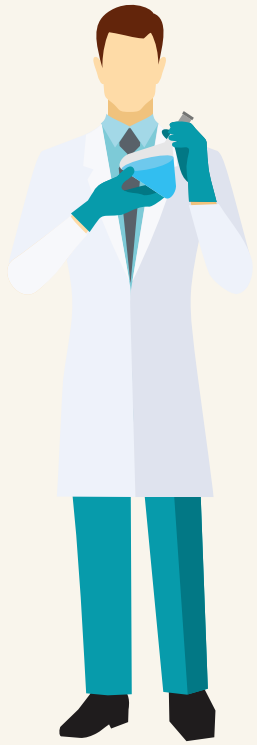
a Falstaff book

Cocktail Chemistry

John Jenkins Professor of Cocktology

Introduction



We wanted to do a menu that looked at some of the stranger parts of mixing drinks.

Here is collection of 16 cocktails that each have an element of weird science to them.

We look at infusions of flavour, manipulations of texture and emulsions, the balance of sugar and acidity, density and carbonation, amongst others.

Our top priority was for these drinks to taste good and be enjoyed. There is a lot of information about the processes behind the drinks as well for anyone interested.

For this course you will need:

Hibiscus infused Mezcal Fizz

£9

Natural maceration infusion

Hibiscus infused Del Maguey Mezcal Vida, DOM Benedictine, Yellow Chartreuse, Lemon Juice, Hibiscus Syrup, Egg White, Soda Water

Slight smokiness, floral vibes, fresh citrus burst

Alcohol's ability to suck flavours from herbs, fruits and spices by infusion and then preserve those flavours has been used since the middle ages, originally by monks to produce medicinal potions.

Osmosis and Dissolution

There are two processes which occur when you're infusing certain ingredients in alcohol: Osmosis and Dissolution.

Osmosis is a result of a natural balance. Basically, fresh ingredients such as fruits contain lots of water and alcohol a lot less, so water from fruit flows naturally (with other compounds) to an ingredient with less water to even things out and reach an equilibrium.

Dissolution happens with dried flavourings with no water so the process is about releasing and dissolving compounds into the alcohol. The higher the strength of the alcohol the better the result. Individual chemical components lend themselves to a portion of the drink in the form of taste, colour or body.

Our Conclusion

Inspired by monks, this drink highlights the simplest method of infusion, placing dried hibiscus flowers in to high strength alcohol rapidly extracts soluble compounds from the flowers. Compounds of the flower petals move from areas of high concentration (the leaves themselves) to areas of lower concentration (the alcohol), until balance has been reached.

Bathtub Punch

£32

Nitrogen pressured infusion

Bathtub Gin, Briottet Kumquat Liqueur, London Fields Hackney Hopster Pale Ale, Soda Water, Butterfly Pea Syrup, Citric Acid

Light, fresh, easy drinking orange and citrus forward; three-litre sharing vessel

You can infuse flavours into alcohol almost instantly with nothing more than an iSi Cream Whipper. An iSi whipper is a siphon chefs have used for years that uses nitrogen to create whipped cream and more creatively, foams. They received a notable bump in popularity in the 90s when chef Ferran Adrià used them heavily in his ground-breaking restaurant El Bulli in Spain. The entire process to infuse a spirit takes a little over one minute.

Cavitation

Cavitation is a process, which involves disrupting and opening the microstructure of the cells of the infusion ingredients with nitrogen bubbles.

A liquid and a solid are sealed inside a siphon and highly pressurized with Nitrous Oxide (up to 24.8 bars of pressure or ten times the pressure in a car tyre). The high-pressure forces some of the gas to dissolve into the liquid and diffuse into the pores of the solids.

As the pressure is suddenly released the nitrous forms tiny bubbles, as these bubbles swell in size, they rupture the microstructure of the ingredient and escape rapidly, releasing aromatic molecules into the surrounding liquids.

Results are comparable to a couple of weeks of a regular maceration infusion in a minute, although the results are different. Rapid infusion is neither better nor worse than regular infusion, just different, it tends to pull less bitter, spicy or tannic notes of an ingredient.

Our Conclusion

For this drink we use an iSi syphon to infuse Bathtub Gin with orange peel to enhance the original botanical list and boost the citrus flavour, we also use acids to further boost the flavour of oranges... and round it off with a colour changing butterfly pea tea syrup.

Slow Cooked Sidecar

£11

Sous vide infusion

Orange and Lemon infused H By Hine VSOP Cognac, Triple Sec, Lemon Juice, Orange and Lemon Oleo Saccharum

Smooth and strong with a citrus bite

Sous vide (French for 'under-vacuum'), or low temperature precision cooking, is the process of cooking at an accurate temperature, this cooking method can do wonders for food but it can also be easily applied to speed up the process of making infusions.

Sous Vide

High temperatures are used with sous vide infusions, meaning that the flavours are extracted much faster than at room temperature, such as during traditional infusions.

Sous vide infusions are also made in sealed containers like bottles, or plastic bags which stop evaporation and flavour loss, keeping the flavours of the infusion concentrated.

For a comparison of flavour extraction; to achieve the same flavour result with a natural maceration could take up to a month, think about putting a tea bag in cold water versus hot water. The results (especially when vacuum sealed) are far superior.

Our Conclusion

We've taken a 1920s classic and dialled up the flavours. Slow cooking our cognac with citrus peels compliments some of the fruity flavours. A slow macerated citrus syrup finishes it all off.

Smoked Cocktail

£9

Infusion + smoking

Ghost Vodka, Briottet Blackcurrant Liqueur, Rioja, Port, Brown Sugar, Champagne Acid

Rich, smoky, red wine flavours

Smoking as a process for food production has been around since the Palaeolithic period (over 3 million years ago). Up until the modern era, it was primarily done as a method of preserving foods, there are some elements in wood smoke that antioxidize, slowing the rate of decay and thus preserving the life of the foods.

Smoke as an ingredient or an influence in food may spark up some form of primal nostalgia, but it is something we have done for a long time. Most commonly foods such as meat and fish are the prime candidates for smoking. There are various different ways of smoking foods however the method we use the most here for liquids is 'cold smoking.'

Cold Smoking

Cold smoking, smokes the liquids without any heat being added to it, (for food it would be done with raw meats so cooking would need to be done afterwards.) It leaves the desired flavour and nuances of smoke in the liquids it has mixed with.

Wood Chips

Different wood chips can impart different flavours to whatever you chose to smoke, we're using oak wood chips, oak is one of the most traditional woods for smoking and has a good smoke level and gives that amazing barbeque flavour profile.

Our Conclusion

In this drink we pair whiskey soaked oak wood smoke with some amazing port and rioja to create a fantastic, heavy duty, fruity aged complex wine/barbeque kind of vibe.

Aperol Quitz

Sugar + balance

£10

Aperol, Pampelle Ruby Aperitif, Solerno Blood Orange Liqueur, Prosecco, Champagne Acid, Sugar Syrup, Soda Water

Bitter-sweet and sparkling

Sucrose is a natural substance, a carbohydrate derived from sugar canes that we use for energy. Through human evolution we relied on fruit and other plant-based foods and developed a strong sense for the natural bitter taste in plants and leaves. As time progressed, we retained these early taste preferences and acquired newer ones. We like the taste of sweet because it signifies a source of sugar, which means energy.

Sweet and Sour

Our preference for sweet and sour/bitter flavours appears to change as we age. There are many possible reasons for this, as infants it's probably a good rule that if it tastes bad it could kill you (think drain cleaner) and if it's sweet it probably carries lots of sugar/energy (which is good for growing). As we age and have less need for energy rich foods (or get used to the positive enforcement of bitter things like alcohol and caffeine) our palates mature and our tastes adapt.

Sugar

It is generally known that sugar has been a part of cocktail culture since its inception. It's part of the earliest definitions of a cocktail and lends depth, texture and balance. If a drink is too sour, the solution is straightforward: add a bit more syrup. But if the drink is too sweet, rebalancing it isn't always an intuitive process. By adding a bit of bitterness, the perception of sweetness is dialled down. One of the best examples is Campari, which is known more for its bitterness than its sweetness, but has a very high sugar content.

Our Conclusion

The standard ratio for a 'sour' cocktail is 2:1:1, which is two parts liquor to one part each of the sweet and sour parts, people with a more mature palate may find this too sweet. For this drink we take the simple and iconic Aperol Spritz, rip it apart, dial everything up a notch and then throw it back together and serve it off-balance. Giving you the opportunity to find your own perfect balance.

Acid Corrected Daiquiri

Acidity + balance

£8

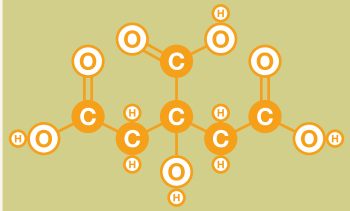
Chairman's Reserve White Rum, Gabriel Boudier Kaffir Lime Leaf Liqueur, Absentroux Dry Vermouth, Chamomile Tea, Sugar, Lactic, Malic and Tartaric Acid

The most loving and gentle daiquiri known to man; floral hints on top of solid rum

Acid has an important role in brightening flavours (if flat or bland), reigning in sweetness, or toning down richness, sour ingredients signal the presence of acid and fermentation, which is important for digestion. Some vitamins, like vitamin C, also have a sour taste.

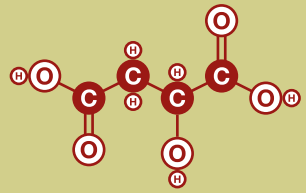
Many natural acids are found in nature, which can be used in cocktails, they can balance drinks perfectly while enhancing flavours. Citrus juices aren't exactly consistent (bad for drinks) and they spoil causing wastage.

Citric Acid



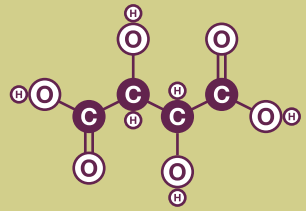
The main acid in citrus fruits. Lemons and limes have particularly high levels. It is also the primary acid in a number of different berries.

Malic Acid



The main acid in most stone fruits, also very high in apples and appears in banana and watermelons.

Tartaric Acid



The main acid found in grapes, avocado and tamarind.

Our Conclusion

Acid correcting Chamomile tea with Lactic, Tartaric and a touch of Malic acid adds a wonderful freshness to the acidity and ties the drink back to the classic acids found in a daiquiri, the drink still manages to feel and taste like a daiquiri even though we've lost one of the most important ingredients (the lime juice).

Colour Changing Apple-rita

£8

pH levels + balance

Butterfly Pea Tea infused Ocho Blanco Tequila, Edmond Briottet Manzana Verde, Green Chartreuse, Butterfly Pea Tea Sugar Syrup and Citric Acid

Balanced, fun and the amazing combination of tequila and apples

Wanting to visualise the reaction of changing pH levels, we use Asian Butterfly Pea flowers. When steeped in liquid they colour it a deep blue (the flowers have been used in dyes for centuries). They also have an amazing reaction when mixed with acid, changing colour to a bright pink.

pH Level

The pH level is an indicator as to how acidic or alkaline a liquid solution is. The PH scale goes from 0 – 14, with 7 being neutral (most tap water sits at 7).

If a solution contains more hydrogen ions than hydroxide ions, it is said to be acidic. The more hydrogen ions, the stronger the acid and the lower the pH value.

For a rough scale, battery acid sits at 1; lemon juice sits at around 2.5 (quite acidic); coffee is around 5 (less acidic), seawater sits at 8 (quite alkaline), Milk of Magnesia is around 10 (more alkaline) and bleach is around 13.

It is important to remember that moving from one value to the next increases (or decreases) the strength by 10-fold. The extremes at either end are very dangerous.

Our Conclusion

We take a classic Margarita, infuse the tequila with Butterfly Pea leaves, swap apple liqueur in for the traditional orange, and use a citric acid soution instead of lime. The drink changes colour as it's poured from a deep blue to a fantastic pink, like a yummy tequila based litmus paper.

3-Layered Southside

£8

Viscosity + densities + sugar contents + layering

Edmond Briottet Crème de Menthe, Mint infused Cinzano Bianco Vermouth, Malic Acid, and Sugar Syrup with a Green Chartreuse Float

Herbal, with some herbs and a herbal finish

Once upon a time in history, there was a family of drinks known as the Pousse-Café, they were head turning and fantastic. The general concept was to slowly pour various spirits and liqueurs in to a glass to form a multi-layered drink, to be drunk layer by layer. It is survived by a few shots (the B52 is probably the most well-known).

Gravity

To create the desired 'water and oil' look, the trick was always to know the 'specific gravity' or 'relative density' of the liquids and the effect can be fantastic to see different coloured liquids appearing to defy gravity, however it is very time consuming (probably one of the reasons they virtually died out).

It's all about the mass or density of the liquids, using water as a base (we can assign it a value of 1), pure ethanol alcohol is lighter (so has a density of around 0.8) and will float on top of water. Sugar is, of course, heavier than water, so any spirit or liqueur with a sugar content will sink below the water, as sugar and water are present in virtually all alcohols this gives us a huge amount of varying densities to play with.

The sweeter the alcohol the heavier it is and the lower it would sink, conversely the higher the alcohol content the more likely it is to float to the top. Without a chart to show the varying densities of all the different brands of booze, a fair bit of trial and error is required.

Our Conclusion

For this drink we separate the elements of one of our favourite twists on a classic called the Southside, we drop sweet and heavy Crème de menthe to the bottom of the glass, shake a fantastic Cinzano southside (we previously infused with extra mint) and float that on top of the mint liqueur, then we float a high ABV herbal liqueur on top of the drink.

The Elements

Hibiscus infused Mezcal Fizz £9
Hibiscus infused Del Maguey Mezcal Vida, DOM Benedictine, Lemon, Hibiscus Syrup, Egg White, Soda

Bathtub Punch (serves 4) £32
Orange infused Bathtub Gin, Briottet Kumquat liqueur, London Fields Hackney Hopster Pale Ale, Butterfly Pea Tea Syrup, Citric Acid, Soda Water

Slow Cooked Sidecar £11
Orange and Lemon infused H By Hine VSOP Cognac, Boudier Orange Liqueur, Lemon, Sugar

Smoked Cocktail £9
Ghost Vodka, Briottet Blackcurrant liqueur, Port, Rioja, Brown Sugar, Champagne Acid (smoked)

Aperol Quits £10
Aperol, Pampelle Grapefruit Bitter, Solerno Blood Orange Liqueur, Champagne Acid, Sugar, Prosecco, Soda

Acid-Corrected Daiquiri £9
Chairman's Reserve White Rum, Boudier Kaffir Lime Leaf Liqueur, Absentroux Absinthe Vermouth, Sweetened and Soured Chamomile tea

Colour Changing Apple-Rita £8
Butterfly Tea infused Ocho Blanco Tequila, Briottet Green Apple Liqueur, Green Chartreuse, Butterfly Pea Tea Syrup, Citric Acid

3-Layered Southside £8
Briottet Green Mint Liqueur, Cinzano Bianco Vermouth, Green Chartreuse, Citric Acid, Sugar

Funky Ferment £10
Porter's Tropical Old Tom Gin, Edmond Briottet Passionfruit Liqueur, Guava, Lemon Juice, Sugar

'Sham'pain £8
Ghost Vodka, Briottet Peach Liqueur, Champagne Acid, Sugar, Chardonnay, Pinot Noir

Old, Old Fashioned £12
Barrel Aged Whiskies and Rums, Sugar and Bitters

Microw'aged' Negroni £9
Beefeater Gin, Hayman's Sloe Gin, Campari, Pampelle Grapefruit Bitter, Antica Formula Sweet Vermouth, Dolin Sweet Vermouth

Tropical Bourbon Sour £9
Evan Williams Extra Aged Bourbon, Briottet Blackcurrant Liqueur, Giffard Caribbean Pineapple Liqueur, Lemon, Sugar, Bitters, Egg White

Creamy Pornstar Flip £9
Martin Millers Gin, Briottet Passionfruit Liqueur, Passionfruit syrup, Cream, Bitters, Whole Egg

Clarified Pina Colada £9
Aluna Coconut Rum, Giffard Caribbean Pineapple Liqueur, Pineapple Juice, Acids, Sugar, Cream Soda

In Suspense £9
Tapatio Still Strength Blanco Tequila, Cinzano Bianco Vermouth, Acids, Sugar, Aloe Vera Juice

Spirit Ac Aluna Coconut Rum	Spirit Crr Chairman's Reserve Rum																	Dairy Ew Egg White	Dairy We Whole Egg
Whisky W Evan Williams Bourbon	Whisky Wb Whiskey Blend																	Dairy Cr Cream	Fruit Gr Grapefruit
																	Sour Ta Tartaric Acid	Fruit Or Orange	Fruit Ap Apple
Agave Mv Mezcal Vida	Brandy Hhc H by Hine Cognac							Wine Pr Prosecco	Wine Based Av Absentroux Vermouth								Sour Ma Malic Acid	Fruit Le Lemon	Fruit Li Lime
Agave To Ocho Blanco Tequila	Agave Tt Tapatio 110 Tequila	Liqueur Efl St Germain Elderflower	Liqueur Kll Kafir Lime Leaf Liqueur					Wine Ch Chardonnay	Wine Based Vaf Antica Formula Vermouth	Lengthener Ssc S&S Chamomile			Sweet Bps Butterfly Pea Syrup	Sweet Pfs Passionfruit Syrup	Sour La Lactic Acid	Misc Cy Champagne Yeast	Bitters Pb Peychauds Bitters
Gin Gpt Porter's Tropical Gin	Vodka Gv Ghost Vodka	Liqueur Kql Kumquat Liqueur	Liqueur Pfl Passionfruit Liqueur	Liqueur Sbo Solerno Blood Orange Liqueur	Amaro Yc Yellow Chartreuse	Amaro C Campari	Wine Ml Merlot	Wine Based Cb Cinzano Bianco Vermouth	Lengthener Sw Soda Water	Lengthener Pj Pineapple Juice	Sweet His Hibiscus Syrup	Sweet Gs Grape Syrup	Sour Ca Citric Acid	Misc CO_2 Carbon Dioxide	Bitters Ab Angostura Bitters
Gin Bg Bathtub Gin	Gin Hs Hayman's Sloe Gin	Liqueur Ga Apple Liqueur	Liqueur Cp Carribean Pineapple	Liqueur Cdm Crème de Menthe	Amaro Db Dom Benedictine	Amaro Ppl Pampelle	Wine Pn Pinot Nero	Wine Based Vdr Dolin Rouge Vermouth	Lengthener Hh Hackney Hopster IPA	Lengthener Gp Guava Puree	Sweet Bs Brown Sugar	Sweet Gd Grenadine	Sour Cha Champagne Acid	Misc Mcw Mircowaves	Herb Mi Mint
Gin G Beefeater Gin	Gin Gmm Martin Millers Gin	Liqueur Trs Triple Sec	Liqueur Pl Crème de Peche	Liqueur Cdc Crème de Cassis	Amaro Gc Green Chartreuse	Amaro A Aperol	Wine Rc Rioja Crianza	Wine Based P Port	Lengthener Cs Cream Soda	Lengthener Avj Aloe Vera Juice	Sweet S Sugar	Sweet Co Citrus Oleo	Sour Lj Lemon Juice	Misc Oc Oak Chips	Herb Ro Rosemary

Funky Ferment

Carbonation: natural

£10

Porter's Tropical Old Tom Gin, Briottet Passionfruit Liqueur, Guava, Lemon and Sugar

Very gently sparkling with wonderful tropical fruit

In simple terms, carbonation is the solution of dissolved carbon dioxide gas in a liquid. You can achieve carbonation in one of two ways, either naturally or forced.

To keep the carbon dioxide gas in the liquid, there needs to be pressure. With beer or sparkling wine, this pressure is a sealed bottle cap or tab. When the pressure is released, the carbon dioxide rises to escape in the form of bubbles or carbonation.

Carbonation

Unlike most wines, champagne goes through an additional fermentation in the bottle. Sugar and additional yeast are added when the champagne is bottled, and the yeast then slowly starts converting the sugar to carbon dioxide.

Carbon dioxide gas is a by-product of fermentation, and this is trapped inside the sealed bottles, producing bubbles. This secondary fermentation in the bottles is over in a few weeks as all the sugar is used up by the yeast.

We like carbonation because when carbonated bubbles are released, they tingle with the tongue in a pleasant way, also carbon dioxide combines with water to form carbonic acid, which gives carbonated beverages a slight acidic bite, finally, bubbles lift aromatic molecules to the nose, which intensifies perception of flavour.

Our Conclusion

For this drink, we essentially skip out the primary fermentation (as we are starting with an alcoholic product) and jump straight to the secondary fermentation, by mixing a specific amount of champagne yeast in to our cocktail of tropical gin, guava, and lemon we give it a final dosage of sugar before bottling it and encouraging the secondary fermentation through heat. The result should be a fantastic effervescence that compliments the cocktail.

Sham'pain

Carbonation: forced

£8

Ghost Vodka, Chardonnay, Pinot Noir, Peach Liqueur, Lactic Acid, Tartaric Acid, Grape Syrup

Light and sparkling, heavy grape flavours

Carbonation refers to carbon dioxide dissolved in a liquid. The process of carbonation is based on the principle that high pressure and low temperature maximize gas absorption.

CO_2 is dispensed in to a liquid in a pressurised container where it dissolves, but it is only weakly soluble in liquids so will try to evaporate as soon as it can.

Release
When a carbonated drink is opened or poured into an open glass, it bubbles or fizzes to indicate that the carbon dioxide is slowly evaporating or dissipating. Once pressure is reduced, carbon dioxide is released from the solution in the form of small bubbles, making the drink froth or fizz regardless of temperature. When the carbonated drink is colder, the dissolved carbon dioxide is more soluble and fizzes more when opened.

The Fizz
Surface area for the CO_2 to escape is certainly one factor, but nucleation is another, and the taller the glass, the more nucleation points you'll likely have over a shorter one just by virtue of the surface area of the interior glass. Carbonated drinks tend to lose their fizz at higher temperatures because the loss of carbon dioxide in liquids is increased as temperature is raised, hence why most drinks are served with lots of ice.

Our Conclusion

For this drink we have injected CO_2 (from a Sodastream) in to a mix we have designed to taste loosely like champagne by featuring two of the main grapes in the champagne making process backed up with a grape syrup and the use of lactic and tartaric acids to recreate the expected mouth-puckering dry finish one expects from sparkling wine.

Old, Old Fashioned

£12

Maturation: natural barrel ageing

Bourbons, Scotches and Rum, Bitters and Sugar

Smooth, and easy to drink, deceptively powerful

Many products are matured before we consume them, wines, beers and spirits as we all know are aged but also things like cheese, meats, vinegars, tabacco and mustard.

Barrels

Barrels were designed for transportation. The shape enables man to move large weights around easily. This is the purpose behind the round shape of the barrel, which is made by heating and bending the wood, traditionally by lighting a fire inside the barrel, it could be bent into shape. Charred wood inside the barrel adds flavour and colour to its contents.

Alcohol trapped in a barrel is constantly exposed to the wood and oxygen. Exposing distilled alcohol to oxygen will cause chemical reactions, altering the molecular structure of the alcohol. This changes colour, aroma and flavour in various and mostly beneficial ways.

Temperature where the barrels age will affect the rate of oxidation, and causes evaporation as well. Warm climates cause faster reactions and the aging will cause change more quickly but more harshly, occasionally removing desirable components as well. To better control these conditions, barrels are usually placed in underground cellars to regulate temperature.

Throughout the time of ageing, alcohol will slowly leach flavor from the wood which is were it will gain colour, flavour, vanillins and tannins. Interestingly, time seems to be the most unpredictable of barrel-aging factors. Products can go from tasting great to awful or vice-versa in a matter of days or years.

Our Conclusion

We mix a nice old Fashioned with Scotch and American whiskies with a hint of Rum and then leave it in a barrel for several months. The spirit mix that comes out has been hugely altered, mellowed and influenced by the wood.

Microw ‘aged’ Negroni

£9

Maturation: forced

Beefeater Gin, Hayman’s sloe gin, Campari, Pampelle Aperitif, Antica Formula Sweet Vermouth, Dolin Sweet Vermouth

Complex and bitter-sweet, an elevated, slightly herbal Negroni

Oak was and is the most common wood used for barrels, it’s durable, malleable, expensive and more inert than other woods (meaning it’s less reactive to its contents) it is also sweeter and has more phenloic substances – tannins and lingnins that aid the development of complex flavours in the spirit.

Ageing

During a spirit’s ageing process, the high strength of the alcohol helps to leach flavour (amongst other things) out of the wood. We invert the process here by putting charred wood chips in to a mix of liquids (or cocktail) and applying heat to speed up the natural maceration infusion process to recreate the reaction of wood and alcohol ageing.

Toasting wood chips causes carame1ization to occur in wood (most barrels are charred or toasted to some degree) and then add them to a batched Negroni before blasting it in a microwave in a sealed container so nothing can evaporate.

The process doesn’t create the exact effect of natural ageing, we sacrifice oxidation, which normally allows some of the ‘harsher’ alcohol molecules to evaporate and mellow. We won’t be able to extract anywhere near as many of the wonderful compounds found after a decade or so.

Microwaves work by spinning magnetic polarity, causing water molecules to spin, creating friction which then creates heat. Water in oar cocktail leaves a lot of little molecules getting excited and spinning.

Our Conclusion

We add toasted wood chips, grapefruit peel and rosemary to our large Negroni batch before microwaving it all. The process creates a wonderfully complex Negroni with hints of ageing and bright citrus notes.

Tropical Bourbon Sour

£9

Emulsification: sour

Evan Williams Extra Aged Bourbon, Briottet Crème de Cassis, Giffard Caribbean Pineapple, Lemon Juice, Sugar, Peychauds Bitters, Egg White, Merlot

Strong and fruity, Blackcurrant and pineapple with a bourbon backbone

Emulsification is a scientific process in which two unmixable liquids are mixed together in a way that makes them stay mixed.

There's been much concern over salmonella in eggs, but its prevalence has fallen considerably. Any egg can contain it, but it is virtually a gone in the UK as commercial chickens are vaccinated against salmonella.

Texture

Like the milk foam on cappuccinos, egg whites add luscious, fluffy foam atop your cocktail. They also contribute to a rich, creamy body so every sip is smooth and silky.

This reaction occurs because egg's main protein, ovalbumin, unravels when you mix, beat or shake an egg. As it unwinds, it traps air into its folds, becoming fluffy and frothy and creating this emulsion.

Like whipping eggs into a meringue, shaking egg white in cocktails gives an immediate foamy quality, enhancing texture without affecting taste. We're essentially talking about aeration, the same chemical change that happens when you whip egg whites with a whisk.

Proteins make rings around air bubbles and form a tiny network, changing the composition of liquids and increasing volume, that's why you see a foamy head on top of drinks. The exact amount of expansion varies but science says with enough proteins, 1 egg can theoretically create up to 100m² of foam.

Our Conclusion

In this drink we take a whiskey sour, add some wonderful tropical fruit flavours and a fantastic creamy foam, enhancing the texture and mouth feel of the drink.

Creamy Pornstar Flip

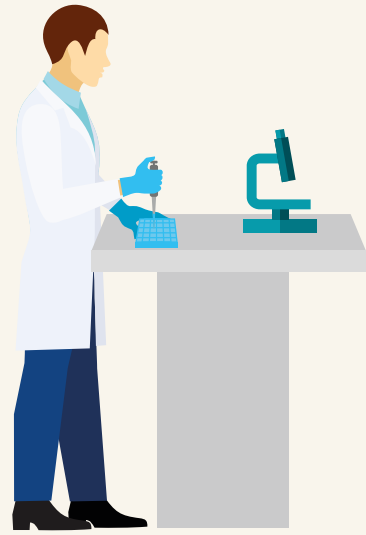
£9

Emulsification

Martin Millers Gin, Briottet Passionfruit Liqueur, Grenadine, Passionfruit Syrup, Double Cream, Whole Egg, Peychauds Bitters

Amazingly smooth, passionfruit everywhere with a creamy mouthfeel

The flip as we know it dates back beyond the 1860s although the drink comes from the 1600s. It became very popular in colonial America and was probably a great way of consuming much needed fats and protein.



Egg Effect

What we like about the drink is the emulsion created from the egg, the whole drink foams and froths in to a fantastic creamy tasting delight.

The fat in the yolk serves to mute some of the more eccentric flavours and also contributes it's own flavour to the mix (unlike egg whites). Shaking the drink aerates and causes the whole liquid to emulsify and hang together in a combined state.

Egg yolks contain a number of emulsifiers which cause the water loving molecules in our liquids to combine on a molecular level, creating the velvety taste we love so much.

Our Conclusion

In this drink we take the classic pornstar martini and reimagine it as a flip, whole egg and double cream just round it out and leave it with an almost milkshake like texture.

Clarified Pina Colada

£9

Clarification + suspension

Aluna Coconut Rum, Giffard Caribbean Pineapple Liqueur, Pineapple Juice, Citric Acid, Malic Acid, Sugar, Ice Cream Soda

Tropical, pineapple and coconut with a smooth creamy texture

Tiny particles in juices and other liquids can affect the flavour, visual appearance and textural mouthfeel of a finished drink. By clarifying a classic cocktail, you can take it in to a whole new direction.

Clarification

Clarification essentially refers to the act of removing solid particles from a liquid solution.

There are some incredible scientific methods of clarifying liquids by using highly expensive bits of science kit. The easiest is possibly a centrifuge which spins liquids so fast it causes the liquid and solids to separate allowing a clear liquid to be drawn off the top.

In this instance we are using some real low-tech stuff for clarifying. Coffee filters and super fine straining bags are good enough to clarify pineapple juice (it will generally separate and fall out of suspension on its own in a few hours).

We're also cheating a bit (because we can). Rather than using lime juice and having to consider clarifying that, we use a mix of citric and malic acids (the primary acids naturally occurring in pineapple), which give a natural rounded acidic vibe to the drink whilst remaining crystal clear.

Our Conclusion

To finish off we float the drink on a base of cream soda, which adds an almost creamy texture to the drink due to the tartaric acid in the recipe.

In Suspense

Suspension

£9

Tapatio Still Strength Blanco Tequila, Cinzano Bianco, Citric Acid, Tartaric Acid, Sugar, Aloe Juice

Complex and earthy but more-ish with grape flavours and balanced finish

Suspension is a state where solids and liquids mix in to a solution. Think of a bucket of sand and water, when mixed it combines. If left alone, undisturbed the sand will sink to the bottom and you'll be left with clear water on top.

Suspensions

Suspensions in drinks rely on colloids (a mix of insoluble particles and liquid) to manipulate the density of the liquids to prevent the particles from sinking with the force of gravity. In this drink we use Aloe Vera juice which has Xanthan gum added to it to control the density of the liquid and prevent the pieces of aloe from sinking.

Xanthan gum

Xanthan gum has many uses in gastronomy and is often added to various goods we consume regularly, it's xanthan gum that keeps a nice vinaigrette from separating and falling out of suspension. It also adds 'weight' to a liquid in a similar way to fatty proteins. It also has a high pour-ability due to its structure, meaning it can be poured easily but will hold it's abilities as soon as the liquid solution rests. On a microscopic level Xanthan gum creates a web like structure in liquid which holds particles in constant suspense.

Our Conclusion

In this drink we piggyback on the xanthan gum in aloe juice (we increase the amount ever so slightly to balance the dilution from alcohol and other liquids) to create a visually impressive, gravity defying crystal clear drink.

In summary

We hoped you enjoyed our creations. As always, if you can't see anything you like please ask for a recommendation or for your favourite.

For further course materials

You can get in touch with us at:

Email – bar@thefalstaffincanterbury.com

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COCKTAIL CHEMISTRY **is a fairly non-comprehensive introduction to the (slightly) amazing world of the background science of bartending and mixed drinks. Read about some of the slap-dash techniques used by top drink-mixographers around the world. Discover some vaguely interesting methods we utilise in the advanced field of pretty-tasty-drinky-work.**

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