



Santa Maria

PEPPER

GREEN, BLACK & WHITE

[Piper Nigrum]

TASTE
ACADEMY

THE PEPPER STORY

Universally acknowledged as the 'King of spices' pepper was one of the first spices to be traded overseas from its place of origin in India's western Ghats – now a UNESCO World Heritage site and bio-diversity hot-spot. The story of pepper, perhaps the story of spices as a whole, began over 3,000 years ago in the forests of Kerala on India's south-western coast. Pepper appears in Sanskrit writings, was well-known to the ancient Greeks and Romans and by the middle-ages it became such a valuable commodity that it was referred to as 'black gold'. The status of a family could be instantly ascertained if black pepper were served at the table.

The pepper trade has waxed and waned over the centuries. Empires, fortunes and cities have been built on the wealth it generated. When the spice supply route via Constantinople was blocked by the Turks a new western route to Asia was urgently needed. This led to Christopher Columbus's famous if mis-directed journey on board the Santa Maria in search of the Spice Islands. Vasco de Gama was more accurate when he landed on India's Malabar spice coast in 1498.

Over the years we have believed a great many tall stories about pepper and still, to this day, we often mistakenly believe that white and green pepper are from different plants altogether. Perhaps these mistakes were encouraged by the Arab traders of the 15th century. Anxious to keep their source a

secret they told tales of highly venomous flying serpents that guarded the forests. Fire was the only way to get rid of the serpents so the forests were set ablaze as soon as the pepper was ripe. The flames that engulfed the trees turned the pepper berries black and gave them their fiery taste. It was then a race between man and enraged serpent to retrieve the charred peppercorns as soon as the fire had died down!

To make things even more complicated there are many spices carrying the name 'pepper' which really have nothing to do with pepper. So, let's get this clear right at the outset. Black pepper, white pepper, green pepper and, only very occasionally, red pepper (known as true pink pepper) are all from the same Piper Nigrum vine.

It is their treatment that changes the colour. Green pepper is partially ripened pepper, red pepper is fully ripened pepper (known as true pink pepper), black pepper is dried green or red pepper and white pepper is black pepper with the dark outer husk removed.

Almost everything else that's called pepper probably isn't. Pink pepper and Sichuan pepper are unrelated. All the chili peppers are from a different family too.

Just as with nutmeg and cloves, struggles to control the international supply of pepper has been a frequent cause for conflict. Today pepper is the only spice that is quoted on the stock market yet it has also become so ordinary and every-day that we utterly take it for granted.



THE PLANT

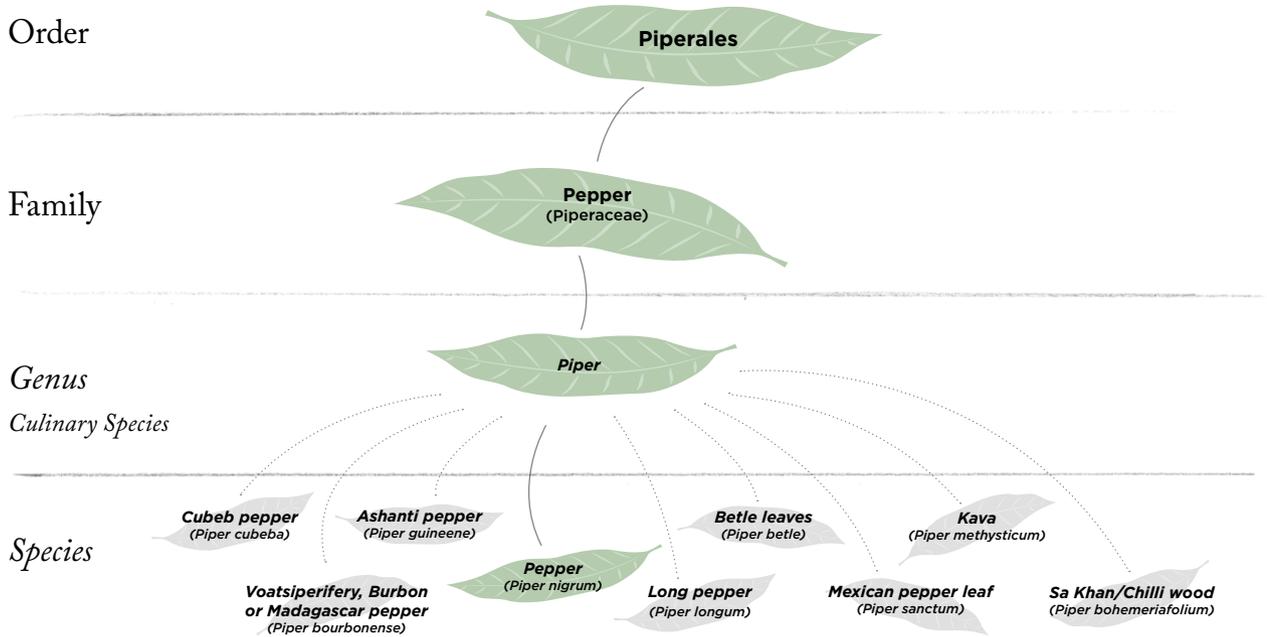
The Piper Nigrum plant is a dark green perennial climbing vine that uses a host tree, pole or trellis to reach a height of up to 10 metres.

The peppercorns are berries that form after pollination in conical spikes a few centimetres long and wider at the base than the tip. Each spike can carry up to 50 berries. A vine takes three years to reach maturity from which point it produces up to 20 kg

of berries per annual harvest. As the berries ripen they turn from green to red and their content of pungent, heat-giving piperine continually increases whereas their content of essential oils peaks and then declines. Fully ripened red berries may contain much less aroma than they had at the late green stage which is one reason red pepper berries are rarely seen.



BLACK PEPPER CULINARY FAMILY TREE



CULINARY CONNECTIONS

The Piperaceae family is a large family of flowering plants. Piper is a genus of about 1,500 species, several of which have culinary uses. Some of these species were commonly used in the distant past though they are rarely seen in modern recipes.

Piper longum (long pepper) was well-known to the Greeks and Romans who are said to have preferred its hot, pungent taste to that of regular black pepper. Native to India and Indonesia it gets its name from

the fact that the peppercorns are elongated in the manner of a catkin.

Piper cubeba (cubeb pepper) is a member of the family with its own section in this guide.

Piper betel (betel leaf) produces leaves which are wrapped around other ingredients such as tobacco and formed into small packets for chewing. The stimulant effects of these packets has ensured widespread use in south-east Asia.



Piper sanctum (Mexican pepper leaf) grows in Central America. The leaves are used in Mexican cookery to wrap other ingredients in the manner of vine leaves in European cookery. They are rarely seen outside of Mexico.

Piper guineense (Ashanti pepper) is a West African species of Piper. It is used in West African cuisine, especially in stews, although its high price limits the amounts used.

Piper methysticum (Kava) is a crop of the western Pacific and is consumed for its sedating effects throughout the region. Many kava supplements are marketed as stress-relief products in tea or capsule form.

Piper boehmeriaefolium (Sa Khan, chili wood, pepper wood) is used to infuse dishes such as stews in the cookery of northern Laos. Its flavour is very spicy with pepper and chili tones and a lingering, slightly tongue-numbing aftertaste.

The trunk, cut into small 3 x 1 cm sections, is used rather than the peppercorn. It is said to be an appetite-suppressant. A blend of regular black pepper, Sichuan pepper and chili is a satisfactory substitute.

Piper borbonense (Madagascar wild, Bourbon or Voatsiperifery pepper) is a very rare and relatively unknown pepper from Madagascar with distinctive floral and citrus notes on top of the peppery base.

MAJOR PEPPER PRODUCING COUNTRIES



CULTIVATION

Latitude is an important factor in the natural cultivation of the piper nigrum vine with the world's supply coming from the countries lying within the tropics of Cancer and Capricorn. Altitude and rainfall are significant too. A pepper vine needs about 2,000 mm of rainfall per year. A mean temperature of 25-32 oC and a high humidity, RH 65-95 are also required. The sub-mountain tracts, 800-1200 m above sea level, in

Kerala, south-west India create the optimum growing conditions. The colour, size and flavour of a vine's berries will vary according to these factors.

Vietnam produces the most pepper and Indonesia and Brazil are the other significant producers with limited supplies coming from, Cambodia, Cameroon, Malaysia and Sri Lanka.



INDUSTRIAL CULTIVATION

While the traditional method is to plant the vine beside a host tree the more common way on industrial plantations is using concrete poles, often with built in irrigation systems.

PEPPER ORIGINS

Pepper is called differently depending on which origin, shape and quality it has. Some countries have a system to grade the qualities and in other there are no such grading.

INDIAN PEPPER has two main types, Tellicherry and Malabar, named after the centres from which they are traded. The name 'Tellicherry' is an Anglicisation of 'Thalassery', a commercial city north of Cochin. Malabar is the southwestern coast of the Indian subcontinent. Indian pepper is regarded by many as the best pepper in the world due to its high volatile oil content.

INDONESIAN PEPPER

also has two main types, called Lampung and Muntok. Lampung is named after a district in south-eastern Sumatra, which is a key pepper-producing area for black pepper. Muntok is a mild-flavoured white pepper named after the town Muntok on the island of Bangka. Indonesian peppercorns tend to be a little smaller than the Indian and has some lemon-like flavour.

MALAYSIAN pepper is mostly produced in Sarawak and named thereafter. It is used both for black and white pepper and has a milder aroma and is less pungent in flavour than Indian and Indonesian peppers.

CAMBODIAN pepper is usually sold as Kampot, named after the southern province of the country. The drying process of black Kampot pepper is a started when berries are ripe and a bit slower which gives the peppercorns a little sweetness and reddish hue.

Pepper from **CAMEROON** is called Penja since it is grown in the volcanic soil of the Penja valley. Most known is the white Penja pepper which beside heat has a little different aroma that is less musty than other white peppers.

VIETNAM AND BRAZIL are big producers in volume of black pepper. There is no quality grading system of these peppers. Vietnamese pepper has strong intense aroma but a mild, weaker flavour. The Brazilian pepper has a clear pungency with a mild aroma and flavour.

HARVESTING AND PROCESSING

In India the peppercorn harvest takes place between November and February but wherever it is grown farmers wait for about 6-9 months after the vine has flowered before they begin. The berries ripen over a period of 2 - 3 months. They are green to begin with, ripening through yellow to red. Waiting for the berries to turn red is hardly worthwhile since the amount of essential oils declines and the risk of spoilage increases. The vast majority of berries are harvested when green.

Harvesting is still a traditional, manual process. A simple pole with footholds is placed on the host tree and pickers climb up alongside the vine, harvesting the spikes of berries as they go. An experienced picker can clear a vine in 30 minutes, gathering up to 120kg of berries a day.

Once gathered, simple tershing machines are used for removing the berries from the spikes.

The peppercorns that require drying are left to slowly bake in the sun on large mats for up to 10 days, developing their distinctive, rich brown colour, while the green peppers go off for further treatment.





TRADITIONAL FARMING AND HARVESTING OF PEPPER, KERALA, INDIA



FRESH GREEN PEPPER

FREEZE DRIED GREEN PEPPER

GREEN PEPPER

Green pepper is produced from berries which are fully-grown but not yet ripened. To prevent further ripening the enzyme which changes their colour must be deactivated. Traditionally this was achieved by submerging the green berries in brine which is why we are used to seeing green pepper preserved in jars.

Dried green pepper is processed by boiling the freshly harvested berries for a short time before drying in the same manner as black pepper. The berries shrivel but retain their green colour and distinctive flavour.

Freeze-drying produces the best results as the berries retain their plumpness and bright green colour. However, freeze-dried green peppercorns are very fragile and crumble easily so they are unsuitable for use in a grinder.

RED OR TRUE PINK PEPPER

Farmers are reluctant to take the risks associated with producing true pink pepper so it is a rarity. It can only be processed in the same way as brined green pepper since the ripe red berries are too fragile to survive any other methods.

WHITE PEPPER

White pepper is the inner seed of the peppercorn with the outer husk or pericarp removed. The berries are allowed to mature for 3-4 weeks longer than green or black pepper before processing in order to make the skins softer. The outer husk is removed either by soaking in sacks for a week or two under running water, often a clear stream or river. This softens the outer layer (a process called retting) just enough for it to be removed by trampling and washing, after which the berries are air or kiln-dried. The inner seed has a creamy white colour



WHITE PEPPER

BLACK PEPPER

which will not deteriorate since all of the enzymes responsible for ripening are found in the husk. An alternative, less satisfactory method of removing the outer husk is called 'decortication'. The pericarp is rubbed away by mechanical abrasion but rarely completely. Decorticated pepper is inferior in quality and rarely sold whole.

BLACK PEPPER

The 'King of spices' is produced by drying under-ripe green berries on large mats in the hot sun. The green berries are sometimes still removed from the stalk by the age-old method of trampling

under foot. Drying triggers the enzyme that causes oxidation and blackening and which helps develop the flavour-giving essential oils which are so abundant in young peppercorns.

The enzyme reaction is sometimes accelerated by scalding the berries for a short period before laying out on the mats. This can shorten the drying process from several days to just a few hours whilst still achieving an attractive dark brown finish.

When ready for market the farmers will take their stock to a local wholesaler who will buy varying types of produce from many farms

in the area before selling it on to different processing houses depending on the destined finished product.

These processing houses will use machinery to clean and sort the pepper into different quality grades before steam cleaning and packing the peppercorns. Black peppercorns are sieved to remove all foreign bodies and may also be sorted by size - a process called 'garbling'.

The size of the peppercorn has a tremendous influence on its taste. The largest peppercorns are considered to be the finest.

COMMONLY MARKETED FORMS OF PEPPER

Pepper is marketed in a large number of different qualities and product formats.

WHOLE PEPPER

The highest quality peppercorns are usually reserved for sale in pre-filled pepper grinders or as premium quality packs. Both Tellicherry black pepper grades and Sarawak creamy white are sold either individually or mixed with other colours. Black and white may be sold together. Triple pepper includes green peppercorns and five-pepper mix includes green pepper, pink pepper (never true pink pepper, rather the fruit of the schinus terebinthifolius tree covered elsewhere in this guide) and allspice (also covered in a separate section of this guide). Whole peppercorns of any grade may also feature in exotic mixes in grinders of all sizes.

Green pepper is also sold whole on its own. Freeze-dried green peppercorns are too fragile to be used in grinders but late-picked dried green berries can be used.

GROUND PEPPER

Pepper of MG1 quality and below may also be sold whole but is most often reserved for grinding and incorporating in spice blends. Ground pepper is usually sold in three formats:

1. Cracked
2. Coarse ground
3. Finely ground

PEPPER IN BRINE

Green pepper and true pink pepper are mostly sold brined in jars.

PEPPER OIL AND OLEORESIN

A significant market exists for pepper oil in the perfumery industry.



BLACK PEPPER GRADES

The highest qualities of pepper comes from Kerala, India. There quality is graded as follows:

- 1.** Peppercorns of a diameter of 4.75mm or more are referred to as 'Tellicherry Garbled Special Extra Bold. (TGSEB)
- 2.** Peppercorns of a diameter of 4.25mm to 4.75mm are referred to as Tellicherry Extra bold. (TGEB)
- 3.** Peppercorns of a diameter of less than 4mm are referred to as Mala-bar pepper. These are commonly available in two grades, MG1 and MG2 and may be supplied garbled or ungarbled (MUG1 and MUG2)
- 4.** Light pepper is the lowest grade and is sold garbled or ungarbled.

WHITE PEPPER GRADES

- 1.** Sarawak - large, flavourful berries with a uniform creamy white colour. The top quality of sarawak peppercorns is thereby referred to as "creamy white"
- 2.** Muntok - the most common, cheaper and less uniform variety, named after the main port on the Indonesian island of Bangka.

A third variety called Penja White from Cameroon is of high quality and limited availability. Most of the production goes to France.

GREEN AND TRUE PINK PEPPERCORN GRADES

Green and true pink peppercorns are not graded in the same way since most of the crop is used in the production of brined products.

TELLICHERRY BLACK PEPPER ORGANOLEPTIC DESCRIPTION



WHITE PEPPER ORGANOLEPTIC DESCRIPTION

GREEN PEPPER ORGANOLEPTIC DESCRIPTION

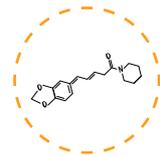
TASTING NOTES

Pepper, like wine, takes on the characteristics of its 'terroir' but much also depends on the size and ripening of the berry. A peppercorn consists of the husk or pericarp and the core or seed. Break through the husk of a peppercorn where all the essential oils are found and, at its heart, you'll find piperine. This pungent, natural alkaloid is what gives pepper its biting spiciness.

It stands to reason that, if the essential oils are all found in the husk, the more husk there is, the more complex the

flavour. At a minimum of 4.75mm Tellicherry Special Extra Bold peppercorns have more essential oil (because they have more husk) than any other grade of berry. As a rule of thumb premium peppercorns contain 3% essential oils.

Remove the husk altogether, as is the case with white pepper, and the flavour balance is tipped decisively towards spicy piperine. Smaller peppercorns tend to be hotter and less complex in flavour because the ratio of husk to core is smaller.



PIPERINE

Piperine is an alkaloid, which is the major pungent component in pepper. In other words, it is responsible for the hot and burning sensation.

Similar to capsaicin in chili peppers its dilutable in fat, and if had to much of it, drinking water won't help you. Go for some milk or cream



Then there's ripeness. Green pepper tends to be more natural and earthy, especially if harvested early whereas, if you ever taste it, true pink pepper will be comparatively lacking in flavour because the essential oil content decreases with ripeness. Harvesting when the berries are perfectly ripe will yield the most flavourful berries, especially when the sun has concentrated them.

As for the essential oils, they quickly oxidise and lose their flavour once exposed to air. Freshly ground pepper always releases the most flavour. Ground pepper will have lost most of its flavour three months after opening, leaving only heat.

Tellicherry pepper will have a strongly aromatic, citrusy, floral and woody aroma that is warm, pungent and brings tea-tree oil to mind. This is because of the terpene compounds in pepper. Terpenes are a group of compounds produced by a variety of plants, particularly conifers. They are the major components of resin which is why resinous, pine notes are often detected in the aroma of freshly ground black pepper. The same aromas can be detected in all black pepper though they decrease as the berries get smaller or on grinding. Ground black pepper loses much of the tea-tree oil scent.

The flavour of black pepper is often described using similar words. The higher the quality, the more the sweet, citrusy notes will balance the heat coming from the piperine.

White pepper has a very distinctive aroma because all that's left is the piperine. The smell of freshly-ground white pepper is pungent, earthy and reminiscent of a farmyard. Terpene and eucalyptus scents may remain from the contact with the husk. Its flavour is hotter and a little musty. As with black pepper, these aromas and flavours are also found in pre-ground white pepper to a lesser degree with the terpene aromas reduced.

Green pepper smells more natural and plant-like. Citrus and tea aromas can be detected, especially in the freeze-dried product. It tastes grassy, sweet and tea-like unless it has been brined in which case there is also a strong vinegar flavour. Green pepper is milder than black white pepper.

USES AND PAIRING SUGGESTIONS

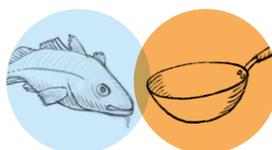


BLACK PEPPER

Pepper is the one spice that seems to appear in every recipe and on every table-top. Having said that, it is actually perfect marriage to all kinds of fruits and sweets, where the fruity and citrusy notes play a big role.

Italian cuisine proves that black pepper can be the main spice for a lot of meat and pasta dishes. Grind generously to get the full complex taste of pepper.

Beer drinkers will note with interest that hops and black pepper both contain caryophyllene, as do cloves, rosemary and lavender. A mix of some of these flavours pairs well with meat dishes and brilliantly together with a hoppy beer.



WHITE PEPPER

Often just just as a more discreet version of pepper because of its color and is therefore used in white sauces.

Tastewise its quite the opposite, and is used in vietmanese soups instead for its sharp and musty flavour.

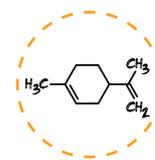
Dill contains piperine which is why pepper and dill work well with fish. Gravdax in particular calls for dill and ground white pepper.



GREEN PEPPER

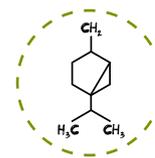
Green pepper is less hot than white and green pepper and pairs well will vegetables and pork.

Green pepper corn also pairs well with rustic and creamy sauces, where the pepper bring a fresh note with a mild heat.



LIMONENE

The shared presence of the compound limonene is what makes a partnership of black or green pepper with citrus fruit successful. Both of these are natural matches for all kinds of seafood.

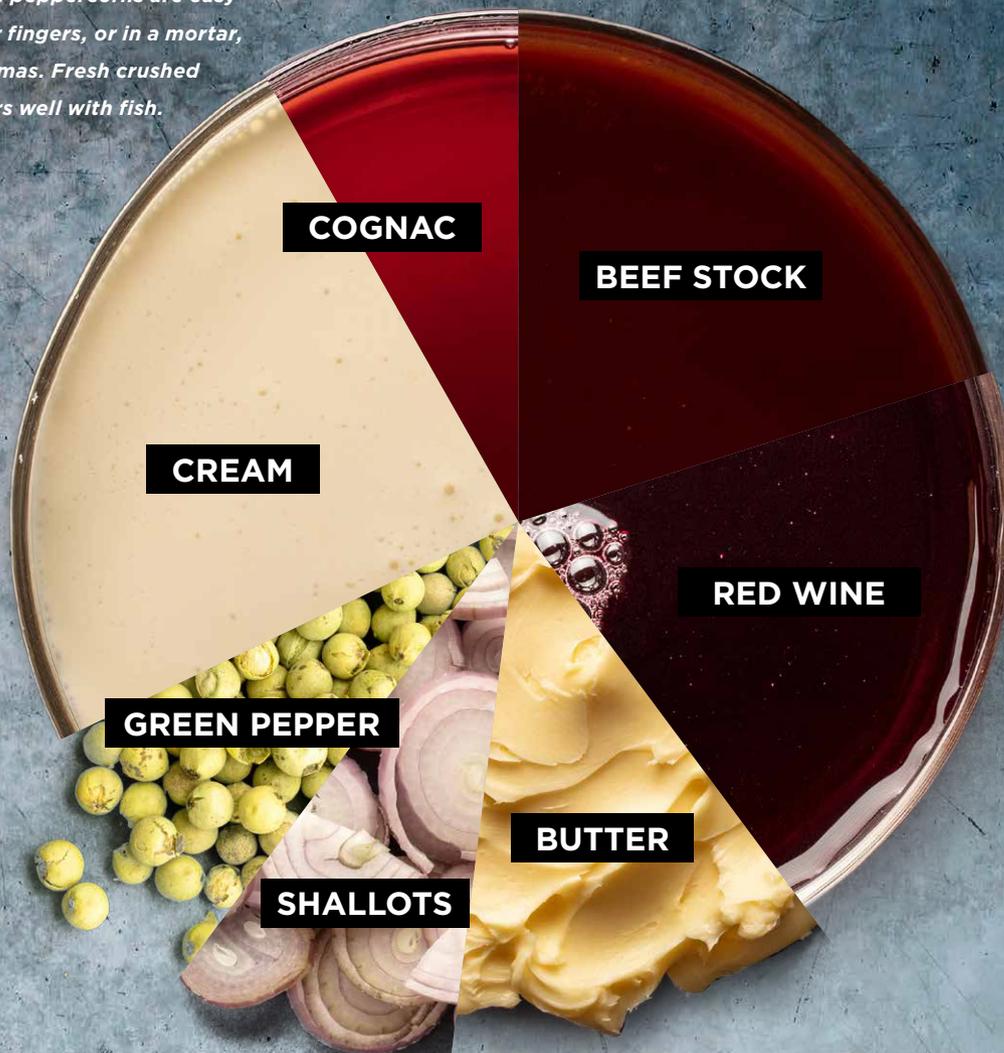


SABINENE

Less commonly known is the fact that carrots and nutmeg have the compound sabinene in common with pepper. Roasted carrots sprinkled with black pepper and nutmeg will enhance the flavour of all three components. Marjoram also contains sabinene and could be added for extra depth.

CHEF'S TIPS

Freeze dried will give the best aroma and flavour. The whole peppercorns are easy to crush with your fingers, or in a mortar, to release the aromas. Fresh crushed green pepper pairs well with fish.



CLASSIC GREENPEPPER SAUCE

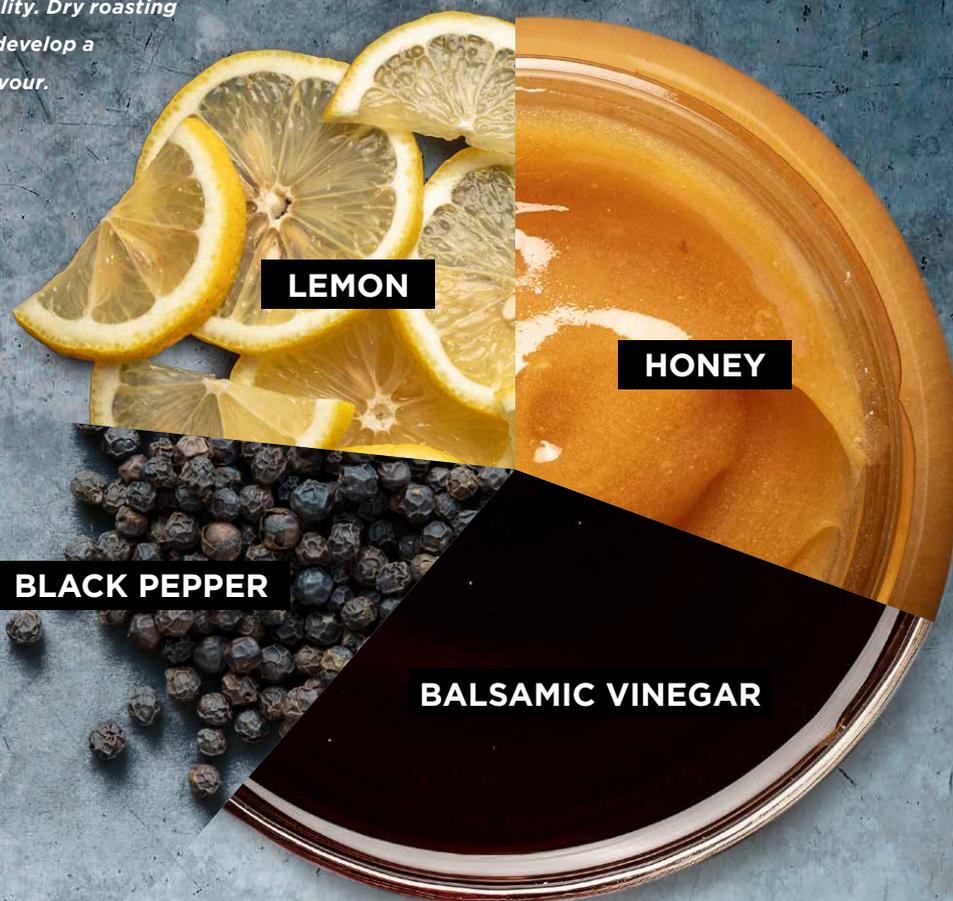
200 ml beef stock, unsalted
200 ml Red Wine
1 tablespoon peppercorns,
freshly ground
3 tablespoons butter
2 finely chopped shallot
300 ml cream (40% fat)
3 tablespoons cognac

Boil stock in small saucepan until reduced to 1/3. Roast peppercorns in a dry skillet on medium heat until pepper starts to pop.

Ground the pepper corn in a coffee grinder or mortar. Melt butter in large skillet over medium-high heat. Add the chopped shallots and pepper to the skillet and sauté for 2 minutes. Add reduced Wine/beef stock & whipping cream and boil until mixture thickens to sauce consistency. Season sauce to taste with salt. Goes excellent to freshly grilled Sirloin steaks.

CHEF'S TIPS

Freshly ground black pepper will be more aromatic and give more flavour than pre-ground. Look for big undamaged whole peppercorns for better quality. Dry roasting of whole peppercorns will develop a rounder and more nutty flavour.



BLACK PEPPER MARINADE FOR STRAWBERRIES

1 liter strawberries
2 tablespoons balsamic vinegar
2 teaspoons peppercorns,
roasted and ground
2 table spoons honey
lemon, juice

Dry roast whole black pepper corns
In a medium hot pan. Ground the
roasted peppercorns in a mortar.
Rinse, hull and slice the strawberries.
Mix the strawberries gently with
balsamic vinegar, honey and black
pepper.

Squeeze a little lemon juice into
the mix and let it stand ambient for
30-60 minutes. Cool the mix in the
fridge before serving

Serve with vanilla ice cream or
whipped cream. The strawberries
are also good in salads, salsas or
together with mild cheese like
mozzarella.

This marinade also works
perfectly with sweet fruits like
melons, peaches or plums.

CHEF'S TIPS

White pepper has warm, aromatic flavour. It is an advantage in light sauces where you want to avoid black stains or pieces, like a bechamel sauce to fish or in a lasagne. Roasting of white pepper will not be advised in contradiction to many other spices. It will enhance the fermented flavour and reduce freshness.



SANDEFJORDS SAUCE

150 ml cream
150 ml crème fraiche
150 g butter
lemon, zest and juice
3 tablespoon dried chives
White pepper
Salt

Boil the cream in half in a thick-bottomed saucepan. Stir occasionally. It takes a few minutes
Lower the heat to the lowest.
The cream should not boil but just be kept warm.

Whisk in butter clockwise.
Finally, stir in the lemon juice and the sauce will thicken slightly.

Stir in chives and finish the sauce with salt and white pepper.

If you want, you can garnish the sauce with a little freshly chopped chives and a slice of lemon on the side

OTHER USES AND APPLICATIONS

Black pepper is a central component in the indian treatment systems, ayurveda, sidha and unani. The fenolic substances in pepper possess very good antioxidant properties.

Terpenes from pepper are commonly used in perfumery. "Hot, surprisingly fresh and invigorating yet very elegant", pepper aromas can often be found in men's fragrances.

Black pepper is also used in premium soap. Apart from its scent, its grittiness makes for a good exfoliant

