effects[[edit](/index.php?title=(none)&action=edit&section=2)]
* 3 Other uses[[edit](/index.php?title=(none)&action=edit&section=3)]
* 4 Composition and properties[[edit](/index.php?title=(none)&action=edit&section=4)]
  + 4.1 Biological[[edit](/index.php?title=(none)&action=edit&section=5)]
  + 4.2 Chemical[[edit](/index.php?title=(none)&action=edit&section=6)]
* 5 History[[edit](/index.php?title=(none)&action=edit&section=7)]
* 6 Etymology[[edit](/index.php?title=(none)&action=edit&section=8)]
* 7 Production[[edit](/index.php?title=(none)&action=edit&section=9)]
* 8 See also[[edit](/index.php?title=(none)&action=edit&section=10)]
* 9 References[[edit](/index.php?title=(none)&action=edit&section=11)]

## Health claims[[edit](/index.php?title=(none)&action=edit&section=1)]

Kombucha has been promoted with claims that it can treat a wide variety of human illnesses, including [AIDS](/wiki/AIDS), [cancer](/wiki/Cancer), and [diabetes](/wiki/Diabetes), and that it provides other beneficial effects such as stimulation of the [immune system](/wiki/Immune_system), boosting the [libido](/wiki/Libido), and reversal of gray hair.<ref name=mskcc/><ref name=myc>[Template:Cite journal](/wiki/Template:Cite_journal)</ref><ref name=JMedFood172>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> However, [evidence](/wiki/Evidence-based_medicine) of kombucha's beneficial effects in humans is absent.<ref name=mskcc/><ref name=Jayabalan/>

In a 2003 [systematic review](/wiki/Systematic_review), [Edzard Ernst](/wiki/Edzard_Ernst) characterized kombucha as an "extreme example" of an unconventional remedy because of the great disparity between implausible, wide-ranging health claims lacking evidentiary support, and the potential for harm the preparations seem to hold.<ref name=Ernst2003/> Ernst concluded that the unsubstantiated list of proposed therapeutic benefits did not outweigh the known risks, and that Kombucha should not be recommended for [therapeutic use](/wiki/Therapeutic_food).<ref name=Ernst2003/>

## Adverse effects[[edit](/index.php?title=(none)&action=edit&section=2)]

Reports of [adverse effects](/wiki/Adverse_effects) related to kombucha consumption are rare. It is unclear whether this is because adverse effects are rare, or just underreported.[[1]](#cite_note-1) The [American Cancer Society](/wiki/American_Cancer_Society) says that "Serious side effects and occasional deaths have been associated with drinking Kombucha tea".<ref name=acs>[Template:Cite book](/wiki/Template:Cite_book)</ref>

Adverse effects associated with kombucha consumption include severe [hepatic](/wiki/Liver) (liver) and [renal](/wiki/Kidney) (kidney) toxicity as well as [metabolic acidosis](/wiki/Metabolic_acidosis).<ref name=Dasgupta11>[Template:Cite book](/wiki/Template:Cite_book)</ref><ref name=Dasgupta13/><ref name=AbdualmjidSergi13>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> At least one person is known to have died after consuming kombucha, though the drink itself has never been conclusively proved a cause of death.<ref name=pfp>[Template:Cite book](/wiki/Template:Cite_book)</ref><ref name=CDC>[Template:Cite report](/wiki/Template:Cite_report)</ref>

Some adverse health effects may be due to the acidity of the tea, which can cause [acidosis](/wiki/Acidosis), and brewers have been cautioned to avoid over-fermentation.[[2]](#cite_note-2)[[3]](#cite_note-3) Other adverse health effects may be a result of bacterial or fungal contamination during the brewing process.[[3]](#cite_note-3) Some studies have found the [hepatotoxin](/wiki/Hepatotoxin) [usnic acid](/wiki/Usnic_acid) in kombucha, although it is not known whether the cases of damage to the liver are due to the usnic acid contamination or to some other toxin.<ref name=Dasgupta13>[Template:Cite book](/wiki/Template:Cite_book)</ref><ref name=LiverToxUsnic>[Template:Cite encyclopedia](/wiki/Template:Cite_encyclopedia)</ref>

Topical use of the tea has been associated with [anthrax](/wiki/Anthrax) infection on the skin in one report, but kombucha contamination may have occurred during storage.<ref name=Ernst2003>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>

Due to its microbial sourcing and possible non-sterile packaging, kombucha is not recommended in people with poor immune function,<ref name=mskcc/> in women who are pregnant or nursing, or in children under 4 years old.<ref name=bccdc>[Template:Cite report](/wiki/Template:Cite_report)</ref>

## Other uses[[edit](/index.php?title=(none)&action=edit&section=3)]

Kombucha culture, when dried, becomes a leather-like textile known as a [microbial cellulose](/wiki/Microbial_cellulose) that can be molded onto forms to create seamless clothing.[[4]](#cite_note-4)[[5]](#cite_note-5) Using different broth mediums such as coffee, black tea, and green tea to grow the kombucha culture results in different textile colors, although the textile can also be dyed using plant-based dyes.<ref name=Hinchliffe>[Template:Cite web](/wiki/Template:Cite_web)</ref> Different growth mediums and dyes also change the textile's feel and texture.[[6]](#cite_note-6)<ref name=Mandelkern>[Template:Cite web](/wiki/Template:Cite_web)</ref> The kombucha textile is similar to cellulose and is sustainable and compostable. In 2014, one designer debuted a clothing collection made entirely out of kombucha textile.[[7]](#cite_note-7)

## Composition and properties[[edit](/index.php?title=(none)&action=edit&section=4)]

### Biological[[edit](/index.php?title=(none)&action=edit&section=5)]

[thumb|Yeast and bacteria in kombucha at 400X](/wiki/File:Kombuchacultsm.jpg) A kombucha culture is a [symbiotic culture of bacteria and yeast](/wiki/SCOBY) (SCOBY), similar to [mother of vinegar](/wiki/Mother_of_vinegar), containing one or more species each of bacteria and yeasts, which form a [zoogleal mat](/wiki/Zoogleal_mat)<ref name=Blanc>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> known as a "mother."<ref name=Jayabalan>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> The cultures may contain one or more of the *yeasts* [*Saccharomyces cerevisiae*](/wiki/Saccharomyces_cerevisiae), [*Brettanomyces bruxellensis*](/wiki/Brettanomyces_bruxellensis), [*Candida stellata*](/wiki/Candida_stellata), [*Schizosaccharomyces pombe*](/wiki/Schizosaccharomyces_pombe), and [*Zygosaccharomyces bailii*](/wiki/Zygosaccharomyces_bailii).<ref name=Dufresne2000>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>

The *bacterial component* of kombucha comprises several species, almost always including [*Gluconacetobacter xylinus*](/wiki/Acetobacter_xylinum) (*G. xylinus*, formerly *Acetobacter xylinum*), which ferments alcohols produced by the yeasts into [acetic](/wiki/Acetic_acid) and other acids, increasing the acidity and limiting [ethanol](/wiki/Ethanol) content.[Template:Citation needed](/wiki/Template:Citation_needed) The population of bacteria and yeasts found to produce acetic acid has been reported to increase for the first 4 days of fermentation, decreasing thereafter.[Template:Citation needed](/wiki/Template:Citation_needed) *G. xylinum* has been shown to produce microbial [cellulose](/wiki/Cellulose), and is reportedly responsible for most or all of the physical structure of the "mother", which may have been selectively encouraged over time for firmer (denser) and more robust cultures by brewers.[[8]](#cite_note-8)[Template:Primary source inline](/wiki/Template:Primary_source_inline)

In Chinese, the [microbial culture](/wiki/Microbial_culture) producing kombucha is called *jiaomu* in Mandarin and *haomo* in Cantonese, meaning, literally, "fermentation mother" ([Template:Zh](/wiki/Template:Zh)).[Template:Citation needed](/wiki/Template:Citation_needed)

The mixed, presumably symbiotic culture has been further described as being lichenous, in accord with the reported presence of the known lichenous natural product [usnic acid](/wiki/Usnic_acid), though as of 2015, no report appears indicating the standard cyanobacterial species of [lichens](/wiki/Lichen) in association with Kombucha fungal components.<ref name=LiverToxUsnic/>

### Chemical[[edit](/index.php?title=(none)&action=edit&section=6)]

Sucrose is converted, biochemically, into fructose and glucose, and these into [gluconic acid](/wiki/Gluconic_acid) and acetic acid, and these substances are present in the drink.[[9]](#cite_note-9) In addition, kombucha contains [enzymes](/wiki/Enzyme) and [amino acids](/wiki/Amino_acid), [polyphenols](/wiki/Polyphenol), and various other [organic acids](/wiki/Organic_acid); the exact quantities of these items vary between preparations. Other specific components include [ethanol](/wiki/Ethanol) (see below), [glucuronic acid](/wiki/Glucuronic_acid), [glycerol](/wiki/Glycerol), [lactic acid](/wiki/Lactic_acid), [usnic acid](/wiki/Usnic_acid) (a hepatotoxin, see above), and [B-vitamins](/wiki/Vitamin_B).<ref name=Teoh>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>[[10]](#cite_note-10)[[11]](#cite_note-11) Kombucha has also been found to contain [vitamin C](/wiki/Vitamin_C).[[12]](#cite_note-12) The alcohol content of the kombucha is usually less than 1% but increases with fermentation time.[[3]](#cite_note-3)

## History[[edit](/index.php?title=(none)&action=edit&section=7)]

The exact origination of kombucha, how or where, is unknown. The drink was consumed in east Russia at least as early as 1900, and from there entered Europe.[[9]](#cite_note-9) In 1913, kombucha was first mentioned in German literature.<ref name=Kaufmann2013>[Template:Cite book](/wiki/Template:Cite_book)</ref> At least as early as the mid-1990s it became popular in the US.<ref name=Katz2012>[Template:Cite book](/wiki/Template:Cite_book)</ref>

## Etymology[[edit](/index.php?title=(none)&action=edit&section=8)]

[thumb|A](/wiki/File:SCOBY_mushroom.jpg) [SCOBY](/wiki/SCOBY) used for brewing kombucha. The English word is [*kombucha*](/wiki/Wikt:kombucha) and has around 80 other names around the world.[[13]](#cite_note-13) The Japanese name for what English speakers know as kombucha is *kōcha kinoko* 紅茶キノコ (literally, 'black tea mushroom'), compounding [*kōcha*](/wiki/Wikt:kōcha) "black tea" and [*kinoko*](/wiki/Wikt:kinoko) [茸](/wiki/Wikt:茸) "mushroom; toadstool". In Japan, [Template:Nihongo3](/wiki/Template:Nihongo3) refers to a different beverage made from dried and powdered [*kombu*](/wiki/Kombu) (an edible [kelp](/wiki/Kelp) from the [Laminariaceae](/wiki/Laminariaceae) family).[[14]](#cite_note-14) Kombucha is of uncertain [etymology](/wiki/Etymology).<ref name=Algeo97>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> The [*American Heritage Dictionary*](/wiki/American_Heritage_Dictionary) suggests that it is probably from the "Japanese *kombucha*, tea made from *kombu* (the Japanese word for [kelp](/wiki/Kelp) perhaps being used by English speakers to designate fermented tea due to confusion or because the thick gelatinous film produced by the *kombucha culture* was thought to resemble seaweed)."[[15]](#cite_note-15) A 1965 mycological study called kombucha "tea fungus" and listed other names: "teeschwamm, Japanese or Indonesian tea fungus, kombucha, wunderpilz, hongo, cajnij, fungus japonicus, and teekwass".[[16]](#cite_note-16) Some further spellings and synonyms include combucha and tschambucco, and haipao, kargasok tea, kwassan, Manchurian fungus or mushroom, spumonto, as well as the misnomers [champagne](/wiki/Champagne) of life, and [chai](/wiki/Masala_chai) from the sea.<ref name=mskcc>[Template:Cite web](/wiki/Template:Cite_web)</ref>

## Production[[edit](/index.php?title=(none)&action=edit&section=9)]

Commercially bottled kombucha became available in the late 1990s.<ref name=Wollan2010>[Template:Cite news](/wiki/Template:Cite_news)</ref> In 2010, elevated alcohol levels were found in many bottled kombucha products, leading retailers including [Whole Foods](/wiki/Whole_Foods) to temporarily pull the drinks from store shelves.[[17]](#cite_note-17) In response, kombucha suppliers reformulated their products to have lower alcohol levels.[[18]](#cite_note-18) By 2014 US sales of bottled kombucha were $400 million; $350 million of that was earned by Millennium Products, Inc. which sells "GT's Kombucha".[[19]](#cite_note-19) In 2014, the market was projected to have 30% growth, and companies that make and sell kombucha formed a [trade organization](/wiki/Trade_organization), Kombucha Brewers International.[[20]](#cite_note-20)

## See also[[edit](/index.php?title=(none)&action=edit&section=10)]

[Template:Portal](/wiki/Template:Portal)

* [List of ineffective cancer treatments](/wiki/List_of_ineffective_cancer_treatments)
* [Tibicos](/wiki/Tibicos)
* [Probiotic](/wiki/Probiotic)

## References[[edit](/index.php?title=(none)&action=edit&section=11)]

[Template:Reflist](/wiki/Template:Reflist)

[Template:Commons category](/wiki/Template:Commons_category) [Template:Teas](/wiki/Template:Teas)

[Category:Alternative medicine](/wiki/Category:Alternative_medicine) [Category:Articles containing video clips](/wiki/Category:Articles_containing_video_clips) [Category:Blended tea](/wiki/Category:Blended_tea) [Category:Carbonated drinks](/wiki/Category:Carbonated_drinks) [Category:Chinese tea](/wiki/Category:Chinese_tea) [Category:Fermented beverages](/wiki/Category:Fermented_beverages) [Category:Mycology](/wiki/Category:Mycology) [Category:Toxicology](/wiki/Category:Toxicology)