**Note by Note Cooking**


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**Module:** Advanced Molecular Gastronomy

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# 1. Background

Molecular Gastronomy is defined by Burke, This and Kelly, (2016) as 'the scientific discipline that explores the phenomena occurring during culinary transformations.' The concept of molecular gastronomy has been developed in research institutes, companies, and a number of universities and professional kitchens around the world since 1988. Molecular Gastronomy serves the purpose of exploring both physical and chemical mechanisms involved in the preparation and processing of food. It also serves as a means of discovering new applications and mechanisms of foods' preparation and processing. Molecular Gastronomy has been previously perceived to be an art more than a scientific technique due to its relation to cooking. However, technological and scientific approaches have long been applied to develop new products in the food industry (Burke *et al.*, 2016). This results in a better understanding of the complexities of how chemistry, microbiology and physics converse in the production of new food products.

Molecular gastronomy has seen new developments in its field of discipline in recent years, particularly, the emergence of the concepts of molecular cooking and Note by Note Cooking. This, (2008) describes the significant differences between molecular gastronomy and molecular cooking. Molecular cooking is a discipline that takes place in a domestic setting, or, a professional one such as a restaurant kitchen. In molecular cooking, the selection of suitable ingredients and the skills involved, don't use any scientific principles. Molecular cooking is defined by the use of new tools, ingredients and methods that reflect culinary trends. On the other hand, molecular gastronomy's activities are one of a scientific application that is carried out in a laboratory setting. The discipline emphasises strongly on the use of chemistry and physics. In its approach, it uses a scientific quantitative approach when applying the scientific processes of investigating methods and producing theories.

The concept of Note by Note Cooking is described by Burke and Danaher, (2016) as an application of molecular gastronomy where dishes are produced not from conventional ingredients, but rather from the use of compounds or mixtures of pure compounds. No food commodities such as meat, fish, fruit or vegetables are used in the composition of a Note by Note dish. The aim of utilizing Note by Note cooking is to create new foods and flavours, rather than the recreation of what already exists. This, (2014:5) says that the creation of Note by Note Cooking began in 1994 when he and his friend, physicist Nicholas Kurti, wrote an article for Scientific American on the use of chemistry and physics in the kitchen. Six years

later, the pair gave birth to the scientific discipline of molecular gastronomy. They then set up an institution in France dedicated to food research. When conducting research for Scientific American, This experimented with compounds and discovered that different aromas and flavours resulted depending on the concentration used. These results began being recorded in articles and led to the discipline of Note by Note cooking being born. This, (2013) and Burke and Danaher, (2016) say that the discipline of Note by Note Cooking can now be used to create all sort of shapes, colours, odours, consistencies, temperatures and trigeminal stimulation. An article by Lee Ball, (2015) suggests that the invention of Note by Note Cooking could solve many of the world's problems in the future regarding food security by eradicating world hunger. A key concept of this is the removal of water from foods, which causes spoilage in transit. Note by Note can accomplish this by breaking down foods into their parts and separating their nutrients and flavours. These components can take the form of a wide variety of powders and liquids that are theoretically, possess a shelf life that lasts forever.

This report details the development of a cocktail and dish using note by note cooking. The topic of this year's assignment is Diracs and cocktails. Participating students in the module are to develop a cocktail and Dirac dish using the discipline of Note by Note Cooking. The cocktail and dish were developed over four classes that were carried out once a week. The final showcase of the finished products was on the fifth and final week. The report details the progressions and components that were worked on each week to complete the concept of the cocktail and dish. An informal sensory analysis is carried out on the third fourth and final week. The Dirac is a Note by Note creation by Herve This, named so after famous physicist, Paul Dirac. It is made using pure proteins, oil and starch compounds. Holmes, (2017) described This's Dirac as 'a flavoured protein pancake.' An article by Bosker, (2015) described how This explained the Dirac as an alternative to meat. It was not intended to simulate a steak or other meats, but rather invent a new food with new flavours. This, (2016) says that making "artificial meat" by way of Note by Note can replace the process of using plant and animal tissues. This could possibly result in great changes being made in agriculture in the future.

## 2. Aim of Report

To create a Note by Note cocktail that contains no alcohol and a Dirac dish that complies with the requirement of the annual International Note by Note contest held in Paris, France.

## 3. Materials and Methods

### 3.1 Equipment

2 Stainless Steel Measuring Jugs

Measuring Spoons

1 Digital Scales (Ascher: Model CS)

1 Weighing Scales

3 Stainless Steel Bowls

3 Stainless Steel Pots

1 Steel Baking Tray

1 Plastic Pipette

1 Thermometer (Brand ETI)

1 Stainless Steel Whisk

1 Stainless Steel Scone Cutter

1 Stainless Steel Office Knife

1 Stainless Steel Kitchen Shears

1 Ceramic Ramekin (3 ½ inch diameter, 3-inch height)

1 Sheet of Silicone Parchment Paper

1 Thermomixer

1 Siphon Gun with Co2 Charge

1 Hand Blender

1 White Ceramic Soup Bowl

1 Ceramic Gravy Jug

1 Cocktail Glass

## 3.2 Ingredients and Quantities

For the Cocktail:

Water 200ml

Sucrose Syrup 100g (sucrose, 200ml water)

Dextrose 3g

Citric Acid 2g

Lemon Yellow Colouring (Tartazine; 1934-21-0) 1ml

Orange Food Colouring (1ml):

β-Carotene

Annatto E160b

Rum flavour Compounds (Rhum Brun, 0.25ml):

Ethyl Propanoate

Ethyl Acetate

Ethyl Isobutyrate

Acetic Acid

2-Ethyl-3-Methyl Butyric Acid

B-Damascenone

Pineapple aroma and flavour compounds (0.25ml):

Furaneol

3-methyliopropanoic acid methyl ester

Ethyl Hexanoate

Ethyl-2-methylbutyrate

For the Creamy Head on the Cocktail:

Hyfoamer 50g

Water 100ml

Sucrose 25g

Pineapple Flavour Compounds (0.15ml):

Furaneol

3-methyliopropanoic acid methyl ester

Ethyl Hexanoate

Ethyl-2-methylbutyrate

## For the Dirac Dish:

Dirac Base (The Island)

Whey Protein 100g

Casein Protein 50g

Albumen 20g

Water 60ml

Linoleic Acid+ Oleic Acid 8g

Corn Starch 5g

Dextrose 2g

Sucrose 15g

Yellow Food Colouring (Tarzatine; 1934-21-0) 1ml

Orange Flavour Compounds:

(+)-(R)-limonene

Ethyl butanoate

Peach Flavour Compounds (0.25ml):

gamma-Decalactone

gamma-Nonalactone

Geranyl butyrate

Geranyl propionate

Cis-3-Hexenol

Iso-Amyl acetate

Linalool

For the Palm Tree Trunk

Sucrose 100g

Glucose 5g

Albumen 20g

Methyl Cellulose 3g

Brown Food Colouring (1ml):

Carminic Acid

Chlorophyll

Propylene Glycol

Citric Acid

Cocoa Flavour Compounds (0.25ml):

Theobromine

(-)-Epicatechin

Proanthocyanidin B1, B2

For the Palm Tree Leaves

Sucrose 100g

Water 9g

Gelatine 2g

Glucose 5g

Tartaric Acid (A pinch)

Green Food Colouring (1ml):

Polysorbate 80

Propylene Glycol

Chlorophyll

Curcuminoid

Citric Acid

Mint Flavour Compounds9 (0.25ml):

Enantiomer (-)-menthol

Menthone

## 3.3 Method of Preparation

For the Cocktail

Prepare the sugar syrup by combining the water and sugar in a pot and bring to the boil. Continue to boil for 5-10 minutes, remove from the heat and set aside to cool. In the main pot, heat the water, dextrose and lemon yellow and orange food colouring. Allow to cool, and add the flavour compounds. Pass through a colander, add the sugar syrup and whisk thoroughly. Add the xanthan gum and continue to whisk. Place the cocktail in the thermomixer and blend for 2 minutes. Remove from the thermomixer and place in the siphon, seal the lid tight and charge with co2. Give the canister no more than 5 shakes, place the nozzle at the end of the cocktail glass and release with a medium-low pressure to avoid splashing. Use the hand blender to blend the Hyfoamer, flavouring compounds, and water together in a jug, bringing the blender to just above the surface to create a foamy texture. Slowly pour the foam evenly on top of the cocktail.

For the Dirac Island

Mix the proteins, corn starch and dextrose together in a bowl. In a separate bowl, add the water and flavour compounds. Mix the water and other compounds with the dry ingredients and whisk. Slowly incorporate the oil with the colouring in the gravy jug and slowly add to the bowl while continuously whisking. Heat a pan and with a small amount of oil and place the scone cutter in the bottom of the pan. Pour the mixture into the cutter and cook for 20 seconds before removing the cutter and flipping over onto the other side for a further 20 seconds. Line a baking tray with a silicone sheet and place the partially cooked mix. Place in the oven with no fan on at 160 degrees Celsius for approximately 20-30mins. Remove from the oven, allow to cool and place in the soup bowl.

For the Tree Trunk:

Weigh the sucrose and methyl cellulose into a mixing bowl. Mix the albumen, water, glucose, food colouring and cocoa flavour compounds together gently with a whisk. Combine with the sucrose mix and thoroughly mix until it comes together. Use hands to knead the mix into a ball, put starch on hands if mix is too sticky to work. Allow to rest in a zip lock bag for 20-30mins. Remove from the bag and gently knead. Roll out the mixture to a 2mm thickness. Square it off and cut into 15cm long and 2cm width strips. If the strips are still too sticky to work with, allow to rest on grease proof paper so they will become more malleable. Wrap the strips in overlapping layers around a wooden kebab skewer. Place the Dirac Island into the serving bowl and push the point of the wrapped skewer into it.

For the Palm Tree Leaves:

Measure the sucrose into a mixing bowl. Place the water, gelatine, glucose and tartaric acid in a pot and bring to the boil while continuously whisking. Pour the mixture into the sucrose and thoroughly whisk. Add the food colouring and flavour compounds and continue to whisk until well incorporated. Remove the mixture from the bowl and gently knead, use a small amount of starch if the mixture is too sticky. Allow the mixture to rest for 30 mins in a zip lock bag. Remove from the bag and divide the mixture into two. Roll out one half of the mixture to approximately 2mm thick. Use an office knife to cut out the shape of the leaves. Use a kitchen shears to make the side cut and line details. Slightly curve the leaves and place them on their sides on a tray to dry (Approximately 30mins). Roll the other half of the mixture into a round shape and sit it on top of a turned over ramekin. When the leaves are dried, push them into the rounded piece on the ramekin. Leave it to set for approximately 15 minutes. When set, carefully lift from the ramekin with a palette knife and place on top of the tree trunk.

# 4. Results

The following chapter represents the results of progressions and components worked on over the five-week period. An informal sensory analysis was conducted on week 3,4, and the final week. Seven peers taking part in their own Note by Note dish development, rated the components and progressions on aspects such as appearance, colour, taste and texture. For each aspect, the average was taken from the responses and displayed using a spider graph. A copy of the sensory key used for each aspect, and the table results, are available in the appendices.

## 4.1 Photographs of week by week progression

### 4.1.1 Week 1

**The test on the basic concept for the note by note cocktail**

### 4.1.2 Week 2

**The cocktail with readjusted ingredient quantities and a concept for an added foam head. Also, the test concept idea for the "Dirac Island."**

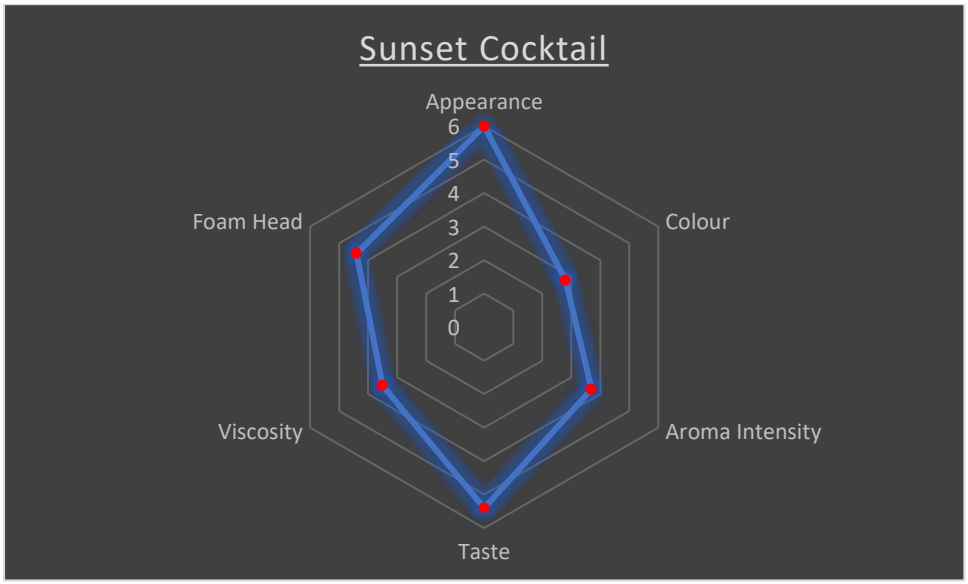
### 4.1.3 Week 3

**The cocktail with a colour and body adjustment. Also, amendments made for the creamy head**

**The Dirac test that resulted in it expanding due to trapped air, which was later amended with the incorporation of albumen into the recipe.**

## Sensory Analysis

Cocktail




**The sensory results for the cocktail**

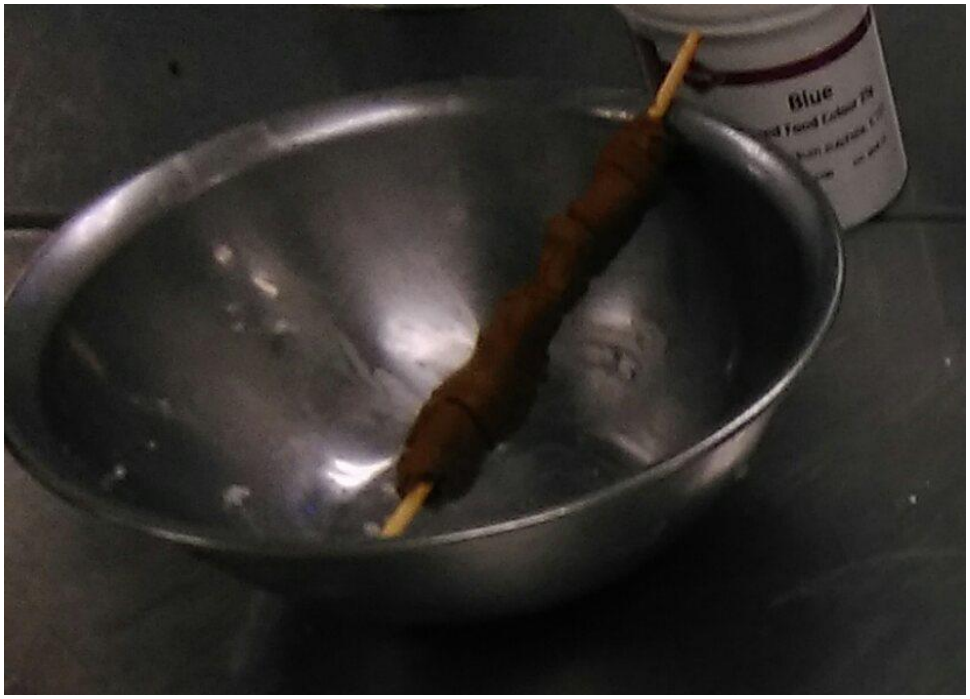
After making several adjustments to the cocktail over the first three weeks, it was thought to have progressed sufficiently enough to conduct the first sensory analysis. On appearance, taste, and flavour, a scale of 1-7 was used with 1 being disliking extremely, to 7 being liking extremely. An average of **6** was recorded for appearance, and an average of **5.4** for the taste and flavour.

For the colour, aroma intensity, and viscosity of the cocktail and the foam head, a scale of 1-7 was used with 4 being just right, while 1 for colour was much too pale and 7 was much too dark. Viscosity's scale was 1 being too thick and 7 being too thin and 4 being just right. Aroma intensity ranged from 1-7 with 4 being just right, 1 being extremely weak, to 7 being overwhelmingly strong. For colour, an average of **2.8** was recorded. Aroma intensity recorded an average of **3.7** and viscosity resulted in an average of **3.5**. For the viscosity of the foam head, and average of **4.4** was recorded.

### 4.1.4 Week 4

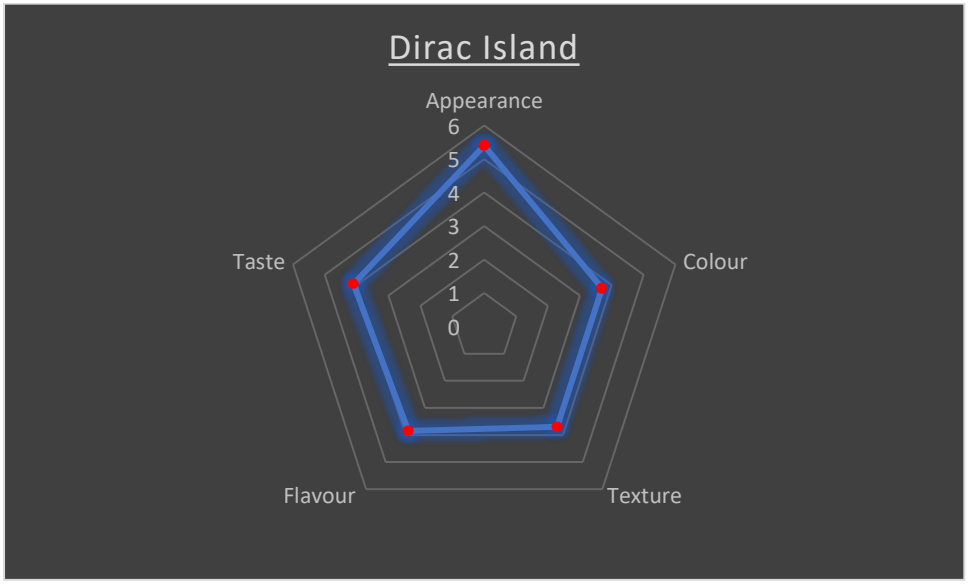
**The concept for the leaves of the palm tree. The leaves were left to dry so they would be pliable enough hold their position when assembling the dish.**

**The "Dirac Island" with adjustments made to the protein composition**




**The test concept for the tree trunk of the palm tree**

## Sensory Analysis




**Results of the sensory analysis of the Dirac**

The second sensory analysis was conducted on week 4 after progressing the Dirac concept to a sufficient level. Participants were asked to rate the Dirac on its appearance, colour, texture, flavour and taste. For appearance and taste, a scale of 1-7 was used with 1 being dislike extremely to 7 being like extremely. For appearance, an average of **5.4** was recorded and an average of **4.1** was recorded for the taste.

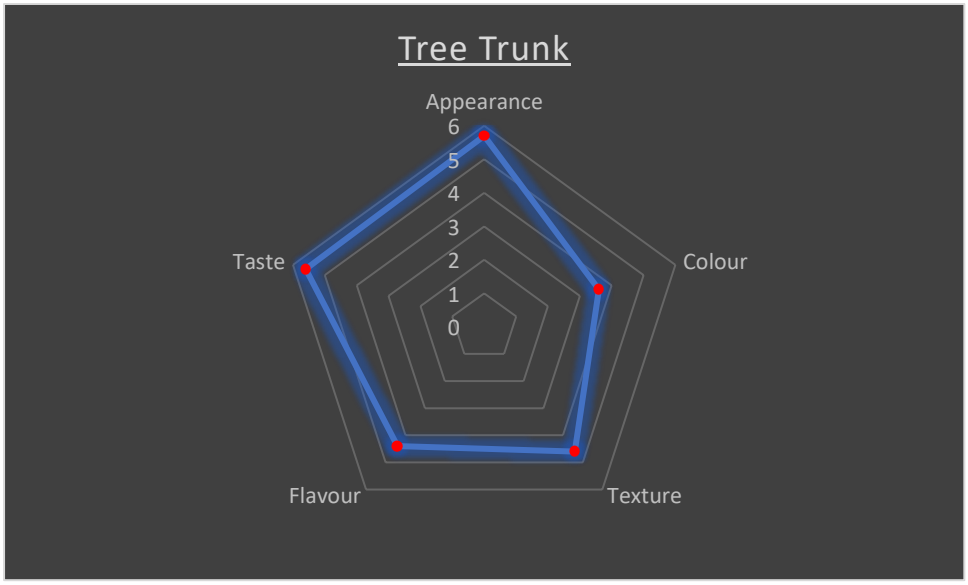
For the colour, texture and flavour, a 1-7 scale was used with 4 being just right while 1 was either way too light for colour, way too hard for texture, or way too bland for flavour. 7 was either way too dark for colour, way too soft for texture, or way too strong for flavour. The average result for colour was **3.7**. For texture, the average was **3.7** while the average result for flavour was **4.1**.

### 4.1.5 Final Week

**The finished cocktail and the assembly of all the developed components in the "Dirac Desert Island" dish**

## Sensory Analysis

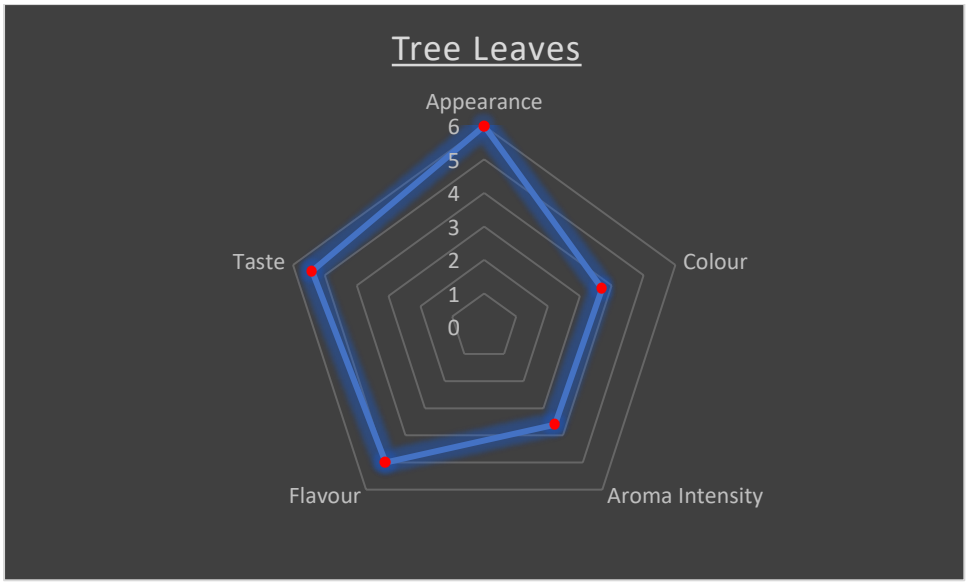
For the final week of the Note by Note progression, sensory analysis was conducted on both the tree trunk and the tree leaves.




**Sensory Results for the Tree Trunk**

Participants of the sensory analysis were asked to rate the tree trunk component of the dish on appearance, colour, texture, flavour and taste. For appearance and taste, a scale of 1-7 was used with 1 being dislike extremely to 7 being like extremely. For appearance, an average of **5.7** was recorded and an average of **5.6** was recorded for the taste.

For the colour, texture and flavour, a 1-7 scale was used with 4 being just right while 1 was either way too light for colour, way too hard for texture, or way too bland for flavour. 7 was either way too dark for colour, way too soft for texture, or way too strong for flavour. The average result for colour was **3.6**. For texture, the average was **4.6** while the average result for flavour was **4.4**.




**Sensory Results for the Tree Leaves**

Participants of the sensory analysis were asked to rate the tree leaves component of the dish on appearance, colour, texture, flavour and taste. For appearance and taste, a scale of 1-7 was used with 1 being dislike extremely to 7 being like extremely. For appearance, an average of **6** was recorded and an average of **5.4** was recorded for the taste.

For the colour, aroma intensity and flavour, a 1-7 scale was used with 4 being just right while 1 was either way too light for colour, extremely weak for texture, or way too bland for flavour. 7 was either way too dark for colour, Overwhelmingly strong, or way too strong for flavour. The average result for colour was **3.7**. For aroma intensity, the average was **3.6** while the average result for flavour was **5**.

# 5. Discussion

## 5.1 Week 1

For the first week, the concept of the cocktail was worked on to establish a route of progression. The idea for the concept came from a Caribbean mocktail influence. The. The Caribbean concept was chosen to coincide with the desert island theme chosen for the note by note dish. This first class of progression was used to familiarise with the compounds we had available to us. A base was started using ½ of a gram of lemon yellow with the dextrose heated in the water. It gave the mixture a very strange silky looking texture that made it look like there was an oil added to it. Small amounts of the flavour compounds were experimented with using 0.5ml for each. They were tasted after each new addition to see how they altered the complexity of the cocktail. The overall aim for this base test was to achieve have notes of citrus fruits and pineapple. When peers tasted the cocktail, collective opinions were that it tasted like “medicine”. This was most likely due to the very deep green colour and syrupy texture that reinforced their opinion. The general appearance of the cocktail made it questionable by some if it was safe for consumption. To further the progression of this cocktail, it is suggested that the amount of flavour compounds and quantities should be reduced. The cocktail will be characterised more by the use of Hyfoamer to produce a creamy head for the cocktail. Later on, a more appealing colour to suit the theme will also be worked on. It was favourable that the cocktail had a very slight viciousness to it. The xanthan gum was thought to be the best option to achieve this but some better alternatives such as gelatine or agar will be reviewed.  This is planned to be done the following progression week along with developing the Dirac that will serve as the island for the main dish.

## 5.2 Week 2

The picture in week 2 results shows the reformulations to the main body of the cocktail and it's topping with a creamy head using Hyfoamer. The lemon yellow was reduced and a yellow colouring was added. This helped to take away the silky looking texture and bright green colour. The strong "medicine like" taste was also amended by using less of the compounds incorporated in the previous week and using a higher sugar syrup to water ratio. In the following week's progression, experimentation will be made to establish a more desirable colour. A good texture was achieved for the creamy head of the cocktail. However, its taste was not very appealing. Further adjustments in next week's progression will be made to correct this.

The Dirac concept idea turned out well in appearance. The appearance was suitable as the colour had a sandy island look which was what was intended. However, the texture was quite hard and the flavour was bland and lacking. In moving forward with next week's progressions, the Dirac will be reduced in size. To fix the texture some of the whey protein will be replaced with another type such as casein to achieve a better texture. The taste will also be improved by adding sucrose to the recipe.

## 5.3 Week 3

In the picture for the results of week 3, it can be seen that the adjustments were made to the cocktail for a more appealing colour and a more palatable creamy head. From experimenting with different colouring, it was found that adding some orange colouring to the existing concept changed it completely to what is shown in the photograph. The colour was sufficient, more appealing and suited the theme. The amount of flavour compounds used were further reduced again as it was found to be too overpowering in the previous week. For the creamy head on the cocktail, sucrose and mango flavour compounds were added to the base concept. This resulted in it having good taste and flavour.

Sensory analysis was conducted for the cocktail, as it was felt that it had progressed far enough to be trialled. The results showed to be very favourable overall. The average result for colour showed that participants found it to be a little too pale. This will be amended in following weeks by aiming for a slightly deeper colour with slight increases in quantity made to the colour mix. Konica Minolta, (2018) says that the colour of food and drink, heavily influences our perception of taste. It is usually the first element that is noticed in appearance. It is thought that from birth, humans start to associate food and drink with colours and link them with perceived taste.

The concept for replacing some of Dirac's whey protein with casein, resulted in it expanding due to trapped air. This resulted in a hard outside layer that lost the intended colour and made it unusable. To amend this, albumen will be added for a slightly fluffier texture and also to allow air to escape. The feasibility of pan frying the Dirac in a mould for short amounts of time on each side will be tested before placing it in the oven. To prevent trapped air compromising the intended shape, albumen will be added to prevent air being trapped in the mixture.

## 5.4 Week 4

The photographs for week 4 show the development for the concept idea for the tree trunk and leaves that will be combined and place on top of the Dirac Island. The concept idea for the two components were very similar in composition but had slight differences in colour and texture. The tree leaves had gelatine added to result in a hard texture when it dried. Another piece was kept in an airtight bag as it was needed to not dry out. This would form a base on the top of the tree so that the leaves could be pushed into it. A green food colouring was also added. A similar recipe was used to make a paste for the tree trunk. It was quite a sticky recipe that was difficult to work with. It needed some drying time before it could be worked with. Both components however, were found to be feasible to work with and were stored for use for the final week's presentation. Overall, the cocoa and mint flavours paired very well together. A sensory trial will be prepared for both components in the final week.

Sensory trials were carried out for the Dirac Island. The appearance and taste showed quite average results. Results for the texture suggested that the average opinion was that it was too soft. Morten *et al*., (2016:10) says that texture evaluation is considered to be perceived only by sensors in the mouth. However, it is also perceived by muscles and skin of the body. The addition of casein resulted in a slightly more spongey texture that at the same time, had quite an amount of stiffness. The average opinion on colour showed that it was perceived to be close to just right for what it should look like. For flavour, the average showed they were mainly just right, but slightly leaning towards being bland.

## 5.5 Week 5

In the final week, the cocktail and dish were assembled and presented. The components were in a stable enough conditioned to be combined and a presentable dish put up for photographing. A small amount of the mix for the Dirac was reserved and some black and white food colouring was added to make it grey and it was cooked in the oven to make a small rock that would sit on the island. This was done to add a little more character to the dish. The black and white colour suited the stone colour more as it gives a more lifeless, cold grey colour rather than the mixing of red blue and yellow colours to make tertiary greys. The 3d printer was also used to make a small starfish shape that was cooked on a silicone mat and acted as a type of garnish

Sensory analysis was conducted for the tree trunk and the tree leaves. The tree trunk appearance and taste resulted quite favourably. The compounds used for a chocolate and mint flavour paired quite well together. The texture colour, and flavour all resulted very favourably being in around the just right mid-point. The appearance of the tree leaves showed a very favourable result by participants. The taste showed quite favourable results. The results for aroma showed an average opinion to it being just right with opinions slightly leaning towards it being slightly weak. According to Marsili, (2007:112), an impression is usually made that a single aroma or flavour sensation is detected from a single product when really, there are often numerous volatile compounds that are combined to impart the given sensory impact from a single product. This result was ultimately favourable as menthol can pose the danger of overpowering a whole dish if it is too strong. The colour showed a favourable result that was slightly leaning toward it being too pale. The green colour was much deeper after the mix was first shaped, but faded over time and in the drying process. For flavour, the result showed that the average opinion was slightly leaning toward it being bland.

## 6. Conclusion

In this report and in the 5-week practical progression plan, the scientific discipline of Note by Note cooking has been explored. Note by Note cooking commands the effective utilisation of physics, chemistry, nutrition and culinary arts. It has been found that there is a vast amount of possibilities in creating dishes using Note by Note Cooking that have various shapes, textures, aromas and consistencies. The chemistry of combining compounds is open to endless possibilities of new flavours, tastes and aromas. Note by Note Cooking is a valuable discipline for both scientists and culinary arts practitioners and enthusiasts alike. It uses the concepts and techniques in its execution to make it possible for further knowledge and creativity in the development of completely new and innovative food products in the future.

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# 8. Log Book

## 8.1 Week 1- Wednesday November 14th

**Aim**

To work on the concept idea for a Caribbean influenced note by note cocktail.

**Objectives**

- Carry out producing the concept idea in the kitchen to test feasibility of the cocktail
- Experiment with different compounds.
- Have peers give basic feedback with a taste test
- Determine the improvements that need to be made for the following week

**Equipment**

Stainless Steel Pots

Measuring Jug

Digital Scales

Colander

Thermomixer

Blast Chiller

Siphon

Whisk

Spoons

Plastic Pipette

Cocktail Glass

**Ingredients**

Water 300ml

Citras 1g

Dextrose 3g

Lemon Yellow 0.5g

Rhum Brun 5ml

Pinya 123 0.5ml

LLimona 130 0.5ml

Taronja Dolca 131 0.5ml

Citrus Colouring 5ml

No 15 Pineapple 1ml

Naha Qemusu 3 drops

Xanthan Gum- 3g

**Method**

Heat the water, dextrose and lemon yellow. Allow to cool, pass through a colander and add the rest of the ingredients expect the xanthan gum. Place in the blast chiller for 5 minutes to bring the temperature down to approximately 5 degrees Celsius. Whisk thoroughly and add xanthan. Place cocktail in the thermomixer and blend for 2 minutes. Remove from the thermomixer and place in the siphon, seal the lid tight and charge with co2. Give the canister no more than 5 shakes, place the nozzle at the end of the cocktail glass and release with a medium-low pressure to avoid splashing.

**Reflection**

Today was the start of Wednesday afternoon's 5 weekly classes to prepare our note by note cocktails and dishes. I decided to focus solely on the cocktail for today's class. The concept idea for this cocktail originates from a Caribbean mocktail that has sprite, orange juice, lemonade and grenadine as its main ingredients. The Caribbean concept was chosen to coincide with the desert island theme chosen for the note by note dish. I took the opportunity of this first class to get a hands-on familiarisation with the ingredients and compounds we had available to us. I used just ½ of a gram of lemon yellow with the dextrose heated in the water. It gave the mixture a very strange silky looking texture that made it look like there was an oil added to it. I added small 0.5ml amounts of the flavour compounds we had and tasted after each one to see how they altered the complexity of the cocktail. I wanted the cocktail to overall, have prominent notes of citrus fruits and pineapple. When peers tasted the cocktail, collective opinions were that it tasted like a medicine. I feel that it's very deep green colour and syrupy texture reinforced that opinion. Some even on appearance, questioned the safety of its consumption. In going forward, I think the flavour compounds should be cut back and the cocktail needs more characteristic elements incorporated, in particular a creamy head, which I will aim to achieve using hyfoamer and later in following weeks, consider using alginate spheres as part of the cocktail's complexity. It was favourable that the cocktail had a very slight viciousness to it. The xanthan gum was thought to be the best option to achieve this but some better alternatives such as gelatine or agar will be reviewed. I will also start to develop the desert island concept by producing a base that will represent the Dirac that is the main aim of this project.

## 8.2 Week 2- Wednesday November 21st

**Aim**

To make the discussed improvements to the cocktail and experiment with the concept of the island base in the form of a Dirac.

**Objectives**

- Reduce the compounds used in the cocktail's composition, particularly, the lemon yellow.
- Assess the feasibility of the concept idea for an island base that will represent the Dirac as the main component of the note by note dish.

**Equipment**

Stainless Steel Pots

Stainless Steel Measuring Jug

Digital Scales (Ascher- Model: CS)

Colander

Thermomixer

Siphon

Whisk

Hand Blender

Spoons

Plastic Pipette

Blast Chiller

Baking Tray

Silicone Sheet

Cocktail glass

Large Soup Bowl

Stainless Steel Scone Mould

**Ingredients**

For the cocktail:

Water 100ml

Sugar Syrup- 250ml water 200g sugar

Citras 0.5g

Lemon Yellow 0.25g

Rhum Brun 3ml

Pinya 123 0.25ml

LLimona 130 0.25ml

Taronja Dolca 131 0.25ml

Citrus Colouring 3ml

No 15 Pineapple 0.5ml

Naha Qemusu 3 drops

Xanthan Gum- 3g

Jaune Yellow Colouring

For the Creamy Head:

Hyfoamer

Water

Dextrose

Naha Qemusu 2 drops

For the Dirac:

200g whey protein

120ml water

16g sunflower oil

100g corn starch

5g Dextrose

1.5 ml Yellow Colouring

0.5ml Pinya 123

0.5ml No.15 Pineapple

**Method**

For the Cocktail:

Prepare the sugar syrup by combining the water and sugar in a pot and bring to the boil. Continue to boil for 5-10 minutes, remove from the heat and set aside to cool. In the main pot, heat the water, dextrose and lemon yellow. Allow to cool, and add the rest of the ingredients expect the xanthan gum. Pass through a colander, add the sugar syrup and whisk thoroughly. Add the xanthan gum and continue to whisk. Place the cocktail in the thermomixer and blend for 2 minutes. Remove from the thermomixer and place in the siphon, seal the lid tight and charge with co2. Give the canister no more than 5 shakes, place the nozzle at the end of the cocktail glass and release with a medium-low pressure to avoid splashing. Use the hand blender to blend the Hyfoamer, Naha flavouring and water together in a jug, bringing the blender to just above the surface to create a foamy texture. Slowly pour the foam evenly to top the cocktail.

For the Dirac:

Mix the whey, corn starch and dextrose together in a bowl. In a separate bowl, add the water and flavour compounds. Mix the water and other compounds with the dry ingredients and whisk. Mix the oil with the colouring in the gravy jug and slowly add to the bowl while continuously whisking. Line a baking tray with a silicone sheet and place the ring mould on top. Pour the mixture into the mould and place in the oven with no fan on at 160 degrees Celsius for approximately 1 hour. Remove from the oven, allow to cool and place in the soup bowl.

**Reflection**

In this week's class, the main aim and objectives was to make reformulations to the main body of the cocktail and top it with a creamy head. The lemon yellow was reduced and a Jaune yellow colouring was used which helped to take away the silky looking texture and bright green colour. The strong "medicine like" taste was also amended by using less of the compounds incorporated in the previous week and using a higher sugar syrup to water ratio. A good texture was achieved for the creamy head of the cocktail. However, it did not taste very good at all and will need some further adjustments in next week's progression. It will also be considered to add mango flavoured alginate spheres as another component in the cocktail in the week's progression.

The Dirac concept idea turned out well in appearance. It had a sandy appearance that can be speculated to look the part as the island component in the dish. However, the texture was quite hard and the flavour was bland and lacking. The plan for next week's adjustments to the Dirac will be to reduce its size, replace some of the whey protein with another type such as casein to achieve a better texture, and to improve the taste by adding sugar to the recipe. Next week's progression will also be used to work on the palm tree that will sit on the Dirac island.

## 8.3 Week 3- Wednesday November 28th

**Aim**

To make adjustments to the colour of the cocktail and the texture od the Dirac that will represent the desert island component of the main dish.

**Objectives**

- Experiment with food colourings to achieve a "sunset" colour for the cocktail.
- Experiment with blends of proteins to create a more palatable Dirac

**Equipment**

Stainless Steel Pots

Stainless Steel Measuring Jug

Digital Scales (Ascher- Model: CS)

Colander

Thermomixer

Siphon

Whisk

Hand Blender

Spoons

Pipette

Blast Chiller

Baking Tray

Silicone Sheet

Plastic Pipette

Cocktail glass

Large Soup Bowl

Stainless Steel Scone Mould

**Ingredients**

For the Cocktail:

Water 200ml

Sucrose Syrup 100g (sucrose, 200ml water)

Dextrose 3g

Citric Acid 2g

Lemon Yellow Colouring (Tartazine; 1934-21-0) 1ml

Orange Food Colouring (1ml):

β-Carotene

Annatto E160b

Rum flavour Compounds (Rhum Brun, 0.25ml):

Ethyl Propanoate

Ethyl Acetate

Ethyl Isobutyrate

Acetic Acid

2-Ethyl-3-Methyl Butyric Acid

B-Damascenone

Pineapple aroma and flavour compounds (0.25ml):

Furaneol

3-methyliopropanoic acid methyl ester

Ethyl Hexanoate

Ethyl-2-methylbutyrate

For the Creamy Head on the Cocktail:

Hyfoamer 50g

Water 100ml

Sucrose 25g

Pineapple Flavour Compounds (0.15ml):

Furaneol

3-methyliopropanoic acid methyl ester

Ethyl Hexanoate

Ethyl-2-methylbutyrate

Dirac Base (The Island)

Whey Protein 100g

Casein Protein 50g

Albumen 20g

Water 60ml

Linoleic Acid+ Oleic Acid 8g

Corn Starch 5g

Dextrose 2g

Sucrose 15g

Yellow Food Colouring (Tarzatine; 1934-21-0) 1ml

Orange Flavour Compounds:

(+)-(R)-limonene

Ethyl butanoate

Peach Flavour Compounds (0.25ml):

gamma-Decalactone

gamma-Nonalactone

Geranyl butyrate

Geranyl propionate

Cis-3-Hexenol

Iso-Amyl acetate

Linalool

**Method**

Prepare the sugar syrup by combining the water and sugar in a pot and bring to the boil. Continue to boil for 5-10 minutes, remove from the heat and set aside to cool. In the main pot, heat the water, dextrose and lemon yellow and orange food colouring. Allow to cool, and add the flavour compounds. Pass through a colander, add the sugar syrup and whisk thoroughly. Add the xanthan gum and continue to whisk. Place the cocktail in the thermomixer and blend for 2 minutes. Remove from the thermomixer and place in the siphon, seal the lid tight and charge with co2. Give the canister no more than 5 shakes, place the nozzle at the end of the cocktail glass and release with a medium-low pressure to avoid splashing. Use the hand blender to blend the Hyfoamer, Naha (Orange) flavouring and water together in a jug, bringing the blender to just above the surface to create a foamy texture. Slowly pour the foam evenly on top of the cocktail.

For the Dirac, mix the proteins, corn starch and dextrose together in a bowl. In a separate bowl, add the water and flavour compounds. Mix the water and other compounds with the dry ingredients and whisk. Slowly incorporate the oil with the colouring in the gravy jug and

slowly add to the bowl while continuously whisking. Line a baking tray with a silicone sheet and place the ring mould on top. Pour the mixture into the mould and place in the oven with no fan on at 160 degrees Celsius for approximately 1 hour. Remove from the oven, allow to cool and place in the soup bowl.

**Reflection**

In today's progression, the adjustments were made to the cocktail for a more appealing colour and a more palatable creamy head. After some experimentation, it was found that that adding some orange colouring to the cocktail resulted in a reddish orange colour that suited with the theme more. The amount of flavour compounds used were also reduced as it was found to be too overpowering. Some sugar and mango flavour compounds were added to the mix for the creamy head on the cocktail which gave a very good result.

For the Dirac, the mixture cooked very fast, expanded and split. This resulted in it becoming very hard and not fit for purpose. To amend this, albumen will be added for a slightly fluffier texture and also to allow air to escape. A better texture and colour will be achieved by pan frying the Dirac rather than placing it in the oven.

## 8.4 Week 4- Wednesday December 5th

**Aim**

Work on a concept idea for the tree trunk and the leaves that will form the palm tree on the desert island

**Objectives**

- Develop a suitable mixture that will represent the tree trunk
- Experiment with a mix that will be feasible in representing the leaves of the palm tree

**Equipment**

Mixing Bowls

Steel Whisk

Wooden Kebab Skewer (6 inches long)

Ceramic Ramekin

Measuring Spoons

Palette Knife

Office Knife

Kitchen Shears

Digital Scales

Plastic Pipette

Stainless Steel Pot

Zip Lock Bags 2

**Ingredients**

For the Palm Tree Trunk

Sucrose 100g

Glucose 5g

Albumen 20g

Methyl Cellulose 3g

Brown Food Colouring (1ml):

Carminic Acid

Chlorophyll

Propylene Glycol

Citric Acid

Cocoa Flavour Compounds (0.25ml):

Theobromine

(-)-Epicatechin

Proanthocyanidin B1, B2

For the Palm Tree Leaves

Sucrose 100g

Water 9g

Gelatine 2g

Glucose 5g

Tartaric Acid (A pinch)

Green Food Colouring (1ml):

Polysorbate 80

Propylene Glycol

Chlorophyll

Curcuminoid

Citric Acid

Mint Flavour Compounds9 (0.25ml):

Enantiomer (-)-menthol

Menthone

**Method**

For the Palm Tree Trunk

Weigh the sucrose and methyl cellulose into a mixing bowl. Mix the albumen, water, glucose, food colouring and cocoa flavour compounds together gently with a whisk. Combine with the sucrose mix and thoroughly mix until it comes together. Use hands to knead the mix into a ball, put starch on hands if mix is too sticky to work. Allow to rest in a zip lock bag for 20-30mins. Remove from the bag and gently knead. Roll out the mixture to a 2mm thickness. Square it off and cut into 15cm long and 2cm width strips. If the strips are still too sticky to work with, allow to rest on grease proof paper so they will become more malleable. Wrap the strips in overlapping layers around a wooden kebab skewer. Place the Dirac Island into the serving bowl and push the point of the wrapped skewer into it.

For the Palm Tree Leaves

Measure the sucrose into a mixing bowl. Place the water, gelatine, glucose and tartaric acid in a pot and bring to the boil while continuously whisking. Pour the mixture into the sucrose and thoroughly whisk. Add the food colouring and flavour compounds and continue to whisk until well incorporated. Remove the mixture from the bowl and gently knead, use a small amount of starch if the mixture is too sticky. Allow the mixture to rest for 30 mins in a zip lock bag. Remove from the bag and divide the mixture into two. Roll out one half of the mixture to approximately 2mm thick. Use an office knife to cut out the shape of the leaves. Use a kitchen shears to make the side cut and line details. Slightly curve the leaves and place them on their sides on a tray to dry (Approximately 30mins). Roll the other half of the

mixture into a round shape and sit it on top of a turned over ramekin. When the leaves are dried, push them into the rounded piece on the ramekin. Leave it to set for approximately 15 minutes. When set, carefully lift from the ramekin with a palette knife and place on top of the tree trunk.

**Reflection**

In today's progression, the concept idea for the palm tree was worked on which will sit on the Dirac Desert Island. This was made up of two parts, the tree trunk and the green leaves. The recipe for the two components were very similar in composition. They were different by way of colour and flavour and also, the use of gelatine for the leaves so that they would hold their place on top of the trunk once they dried and set. The paste made for the tree trunk was a little bit difficult to work with and needed some drying time before it could be cut into strips and worked with. Both components however, were found to be feasible to work with and were stored for use for the final week's presentation. Overall, the cocoa and mint flavours paired very well together.

# 9. Appendices

## 9.1 Sensory Key

**Silky Sunset Cocktail**

### Appearance

| | |
|---|---|
| Dislike Extremely | 1 |
| Dislike | 2 |
| Dislike Slightly | 3 |
| Neither Like or Dislike | 4 |
| Like Slightly | 5 |
| Like | 6 |
| Like Extremely | 7 |

### Colour

| | |
|---|---|
| Much Too Pale | 1 |
| Too Pale | 2 |
| Slightly Too Pale | 3 |
| Just Right | 4 |
| Slightly Too Dark | 5 |
| Too Dark | 6 |
| Overwhelmingly Dark | 7 |

### Aroma Intensity

| | |
|---|---|
| Extremely Weak | 1 |
| Weak | 2 |
| Slightly Too Weak | 3 |
| Just Right | 4 |
| Slightly Too Strong | 5 |
| Too Strong | 6 |
| Overwhelmingly Strong | 7 |

### Taste and Combination of Flavours

| | |
|---|---|
| Dislike Extremely | 1 |
| Dislike | 2 |
| Dislike Slightly | 3 |
| Neither Like or Dislike | 4 |
| Like Slightly | 5 |
| Like | 6 |
| Like Extremely | 7 |

### Viscosity

### Foam Head

| | |
|---|---|
| Way Too Thick | 1 |
| Too Thick | 2 |
| Slightly Too Thick | 3 |
| Just Right | 4 |
| Slightly too Thin | 5 |
| Too Thin | 6 |
| Much Too Thin | 7 |

| | |
|---|---|
| Way Too Thick | 1 |
| Too Thick | 2 |
| Slightly Too Thick | 3 |
| Just Right | 4 |
| Slightly too Thin | 5 |
| Too Thin | 6 |
| Much Too Thin | 7 |

## Dirac Island and Tree Trunk

### Appearance

| | |
|---|---|
| Dislike Extremely | 1 |
| Dislike | 2 |
| Dislike Slightly | 3 |
| Neither Like or Dislike | 4 |
| Like Slightly | 5 |
| Like | 6 |
| Like Extremely | 7 |

### Colour

| | |
|---|---|
| Way Too Light | 1 |
| Too Light | 2 |
| Slightly Too Light | 3 |
| Just Right | 4 |
| Slightly Too Dark | 5 |
| Too Dark | 6 |
| Way Too Dark | 7 |

### Texture

| | |
|---|---|
| Way Too Hard | 1 |
| Too Hard | 2 |

### Flavour

| | |
|---|---|
| Way Too Bland | 1 |
| Too Bland | 2 |

| | |
|---|---|
| Slightly Too Hard | 3 |
| Just Right | 4 |
| Slightly Too Soft | 5 |
| Too Soft | 6 |
| Way Too Soft | 7 |

| | |
|---|---|
| Slightly Too Bland | 3 |
| Just Right | 4 |
| Slighly Too Strong | 5 |
| Too Strong | 6 |
| Way Too Strong | 7 |

**Taste**

| | |
|---|---|
| Dislike Extremely | 1 |
| Dislike | 2 |
| Dislike Slightly | 3 |
| Neither Like or Dislike | 4 |
| Like Slightly | 5 |
| Like | 6 |
| Like Extremely | 7 |

**Tree Leaves**

**Appearance**

| | |
|---|---|
| Dislike Extremely | 1 |
| Dislike | 2 |
| Dislike Slightly | 3 |
| Neither Like or Dislike | 4 |
| Like Slightly | 5 |

**Colour**

| | |
|---|---|
| Much Too Pale | 1 |
| Too Pale | 2 |
| Slightly Too Pale | 3 |
| Just Right | 4 |
| Slightly Too Dark | 5 |

| | |
|---|---|
| Like | 6 |
| Like Extremely | 7 |

| | |
|---|---|
| Too Dark | 6 |
| Overwhelmingly Dark | 7 |

**Aroma Intensity**

| | |
|---|---|
| Extremely Weak | 1 |
| Weak | 2 |
| Slightly Too Weak | 3 |
| Just Right | 4 |
| Slightly Too Strong | 5 |
| Too Strong | 6 |
| Overwhelmingly Strong | 7 |

**Taste and Combination of Flavours**

| | |
|---|---|
| Dislike Extremely | 1 |
| Dislike | 2 |
| Dislike Slightly | 3 |
| Neither Like or Dislike | 4 |
| Like Slightly | 5 |
| Like | 6 |
| Like Extremely | 7 |

## 9.2 Sensory Results

**Sunset Cocktail**

| | Appearance | Colour | Aroma Intensity | Taste | Viscosity | Foam Head |
|---|---|---|---|---|---|---|
| **Participant 1** | 5 | 3 | 4 | 5 | 4 | 4 |
| **Participant 2** | 5 | 2 | 4 | 5 | 3 | 4 |
| **Participant 3** | 6 | 3 | 4 | 5 | 3 | 4 |
| **Participant 4** | 6 | 2 | 3 | 6 | 4 | 4 |
| **Participant 5** | 7 | 4 | 3 | 6 | 4 | 5 |
| **Participant 6** | 7 | 3 | 4 | 5 | 4 | 5 |
| **Participant 7** | 6 | 3 | 4 | 6 | 3 | 5 |
| **Averages** | **6** | **2.8** | **3.7** | **5.4** | **3.5** | **4.4** |

## Dirac

**Dirac Island**

| | Appearance | Colour | Texture | Flavour | Taste |
|---|---|---|---|---|---|
| **Participant 1** | 6 | 3 | 4 | 4 | 4 |
| **Participant 2** | 6 | 4 | 4 | 5 | 5 |
| **Participant 3** | 5 | 4 | 4 | 3 | 4 |
| **Participant 4** | 4 | 4 | 3 | 4 | 3 |
| **Participant 5** | 6 | 3 | 3 | 5 | 5 |
| **Participant 6** | 6 | 4 | 4 | 3 | 5 |
| **Participant 7** | 5 | 4 | 4 | 3 | 3 |
| **Averages** | **5.4** | **3.7** | **3.7** | **3.85** | **4.1** |

**Tree Trunk**

| | Appearance | Colour | Texture | Flavour | Taste |
|---|---|---|---|---|---|
| **Participant 1** | 6 | 4 | 4 | 5 | 6 |
| **Participant 2** | 6 | 4 | 5 | 5 | 6 |
| **Participant 3** | 6 | 4 | 4 | 4 | 6 |
| **Participant 4** | 5 | 3 | 4 | 4 | 5 |
| **Participant 5** | 6 | 3 | 5 | 4 | 6 |
| **Participant 6** | 5 | 4 | 6 | 5 | 5 |
| **Participant 7** | 6 | 3 | 4 | 4 | 5 |
| **Average** | **5.7** | **3.6** | **4.6** | **4.4** | **5.6** |

**Tree Leaves**

| | Appearance | Colour | Aroma Intensity | Flavour | Taste |
|---|---|---|---|---|---|
| **Participant 1** | 6 | 4 | 4 | 6 | 6 |
| **Participant 2** | 6 | 4 | 3 | 3 | 5 |
| **Participant 3** | 7 | 4 | 4 | 6 | 4 |
| **Participant 4** | 6 | 3 | 4 | 6 | 6 |
| **Participant 5** | 5 | 4 | 3 | 4 | 6 |
| **Participant 6** | 6 | 4 | 3 | 6 | 5 |
| **Participant 7** | 6 | 3 | 4 | 4 | 6 |
| **Average** | **6** | **3.7** | **3.6** | **5** | **5.4** |