

# WHY DO WE TASTE?

WITH DR KARL KRUSZELNICKI

A Campari Academy Masterclass

CAMPARI ACADEMY

# SESSION OVERVIEW

**A** journey that will not only debunk common misconceptions, but also bring to life research and recent discoveries on the sense that most motivates our guests at the bar.

The CAMPARI ACADEMY has invited a unique and engaging Guest Speaker for our first Masterclass: Dr Karl Kruszelnicki to bring the subject to life.

By putting a lens on TASTE and all its aspects - Acid, Sweet, Bitter, Salt, and Umami - we are opening up discussions on the subject to trigger your creativity and questioning.

We hope that you will walk away with some degree of inspiration and a better understanding of how to develop new and exciting drinking experiences for your customers.

The Campari Academy Team.

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**DR KARL KRUSZELNICKI**

**CAMPARI ACADEMY**



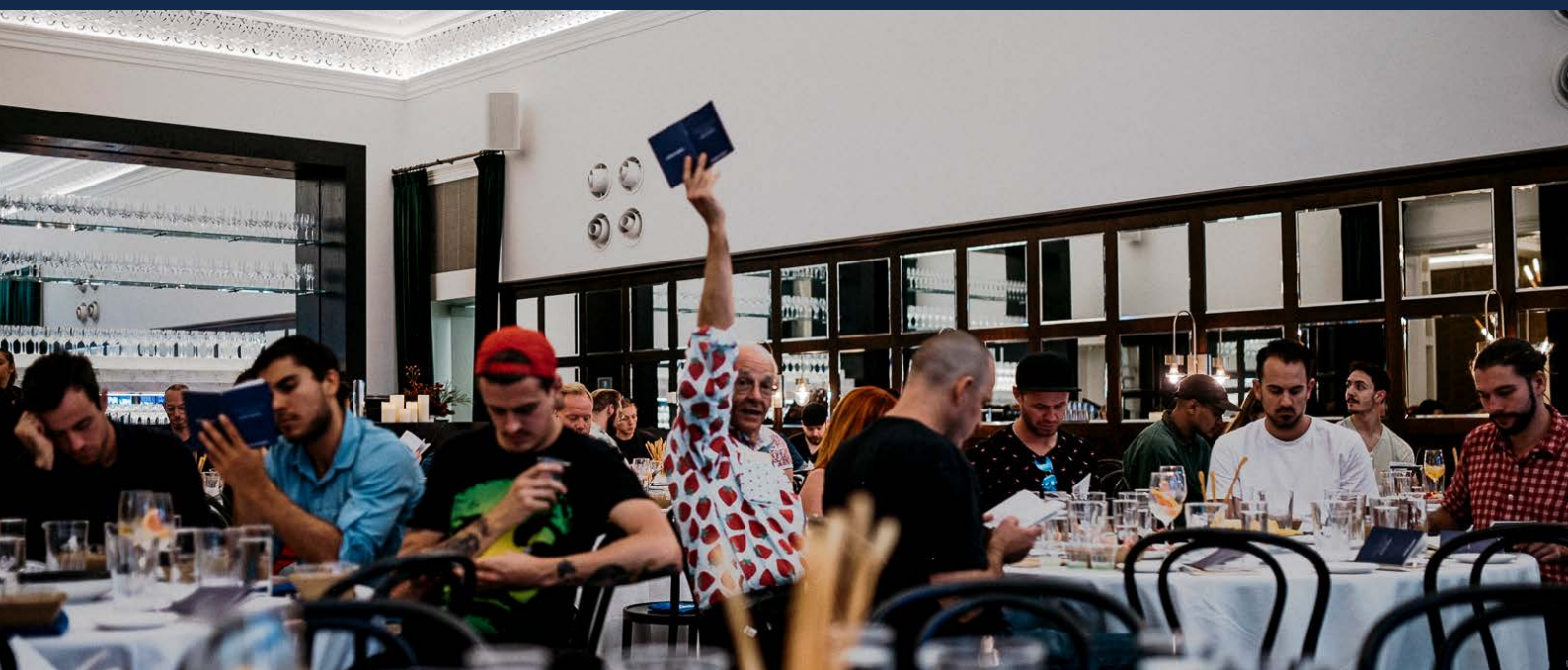
When NASA classified Karl as non-astronaut material in 1981 he walked straight into ABC Radio station Double J and offered to talk about the Space shuttle launch. They said 'Okay' and his radio career took off from there. 'Great Moments In Science' ran on Double J while Karl moonlighted as a medical student. Since then, his media career has exploded from radio, to TV, books, newspapers, magazines, scripting, professional speaking, and of course, the Net.

Karl made his TV debut in 1985 as the presenter of the first series of Quantum. Since 1986 he has reported science on the Midday Show, Good Morning Australia (including a full-time stint in 1991-2 as the TV Weatherman and science reporter),

the Today Show and Sunrise. Along side his fellow geek Adam Spencer, he has written and co-produced two series of Sleek Geeks for ABC TV.

Karl popularises science on ABC radio stations across Australia and on the BBC for several hours each week. Many of you will be familiar with the original talk back program each Thursday on JJJ from 11am to midday.

Karl has written (so far) 43 books, beginning with 'Great Moments In Science' in 1984, and includes such titles as 'It Ain't Necessarily So...'Bro' (2006), which was launched, quite literally, via rocket at Sydney's Bondi Beach (a world first). November 2009 saw the simultaneous release of Karl's 28th book, 'Never Mind The BULLocks...Here's the Science', board game



('Fact OR Fishy'), and first ever music single, 'Get Fact'.

In August 2010 Karl's 29th book, 'Dinosaurs Aren't Dead', was released. In November 2010, Karl's 30th book, 'Curious & Curiouser', was released into the adult non-fiction market. His latest book for adults 'Karl, The Universe and Everything' was released in October 2017.

He released two kids' activity books 'Dr Karl's Little Book of Dinos' and 'Dr Karl's Little Books of Space' in June 2017'.

In 1996 Karl was invited by the United States Information Agency to be a Distinguished Foreign Guest in their International Visitor Program. Previous Alumni of this program include Julius Nyere, Anwar Sadat, Indira Ghandi and Margaret Thatcher.

As part of this program he visited NORAD, Dryden Air Force Base and the Jet Propulsion Laboratory - and got to sit in the front seat of an SR-71 Blackbird. In August 2000 Karl was one of first eight Australian



Apple Masters to be announced (there are fewer than 100 in the entire world). The Apple Masters Program celebrates the achievements of people who are changing the world through their passion and vision, while inspiring new approaches to creative thinking.

In 2002, Dr Karl was honoured with the prestigious Ig Nobel prize awarded by Harvard University in the USA for his ground-breaking research into Belly Button Lint and why it is almost always blue.

In September 2003, Dr Karl was bestowed with the great honour of being named 'Australian Father of the Year'. Dr Karl Kruszelnicki received the Member of the Order of Australia Award in the Member of the Order of Australia Award in the 2006 Australia Day Honours list.



In 2007 the Australia Skeptics Society awarded Dr Karl the Australia Skeptic Of The Year Prize.

In 2012 Karl was delighted to have Asteroid 18412 named after him. Asteroid Dr Karl/18412 was discovered by Robert H. McNaught at the Siding Spring Observatory in Coonabarabran, New South Wales, Australia, on June 13, 1993.

In 2016 Dr Karl was awarded an Honorary Doctorate from the University of the Sunshine Coast. Karl has degrees in Physics and Maths, Biomedical Engineering, Medicine and Surgery and has worked as a physicist, tutor, film-maker, car mechanic, labourer, and as a medical doctor at the Kids' Hospital in Sydney.

Dr Karl is currently the Julius Sumner Miller Fellow at Sydney University, where his 'mission' is to spread the good word about science and its benefits.

His enthusiasm for science is totally infectious and no one is better able to convey the excitement and wonder of it all than Dr Karl Kruszelnicki.

# **SOUR/ACID**



# **DAS EXPERIMENT**

## **Same Same but Different**

### **DAS EXPERIMENT #1**

#### **INGREDIENTS**

45g Espolòn Blanco Tequila

20g Fresh lime juice pH 2.2

15g Simple syrup

40g H<sub>2</sub>O

## **DAS EXPERIMENT #2**

### **INGREDIENTS**

45g Espolòn Blanco Tequila  
20g Acidic H<sup>2</sup>O solution pH 2.2  
15g Simple syrup  
40g H<sub>2</sub>O

## **DAS EXPERIMENT #3**

### **INGREDIENTS**

45g Espolòn Blanco Tequila  
20g Verjus (adjusted) pH2.2  
15g Simple syrup  
40g H<sub>2</sub>O

### **METHOD**

Mix, freeze/chill, dry shake before tasting.  
Serve in tasting glasses or coupettes.

# INGREDIENTS DETAILS & THOUGHT PROCESS

**FRESHLY PRESSED LIME JUICE - pH 2.2**

(filtered from pulp)

**ACIDULATED H<sup>2</sup>O - pH 2.2**

using 200g H<sup>2</sup>O at pH 7

4g citric acid

2g malic acid

**VERJUS - pH 2.2**

(acidity adjusted with Tartaric acid from  
original pH 2.8)

**TEQUILA ESPOLON - pH 7**

(2.8 before dilution)

**CASTER SUGAR SYRUP 1:1 - 45% Brix**

**DILUTION (33%) given with distilled H<sup>2</sup>O - pH 7**

**Recipe proportion kept constant:**

45g spirit - 20g sour agent - 15g sugar

## **FINAL COCKTAILS' pH = 3.1 after dilution**

### **MEASUREMENTS**

Taken with pH meter at room temperature (25°C).  
Multiple measurements were taken for test accuracy.  
Only one subject was tested for tasting on palate...  
Someone had to do it...

### **RESULTS**

We chose the same proportion 45-20-15 + same pH result as the most exemplifying of the test.

We also tried using acidic ingredients at different pH maintaining the proportion 45-20-15 or different proportions with acidic ingredients at different pH, trying to obtain the same final pH in the cocktail.

## OUTCOME

At same pH, fresh lime, acidic H<sup>2</sup>O and verjus, bring the same level of acidity to the drink, but act differently during the tasting.

<b>ACIDIC ELEMENT</b>	<b>FRESH LIME</b>	<b>ACIDIC H<sup>2</sup>O</b>	<b>VERJUS</b>
<b>ACIDITY pH 3.1</b>	Rich & Layered	Softer	Sharp & Delayed
<b>PALATE</b>	Textural Mid Tongue Side-Mouth	No Acidic texture Tip tongue Side-mouth	Throat Front Teeth Side Mouth
<b>FLAVOUR</b>	Fresh Perfumed Fragrant	No nose Dry mouthfeel No apparent aroma	Velvety Flavoursome Astringent
<b>LENGTH</b>	Lingering	Short	Crescendo
<b>EFFECTS ON SALIVATION</b>	7/10	3/10	5/10
<b>NOTES</b>	Classic	Increase urge to urinate	Itchy on palate

# CONSIDERATIONS

Same pH doesn't mean same level of sourness.

Different acidulant, even if at the same pH, don't give the same acidic perception on the palate.

Different acidulants bring more to the drink than just pH, therefore, if substituted in same amount, flavour will differ.

Acidic H<sub>2</sub>O mimic fresh juice sourness if at a lower pH than the latter.

In mixing, it's easier to increase acidity, than it is to increase alkalinity.

Temperature doesn't seem to affect pH.

In perishable ingredients, oxidation affects acidity, causing the pH level to rise towards alkalinity.

Lime juice acidity main characteristic is freshness.

Acidic H<sup>2</sup>O acidity main characteristic is dryness.

Verjus acidity main characteristic is a sharp crescendo of sourness.





## DID YOU KNOW

Celebrity Chef Marco Pierre White states that if two ingredients grow together, they'll taste good together.

Try using sour sources from the place other ingredients are from, for example  
Tequila + Lime or Arrack + Curd.



## **ESPOLÒN BLANCO**

40% ALC/VOL

Soft mouthfeel, light to medium bodied palate with bright agave flavour; notes of pepper, vanilla bean, grilled pineapple and spice. Clean finish that ends with a hint of spice.



## **ESPOLÒN REPOSADO**

40% ALC/VOL

Bold, round palate, medium to full bodied with a rich roasted agave; sweet tropical fruit, vanilla and brown spices. Long spicy finish.

# PH CHART OF COMMON FOOD & FLUIDS

NOT EDIBLE	DRAIN CLEANER	14	ALKALINE	
	BLEACH	13		
EDIBLE	SOAPY WATER	12		
	AMMONIA	11		
	MILK OF MAGNESIA	10		
	BAKING SODA	9		
	BLOOD, SOME MILK	8		
	WATER	7		NEUTRAL
	SALIVA, URINE, MILK	6		ACIDIC
	BLACK COFFEE	5		
	TOMATO JUICE	4		
	ORANGE JUICE	3		
LEMON JUICE	2			
NOT EDIBLE	GASTRIC ACID	1		
	BATTERY ACID	0		

pH scale is exponential. Every degree is ten times more or less acidic than the one below or above.

# PH CHART OF LIQUOR & SPIRITS

EDIBLE	VODKA	7.6	ALKALINE
	GIN, LONDON DRY	7.4	
	TEQUILA	7	NEUTRAL
	CACHACA, UNAGED	6.9	ACIDIC
	BITTER	5	
	AMARO	4.8	
	BOURBON	4.1	
	JAMAICAN RUM 12YO (no caramel)	4	
	RYE	4	
	SCOTCH 10YO SPEYSIDE	3.9	
	VERMOUTH, SWEET	3.6	
	VERMOUTH, BIANCO	3.5	
	VERMOUTH, DRY	3.4	

All measurements have been taken manually on available products on hand. Different brands might differ.

**SWEET**

**CAMPARI ACADEMY**



# SMURF'S WORLD

## INGREDIENTS

45ml Sagatiba Cristalina Cachaca  
(fat washed with coconut oil and orange peel)

90ml Natural Mineral Water

Smurf Tea Ice Spear

2.5ml Glycerine

## GLASS

Highball

## METHOD

Build into highball and gently stir.  
Add Ice Spear. Express oils and garnish.

## GARNISH

Lime peel coin

# INGREDIENTS DETAILS & THOUGHT PROCESS

## **Sagatiba Cristalina Cachaca. Coconut oil and Valencia Orange peel fatwashed**

In a bag, introduce 700ml of Sagatiba with 200g of organic coconut oil and the whole peel of a Valencia orange.

Seal and cook sous vide at 80°C for 2 hours.

Strain and freeze.

Remove solids and filter through cheese cloth/coffee filter. Bottle.

## **Smurf Tea**

We have partnered with VIC based Australian Tea Masters. Sharyn Johnston developed a unique tisane herbal infusion with the following botanicals: Fennel, Liquorice, Stevia, Star anise, Blue pea flower, Lime peel, Lemon verbena, Vanilla and Lemongrass.

The idea was to create a blend for an infusion that would truly give the perception of naturally added sweetness, without having to incorporate any artificial or processed sugars into the drink.

## **To make Ice Spear**

Infuse 150g of the blend for each litre of (almost) boiling water.

Infuse at hot temperature for about 15/20 minutes.  
Allow to cool and create large clear ice block  
(directional freezing technique).

Cut into long Collins spears.





# CONSIDERATIONS & KEY POINTS

For this drink we looked at ways of introducing “Unexpected sweetness” and wanted to shy away from processed sugars, instead introducing sweetness through natural means in the form of “sweet” botanicals that bring no actual sugar with them.

We chose Cachaca - made from fresh sugarcane, Cachaca undergoes multiple distillations to produce a very clean spirit with no processed sugar content but with delicate flavours and aromas of fresh cut sugarcane.

This light sweetness is enhanced through a blend of naturally occurring herbs that have been infused at high temperature in filtered water.

We opted for a coconut oil fat wash and a drop of glycerol to add mouthfeel without corrupting the intent of the experiment.

Hope you enjoy it and start thinking of different ways of triggering sweetness in your drinks.



## **SAGATIBA CRISTALINA** 38% ALC/VOL

White pepper, sugar cane and herbaceous aromas form the nose. The palate is medium dry and bursts with bright vegetal flavours. The mouthfeel is pleasant and light with a clean spicy finish.





## DID YOU KNOW

### **Smurf flavoured Ice Cream and Popsicle**

Blue icicles started their popularity in Italy in the 80's as sweet and anise flavour summer treats.

They were dyed blue with natural colouring to leverage the popularity of the tv cartoon "The Smurfs".

They became a classic.

Our ice block is an ode to those nostalgic times.

**BITTER**

**CAMPARI ACADEMY**



# THE PREQUEL

## INGREDIENTS

40ml Amaro Averna

25ml Cynar

45ml Fresh Pomegranate juice macerated  
with chamomile & citrus oils

1 drop of gentian tincture

2 drops of wormwood tincture

## GLASS

Double Old Fashioned

## METHOD

Combine and stir ingredients in a mixing glass, strain over fresh ice in a rosemary smoked glass dusted with dehydrated yoghurt powder.

## **GARNISH**

Lemon peel coin, dehydrated yoghurt.

## **INGREDIENTS DETAILS & THOUGHT PROCESS**

This is a Bitter driven digestivo drink that could easily be served as an Aperitivo.

Averna & Cynar are lengthened with fresh chamomile macerated pomegranate juice which provides a tart and tannic balance (people also describe tart with bitter) and the sweetness in the Amari to create a rich structured palate.

This is brought together with the soft calming aromatics of chamomile.

Lemon oils help to stretch the drink across the width of the palate without the addition of acid.

Rosemary smoke evokes the brain to think the drink will taste bitter.

## **Pommegranate Infuso**

Macerate 100 grams of loose organic chamomile into 1 litre of fresh organic pomegranate juice in a refrigerated environment for 12 hours.

Strain and bottle.

Keep refrigerated.





## DID YOU KNOW

Tannins. Many tannic or astringent ingredients “taste” bitter, but tannin and astringency are not experienced through bitter receptors.

Sour and bitter are often confused too, especially in the realm of “tartness”.

Grapefruit is a classic example.

Humans have only a few taste receptors for sweet, but dozens receptors for bitter.





## **BRAULIO** 21% ALC/VOL

Notes of wood and roots, from which gentian root stands out, rounded out with refreshing fragrances of juniper and aromatic herbs and wormwood on the finish. Robust and intense taste of herbs and essential oils, followed by classic notes of wood and roots, and ending with a pleasant bitterness.





## **CYNAR**

16.5% ALC/VOL

Typical herbal complex rounded by bittersweet notes, gently alcoholic. Bittersweet liquid that carries peculiar herbal notes including artichoke memories married with dried fruit hints, rounded by a caramel smoothness. Pleasantly persistent woody notes and caramel.



## **AVERNA**

32% ALC/VOL

Opening citrus notes mixed with scents of Mediterranean herbs such as myrtle, juniper, rosemary, sage and aromas. Orange hints balanced with liquorice and Mediterranean herbs. Velvety and rounded texture.



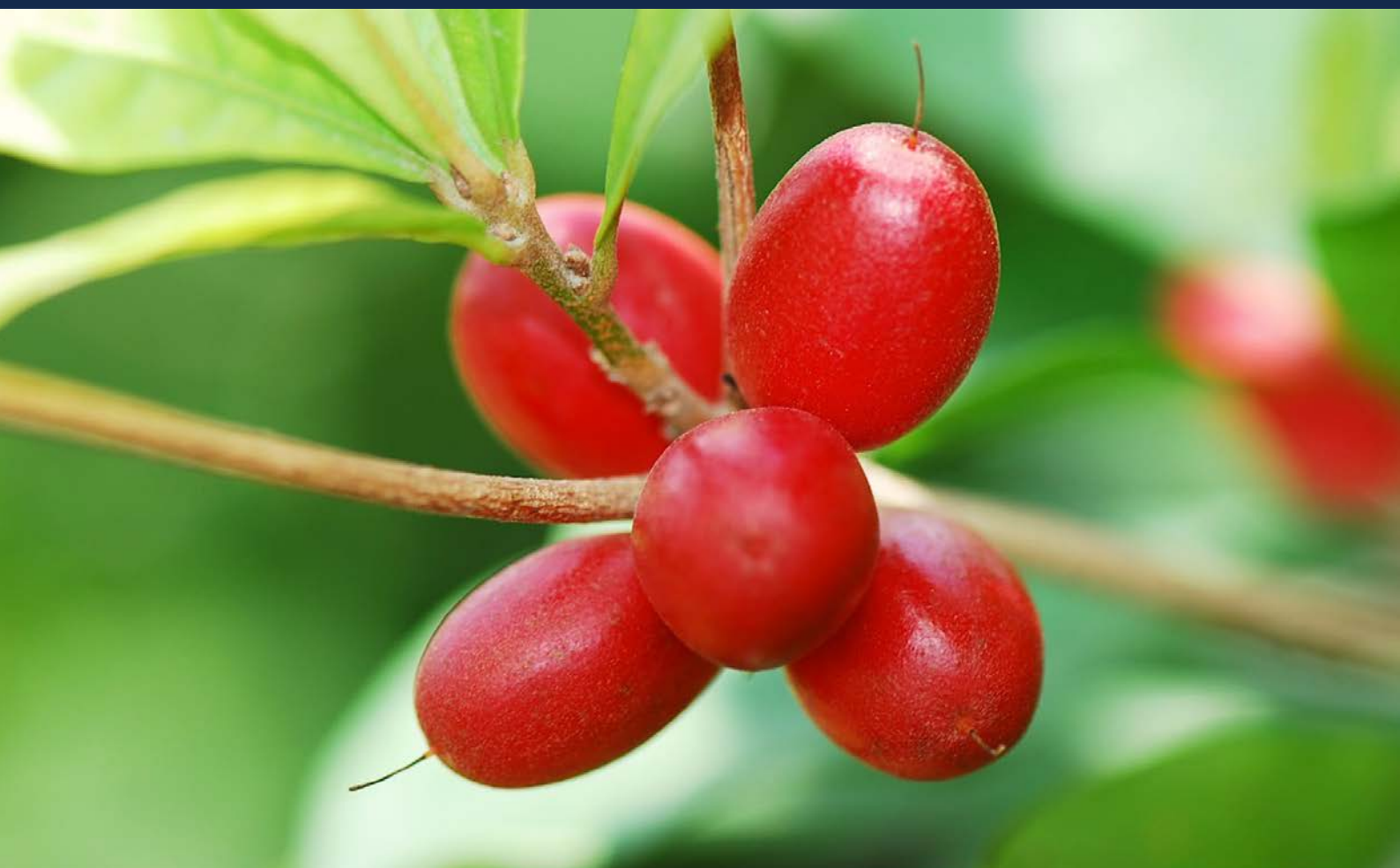
**DID YOU KNOW**  
**THE MIRACLE FRUIT**  
***Synsepalum dulcificum***

Native to West Africa, Miracle fruit was described as the 'miraculous berry' by British Surgeon Dr. William F Daniell in the 1852 April edition of The Pharmaceutical Journal.

Miracle fruit contains Miraculin, a glycoprotein that binds to the sweet receptors on the tongue.

Miraculin has taste-modifying activity in which metallic, acidic and sour flavours can taste sweet.

This may be helpful for people whose sense of taste has been disturbed for any reason (e.g. after medical treatment).



**SALT**

**CAMPARI ACADEMY**



# **BONDI BIRD APERITIKI**

## **INGREDIENTS**

45ml Appleton Estate Signature Blend  
20ml Pineapple & White Peach Campari  
20ml Broiled Lime Juice  
30ml Salted Pink Grapefruit Sherbet

## **GLASS**

Tiki Mug

## **METHOD**

Shake and strain in tiki mug.  
Complete with plenty of crushed ice.

## **GARNISH**

Grapefruit peel and fresh mint sprigs.

# INGREDIENTS DETAILS & THOUGHT PROCESS

## **Pineapple and White Peach Campari**

White peaches are at the peak of their season,  
it had to be done.

White peach and fresh pineapple flesh were sous vide  
with Campari Bitter for 12 hours at 40°C, then strained.

We recommend to dehydrate fruit for 12 hours at 70°C  
to completely dry and caramelize natural and added  
sugars from Campari.

Blitz in a coffee grinder and reserve dust for other  
preparations.

## **Salted Pink Grapefruit Sherbet**

Create a pink grapefruit oleo saccharum using peels  
from 3 large pink grapefruit every 200g of sugar.

Once fully dissolved add the juice from the respective  
peeled fruits: zero waste, all taste.

Add 20g of himalayan pink rock salt every Kg of  
sherbet (2% salt solution). Store refrigerated.

## **Broiled Lime Juice**

Cut limes in half. On a baking paper sheet position flesh up.

Blast at high temperature in an oven (closed door - 180°C) for 5 minutes.

Use salamander to help caramelize slightly (do not overdo it). Let cool. Juice and store refrigerated.

## **CONSIDERATIONS & KEY POINTS**

Who doesn't love a well executed Jungle Bird?

We certainly do, but too often following "specs" leads to unbalanced and overly acidic drinks, with a lingering unpleasant bitterness as a consequence. Reasons are usually the lack of sugar to balance the fresh lime and the un-ripe-ness of the pineapple juice.

This created the perfect case study to introduce salt in a "smart" way into a drink preparation. From what we have experienced the 2 basic tastes that salt has the tendency to diminish and at times nullify are acid, and bitter, while exalting other compounds in our ingredients.



By introducing salt into the sherbet, and by broiling the lime juice (hence killing the vitamin C, one of the drivers of acidity in citrus fruit) we have managed to tame the sourness and bitterness of the drink.

Too often salt is misused in cocktail preparations. We suggest to go back to the basic principles that make boiled broccoli, fresh unripe sour mango, dark chocolate and bitter caramel so much tastier, always asking ourselves the reasons why we do what we do...

Campari soda and caper berries anyone?





**CAMPARI**  
25% ALC/VOL

Pleasantly bitter, intense orange and herbal fragrances with typical gentian and woody notes. Herbal, long-lasting, pleasant and typical bitterness.



**APPLETON ESTATE SIGNATURE  
JAMAICA RUM**  
40% ALC/VOL

Perfectly balanced complex citrus fruity and sweet notes with subtle orange peel, dried apricot, fresh peach and a hint of molasses and woody notes.

**UMAMI**

**CAMPARI ACADEMY**



# **THE SUN'S ORIGIN**

## **INGREDIENTS**

45ml Russell's Reserve 10yo  
30ml Cinzano Bianco Vermouth  
(Nori Infused)  
15ml Sundried tomato Cordial

## **GLASS**

Coupe

## **METHOD**

Stir and strain

## **GARNISH**

Lemon peel oils (express and discard) Dehydrated

sundried tomato dust, served with a 24 month Parmigiano Reggiano crisp dusted with nori powder.

## **INGREDIENTS DETAILS & THOUGHT PROCESS**

### **Nori Cinzano Bianco**

Infuse at room temperature for 12 hours using 1 sheet of Nori every 200ml of Cinzano Vermouth Bianco. Strain, rebottle, label and keep refrigerated.

### **Sundried Tomato Cordial**

Cover every 500g of sundried tomatoes with 1 litre of boiling water and steep for approximately 12 hours. Add 500g of white sugar and simmer for 20 minutes. Fine strain and reserve tomatoes.

### **Sundried Tomato Dust**

In a food dehydrator place reserved tomatoes from the cordial preparation and dehydrate at 70°C for approx. 18 hours. Blitz in a coffee grinder. Store in a dry environment (use silica gel packets).

## **Parmesan Crisp**

On a baking paper sheet, finely grate 24 months Parmigiano Reggiano, evenly spread and melt/caramelize with direct heat from the top grill.

Let cool down and cut into desired crisps shape.  
Dust with Nori powder.



## **CONSIDERATIONS**

Umami serves as a signal to the body that we are consuming protein, allowing for the secretion of saliva and digestive juices.

Amino acid compounds are usually found in two synergistic areas: Glutamate + Inosinate.

Inosinate is associated with meat proteins, while Glutamate + guanylate are generally associated with vegetable proteins (mushrooms, tomatoes etc).

This table demonstrates items of high: Glutamate, Inosinate and Guanylate.

### Glutamate



Tomatoes



Onions



Kombu  
Seaweed



Broccoli



Peas



Asparagus



White  
Asparagus



Cheese



Mushrooms



Beets

### Inosinate



Sardines



Bonito

Dried Bonito  
(Katsuobushi)



Poultry



Pork



Beef

### Guanylate



Dried  
Porcini



Dried  
Shitake



Dried  
Morels

Generally speaking, "Increased perception" of overall umami experience occurs with processing of foods.

Some examples include fermenting and Dehydrating. Tomatoes (dried) have presence of guanylate, which is not seen in their fresh/original state.



## DID YOU KNOW

Human breast milk is 16 to 18 times higher in glutamate than cow's milk.

Also, the amniotic fluid contains glutamate. Before we're even born, we float in a Umami broth.

When your palate is coated in glutamate, everything you ingest becomes more tasty...should we then use glutamate solution or serve MSG bar snacks?





## **RUSSELL'S RESERVE 10YO** 45% ALC/VOL

Sweet spices, musk and bay leaf. Sweet vanilla, leather and straw form the nose. The palate has spicy notes of chilli and spearmint. The finish is pleasant and light with a clean spicy finish.



## **CINZANO BIANCO VERMOUTH** 14.4% ALC/VOL

Aroma of ripe stone fruit. Sweet, yet balanced by a delicate bitterness. Hints of fresh citrus and floral. A classic Bianco style vermouth.

# **COOL READS**

## **TASTE**

by Barb Stuckey

## **FLAVORBY**

by Bob Holmes

## **GASTROPHYSICS**

by Charles Spence

## **NEUROGASTRONOMY**

by Gordon M. Shepherd

## **THE FLAVOUR BIBLE**

by Karen Page  
& Andrew Dornenburg

**MOUTHFEEL**

by Ole G. Mouritsen  
& Klavs Styrbaek

**SALT, FAT, ACID, HEAT**

by Samin Nosrat

**THE FLAVOUR MATRIX**

by James Briscione

**THE FLAVOUR THESAURUS**

by Niki Segnit

**THE SCIENCE OF SPICE**

by Dr. Stuart Farrimond

# THANK YOU



The Campari Academy Team