

Note-by-Note Dish: Autumnal Stroll

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Project Aim

The aim of the project was to create innovative and unique recipes and food concepts using Note by Note cooking and including pre-specified compounds and compounds of choice.

To do this a dish was created which included milk proteins (Ingredia), phenolics (Cooperative Sud) and 1-octen-3-ol (Mane)). The theme of autumn was selected and flavours, aromas and textures were developed to reflect the season.

Image 1: Final Dish: ‘An Autumnal Stroll’



Recipes, Methods and Materials

Walnut and Hemp Marshmallow

60g Water

10g Milk Protein

4 leaves of Gelatine

250g Sugar

120g Water

5g Hemp powder
(Proteins: Edistin (65%)
and Albumin (35%))

10 drops of Walnut extract

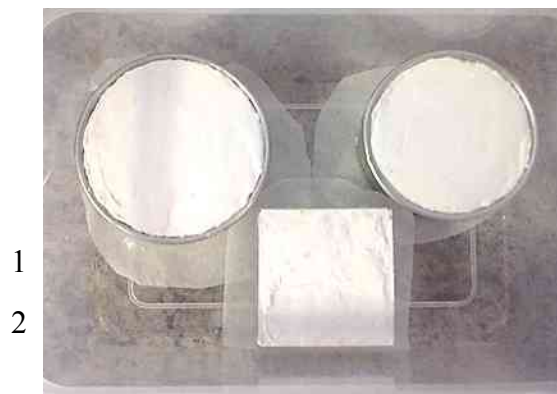
Oil (Glycerol, Linoleic, Oleic & Palmitic acid)

Method:

1. Soak Gelatine in cold water
2. Whisk 10g Milk Protein into 60g Water in KitchenAid® (Model: 5KP M50; 222-240v ~ 50/60Hz; 315w) bowl to dissolve
3. Mix 120g Water with 250g Sugar and bring to 118°C
4. Pour sugar mix into KitchenAid® machine and whisk
5. Add 10 drops of walnut oil and 5g of Hemp powder
6. Add soft Gelatine to mixture and whisk to cool

Spread into oiled moulds on greaseproof paper and allow to set

Image 2: Walnut and Hemp Marshmallows in moulds



1

2

3 Remove moulds

Hemp Brûlée

100g Caster Sugar

5g Hemp powder (proteins; albumin and edistin)

Method:

Mix together

Sprinkle on top of marshmallows, caramelize with blow torch when plating up

Walnut and Mushroom Powder Décor

7 drops of Walnut oil (Glycerol, linoleic acid, oleic acid & palmitic acid)

10g Pistachio paste (sucrose, glucose, water, oleic acid, linoleic acid, palmitic acid)

7 drops of mushroom compound (1-Octen-3-ol)

10g Ab-zorbit (Tapioca starch)

Method:

1 Mix together and sprinkle onto plate

T. molitor (Mealworm) Port Jelly

6g Carrageenan Iota

100g Sugar

150g Water

200ml Port Wine mix (Ethyl acetate, methoxypyrazines (volatiles), tartaric acid, malic acid and phenols)

8g *T. molitor* flour (Protein, lipids and fibre)

Method:

1. Blend 6g carrageenan with 100g sugar
2. Bring 150g Water + 200ml Port to boil
3. Combine both mixtures
4. Pour into glasses to half way level
5. Allow to set

Grape Must Foam

3g Grape Must Powder

50ml Water

1.5g Milk Protein

1.5g Xanthan Gum

30g Sugar

3 Drops Strawberry flavour (Benzyl-Acetate, 4-hydroxy-2, 5-dimethyl-3(2H)-furanone (HDMF))

3 Drops Red Carmine dye (Carminic acid, E120 Natural red 4)

Method:

- 1 Mix all ingredients together
- 2 Whisk for 2 minutes until fully aerated and lighter in colour
- 3 Place on top of port jelly in glass

Images 3(i) & 3(ii): Grape Must Foam



Image 4: Insect Jelly with Grape Must Foam



T.molitor (Mealworm) Décor

8g *T.molitor* flour (Protein, lipid, fibre)

10 Drops Red Carmine dye – made from female cochineal insects - (Carminic acid, E120 Natural red 4)

5g Ab-zorbit (Tapioca Starch)

4g Dehydrated Raspberry (Polyphenols; 60% Flavonoids, 30% phenolic acids, 10% tannins)

Method:

- 1 Mix dye with flour and dehydrated raspberries
- 2 Add Ab-zorbit and blend until desired powder effect is achieved

Pear Spaghetti

100g Water

60g Sugar

3g Agar-Agar

17 drops Pear Williams flavour compound (Ethyl trans: 2-cis: 4-decadienoate)

Method:

- 1 Combine 100g Water and 60g Sugar heat to dissolve Add 17 drops (Using Pipette) Pear Williams flavour compound (Ethyl trans:2-cis:4-decadienoate)

- 2 Add agar-agar to pear syrup, bring to boil
- 3 Use syringe to suck up solution into PVC tube
- 4 Leave to cool and set in ice cold water
- 5 Push spaghetti out using reverse vacuum with syringe

Arrange on plate

Image 5(i) & 5(ii): Pear Spaghetti



Blue Cheese Pearls

Blue cheese syrup:

300ml Water

12 drops 'SOSA' #77 mould (*Penicillium roqueforti*) – used for more intense flavour

0.5g blue cheese powder (*Penicillium roqueforti*, 2:0, 4:0, 6:0.8:0 fatty acids, methyl ketones, C5, C7 and C9 secondary alcohols, 2-phenylethanol, ethyl butanoate, methyl hexanoate, methyl octanoate) – used to add flavour and colour

3g MSK Sodium Alginate

20g sugar

1 drop green food dye (water, tartrazine E102, Green S E142, acetic acid)

1.0g Titanium Dioxide (TiO₂) white powder dye (E171)

Method

- 1 Dissolve 0.5g blue cheese powder in 300ml water add 12 drops mould (*Penicillium roqueforti*)
- 2 Add green food dye and white powder dye
- 3 Place in mixer bowl on lowest speed
- 4 Mix Sodium Alginate with sugar, add this mix slowly to bowl – avoid the whisk
- 5 Continue to mix for 10 minutes until syrupy consistency
- 6 (Or, without mixing – allow to stand for 10 minutes to thicken)

Calcium Bath

500 ml Water

5g MSK Calcium Chloride

Method:

- 1 Add Calcium Chloride to water, stir to dissolve
- 2 Draw Blue Cheese solution into syringe
- 3 Hold approx. 6 inches above calcium solution
- 4 Push pearls into bath
- 5 Remove caviar balls into water then remove with Sieve and plate up

Images 6(i) & 6(ii): Blue Cheese Pearls



Gingerbread Tuile

Isomalt powder

Gingerbread flavour mix (Water, Gum Arabic, Natural Flavour (Vanillylacetone, 6-Shogaol, 6-gingerol, 8-gingerol, 10-gingerol and 12-gingerol), Citric Acid)

Method:

- 1 Drizzle Gingerbread flavour mix on to Silpat
- 2 Sprinkle layer of isomalt on top of gingerbread flavour mix
- 3 Place another Silpat on top and bake in deck oven for 10-15 minutes @ 220° C top and base
- 4 Allow to cool
- 5 Remove top Silpat and break to desired shape/size

Image 7: Gingerbread Tuile



Equipment Used

Image 8: KitchenAid® Pro Line® Model: 5KP M50; 222-240v ~ 50/60Hz; 315w



KitchenAid® Pro Line®, (2014)

Image 9: Mini Scales: 0.1g increment



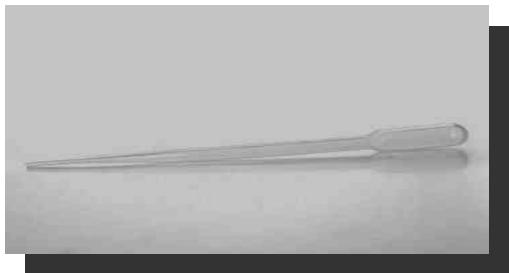
MSK Ingredients, (2015)

Image 10: Agar Spaghetti Kit: PVC tube and Syringe



Molecular Recipes, (2015)

Image 11: Pipette: Conical, 5ml



MSK Ingredients, (2015)

Image 12(i) & 12(ii): Tom Chandley Deck Oven



Dillon, (2014)



Process Steps and Results

Week 1

Pear Spaghetti:

100g Water

100g Sugar

3.6g Agar (1.8%)

Pear flavour compound -, taste and record amount – (Ethyl trans:2-cis:4-decadienoate)

Citric Acid

(Following the same method as previously mentioned in the final pear spaghetti recipe)

Results: As I developed the flavour of the pear consommé the recipe required 17 drops of the pear flavour compound and 0.6g of citric acid. Once the spaghetti was pushed out from the tube, it did not retain its shape and broke up. The gelling ability of agar is affected by the pH of the ingredient mix. The required quantities of agar powder in a recipe will vary depending on the liquid selected. I decided to remove the citric acid entirely from the recipe. I also

reduced the sugar content as I found it too sweet. As a result of the adjustments, the pear spaghetti was finally a success.

Image 13: First Test Recipe for Pear Spaghetti



Week 2

Walnut Marshmallow with Agar

160g water

3.6g agar (0.53%)

290g sugar

230g light corn syrup

Pinch of salt

2g pure vanilla essence (ethyl vanillin)

2g walnut compound oil (Glycerol, Linoleic, Oleic & Palmitic acid)

Corn starch (for dusting)

Results: The method for this recipe was to heat 80g water, sugar and corn syrup to 114°C and then pour this over agar and another 80g of water and whisk until thick. It should turn white and almost triple in volume. This did not happen; my mixture remained syrupy and somewhat transparent. I poured the mixture into molds and allowed to set over night according to the method; however the mixture remained liquid and did not set. I could only surmise that perhaps there was not sufficient Agar in the mix or that the temperature of 114°C had not been reached. As an alternative, I developed a new recipe which worked very well.

Image 14: Walnut Marshmallow with Agar



Blue Cheese Pearl - liquid

300ml water

Blue cheese powder – to taste

3g MSK Sodium Alginate

20 g sugar

1-2 drops green food dye

1.0g Titanium Dioxide (TiO₂)

Analysis of Results: The method called for the blue cheese powder to be dissolved in 300ml of water. I dissolved 0.5g of blue cheese powder and then added 12 drops of ‘Sosa’ 77 mould (*Penicillium roqueforti*) to give a balanced flavour. I also decided to add 1.0g of white Titanium Dioxide dye to soften the green colour. Titanium dioxide is the most widely used white pigment in products such as paints, coatings, plastics, paper, inks, fibres, and food and cosmetics because of its brightness and high refractive index (> 2.4). When combined with other colours, soft pastel shades can be achieved. The high refractive index, surpassed by few other materials, allows titanium dioxide to be used at relatively low levels to achieve its technical effect. The food applications of titanium dioxide are broad. US regulations authorize its use as a colour additive in foods in general at levels not to exceed 1%. The European Union also permits its use in foods, in general, with some specified exceptions, at *quantum satis* levels (FAO, 2010). The first and only risk assessment of titanium dioxide (TiO₂) as a food additive was carried out by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) in 1969, who concluded: “Titanium dioxide is a very insoluble compound. The studies in several species, including man, show neither significant absorption nor tissue storage following ingestion of TiO₂. Establishment of an acceptable daily intake for man is considered unnecessary” (Jovanović, 2014). Based on the US regulations the quantity added was well within what is accepted as safe for human consumption. This mixture was then vac-packed and stored in the fridge to be used on the final day of ‘plating up’.

Week 3

Insect Jelly with Grape Must Foam

6g Carrageenan Iota

100g Sugar

150g Water

200ml Port Wine mix (see above)

8g *T. molitor* flour

As the *T. molitor* flour provided by 'Ynsect' was dark in colour, I decided to include a Port wine mix (to compliment the grape must) in the recipe. This added flavour and darkened the colour to disguise the insect flour. The grape must foam was straightforward, but I chose to add strawberry flavour to enhance the flavour of the grape must and port wine mix. It worked very well and looked and tasted delicious.

The final elements to the dish; Hemp Bruleé, Walnut & Mushroom powder décor and *T.molitor* décor were prepared at home and brought to the final class for 'plate up'. I chose to make the caramel tuile flavoured with gingerbread, to compliment the '*Autumnal*' theme of ingredients. This was prepared in the final class.

Discussion

When I initially set out to create the Note-by-Note dish I chose a theme of autumn, and named the dish 'An Autumnal Stroll'.

The main flavour compounds associated with the food and drink below impart a sense of Autumnal days:

- 1 Walnut
- 2 Mushroom
- 3 Pistachio
- 4 Port Wine
- 5 Grapes
- 6 Raspberries
- 7 Pear
- 8 Blue Cheese
- 9 Gingerbread

Discussion

As I conducted my initial research I came across an article describing 1-Octen-3-ol. Part of the article was describing how to go about creating 1-Octen-3-ol in the laboratory. It then mentioned that a future commercial source could be a member of the mint family, *Melittis*

melissophyllum subsp. *Melissophyllum*. The plant itself contains little of the compound, but on hydro distillation of the flowering aerial parts, the essential oil obtained was found to contain a large amount (43.6% - 54.2%) of 1-Octen-3-ol (Cotton, 2014). I wanted to use the flower as a decorative element to the dish; however I was unable to source it as it was not the season for this particular plant to flower. However I believe this would be a nice element to include for the competition, for example setting the flower in a translucent gel cube.

It was upon reading the following comment from the most recently published book *Note-by-Note Cooking: The Future of Food*, by Hervé This that I decided to source and use insect protein as part of my dish;

Breeding, raising, and harvesting crickets on a massive scale would produce literally tons of protein, an encouraging prospect in view of the challenge of feeding a huge and expanding world population. Few people will want to eat insects, you say? Why not then process them to yield proteinacious [*sp.*] fractions that could be used in new and more palatable ways in preparing other dishes? (This, 2014)

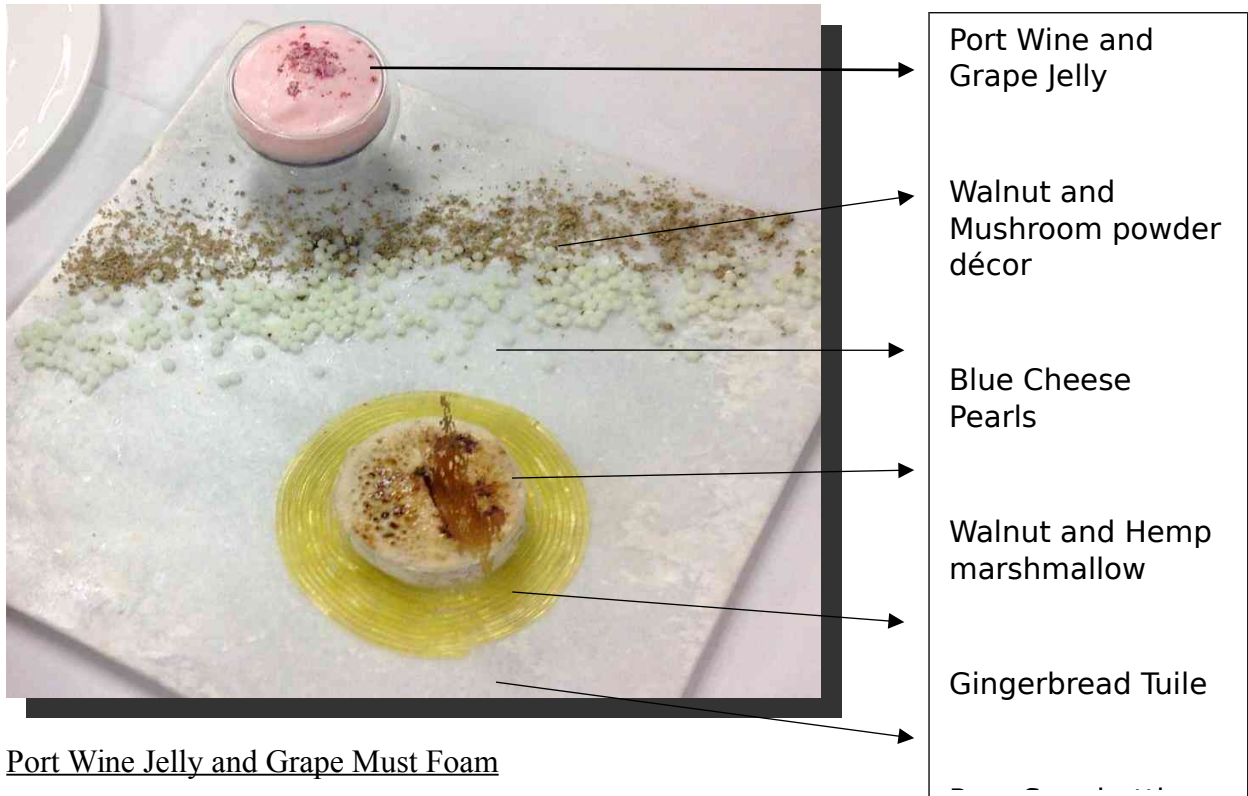
When using the grape must powder I chose to use a small quantity, it produced a very intense, but beautiful colour. Grapes have certain health benefits, as described on the website of Futureceuticals (2015);

Grapes contain powerful phytonutrients such as quercetin, anthocyanin, and catechin and are one of the few sources of the well-researched and popular resveratrol. Resveratrol has been associated with supporting cardiovascular health and healthy aging. Grape seeds are one of nature's richest sources of Proanthocyanidins. Proanthocyanidins are a class of biologically active flavonoids found throughout the plant kingdom and are among the most potent antioxidants in nature. Proanthocyanidins serve to protect plants against oxidative elements such as oxygen and sunshine (Futureceuticals, 2015).

As a flavouring, ethyl vanillin is about three times as potent as Vanillin and is used in the production of [chocolate](#). I opted to use ethyl vanillin due to my experiences of working with chocolate. I was familiar with the superior flavour that is imparted into foods when using ethyl vanillin as opposed to vanillin (Vanilla).

Colours, Textures and Flavours' of 'An Autumnal Stroll'

Image 15: Final Dish: 'An Autumnal Stroll'



Port Wine Jelly and Grape Must Foam

Colour – The Colours of the dark port wine jelly and light pink grape must foam complement each other very well. The dark specks of *T. molitor* flour can also be seen through the darkness of the port.

Taste – Deliciously palatable, those who tasted it loved the lightness of the foam that almost disappeared in the mouth, and the subtlety of flavour. While the port wine jelly added depth of flavour.

Texture – The *T. molitor* flour as well as the dehydrated raspberries allowed for a subtle crunch to the otherwise soft textures of this component of the dish.

Walnut and Mushroom powder décor

Colour – The Walnut and Mushroom together created very earthy tones, which suited the title of the dish very well.

Taste – Walnut and mushroom worked well together and the pistachio paste mix added just the right amount of sweetness to the overall flavour.

Texture – A soft grainy texture melted in the mouth to create a rich mouth feel with nutty undertones.

Blue Cheese Pearls

Colour – I chose titanium dioxide to soften the colour from the green food dye. The pearls had a wonderfully soft green tone, similar to what would be found in the marbling of a blue cheese such as Stilton or Roquefort.

Taste – Very subtle flavour of blue cheese without being overpowering.

Texture – Lovely soft outer texture which gave way to satisfying pop of flavour in the mouth.

Walnut and Hemp Marshmallow Brûlée

Colour – A white marshmallow with a hint of beige from the walnut and hemp. The Brûlée added an autumnal brown and yellow colour to the top of the Marshmallow

Taste – The taste was perfectly balanced with the brûlée imparting a wonderful caramel flavour

Texture – The texture was as a marshmallow should be, with an extra crunchy texture from the brûlée

Gingerbread Tuile

Colour – The colour of autumn leaves. Brown, orange and red. Speckled with darker browns from the gingerbread spices

Taste – Wonderful caramel sweetness combined with a slightly smoky and spicy flavour from the gingerbread spices

Texture – Crisp and thin. With a wonderful ‘snap’ when broken

Pear Spaghetti

Colour – Pale yellow, clear and transparent

Taste – Sweet Pear Williams flavour

Texture – Jelly like, and easy to chew

Conclusion

Although I was pleased overall with the development of and combination of elements to my dish, I would like to re-design the layout and downsize each aspect of the dish to make it more delicate, as well as lower in levels of sugar. I would consider this a dessert dish, due to the use of sugar in most of the recipes. I would also consider adding a frozen aspect to the dish. As I used different note-by-note aspects I kept colour, taste and texture in mind. I was pleased with the overall result of all three of these aspects in my final dish. I would like to incorporate more insect extractions such as oils and proteins for further experimentation and development.

It is possible to make a presentable and pleasing dish using compounds, exclusively. My experiences of a classically trained chef meant that I was forced to think outside of the box when it came to developing different recipes, concepts and aspects to the dish. I discovered that, similar to pastry, Note-by-Note cooking requires that the recipe and methods are respected and accurate, since the slightest deviation from this will result in the recipe not succeeding. The potential for Note-by-Note cooking seems endless since there are so many combinations, variations and methods of combining compounds. It was a very enjoyable (if not challenging) assignment.

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Images

Authors Own. Final Dish: An Autumnal Stroll. [Image 1].

Authors Own. Final Dish: An Autumnal Stroll. [Image 15].

Authors Own. Blue Cheese Pearls. [Images 6(i) & 6(ii)].

Authors Own. Gingerbread tuile. [Image 7].

Authors Own. Grape Must Foam. [Images 3(i) & 3(ii)].

Authors Own. Insect Jelly with Grape Must Foam. [Image 4].

Authors Own. Pear Spaghetti. [Image 5(i) & 5(ii)].

Authors Own. Walnut and Hemp Marshmallow in Moulds. [Image 2].

Authors Own. Walnut Marshmallow with Agar. [Image 14].

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Appendix

Nutritional Analysis for *T. molitor* (mealworm)



The Insect Biotech Company

Providing innovative products & services from insects

Data Sheet

Product *Tenebrio molitor* flour

Batch N° IBPR A152

Date produced 29.10.2014

Weight 251.81 g

Operator AGS

Protein content	54.6 % dry mass	Kjeldahl (Nx6.25) - In vivo labs
Lipid content	32.7 % dry mass	Adapted from CE 152/2009 - In Vivo labs
Fibres	6.8 % brut extract	Adapted from AOAC 985.29-SN - In Vivo labs
Ashes	3.3 % dry mass	Adapted from CE 152/2009 - In Vivo labs
Moisture	< 2%	Adapted from NF V04-401 - In Vivo labs
Peroxyde value	n.d.*	
Sieve residue > 1.5 mm	n.d.*	
Pepsin digestibility	91.3 %	Directive 72/199/CE - In Vivo labs
<i>Salmonella sp.</i>	Abs.	NF EN ISO 6579-CT

Enterobacter sp.

< 40 UFC/g

NF V 08-054 - In Vivo labs