

*Traditional Scones with jam, lemon curd and clotted cream*



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Playing with pectin's and a minimum sugar content

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## ***Background***

What is Molecular Gastronomy?

Molecular Gastronomy is the application of scientific principles to the understanding and improvement of small-scale food preparation. The term was invented by the Hungarian physicist Nicholas\_Kurti in a 1969 presentation to the Royal Institution called "The Physicist in the kitchen", and popularized by his collaborator the French scientist Hervé This. Molecular gastronomy is a science which is interested in culinary phenomena.

Note by note

Note by note is derived from molecular gastronomy. It involves making foods and dishes using only pure compounds, combining these pure compounds can leave an amazing dish. This method is known to be similar to music is that it is made note by note to build a masterpiece.

Pectin

Pectin is an extract from citrus peel or cell walls from fruits such as lemons limes or apple skin. It gives the skin structure. Pectin is often used for its gelling properties. Pectin is a type of starch called heteropolysaccharide. To get a pectin, it needs to be mixed with an acid and sugar. There are two main types of pectin, high methoxyl and low methoxyl. High methoxyl is much more common and it is known as fast set pectin. Low methoxyl uses calcium instead of sugar to set takes much longer but creates a finer gel. Pectin is extremely sensitive to pH and sugar content.

Gelling works on trapping water within its complex structure. The structure then gives a texture and thickens the liquid which then forms a gel.

### *Aims*

There are several aims of this project one is to develop a dish using pectin's while keeping the sugar content low. Using pure compounds to create a scone with similar characteristics to a scone served with a traditional afternoon tea, this scone should be light and fluffy with an airy consistency. Another aim is to develop a cream pearl to represent clotted cream, clotted cream is traditionally served with an afternoon tea selection to pair with scones. The final aim is to use gelling properties of pectin to gel a jam and lemon curd.

## ***Materials and methods***

### ***Ingredients***

Water

Dextrose

Food colouring

Tartrazine, sodium alginate

Xanthan gum

Calcium Lactate

Sodium alginate

Corn starch

Amylopectin

Milk powder

Whey, lactose, calcium.

Gluten

Wheat, Gluten

Baking powder

Amylopectin, sodium bicarbonate, potassium bicarbonate

Citric Acid

Flavourings

Monka, Citral

## ***Recipe***

### *Milk pearls*

Water	250ml
Milk powder	14g
Dextrose	0.5g
Food colouring (yellow)	2 drops
Xanthan gum	1.5g
Calcium lactate	1g
Note by Note	3 drops

### *Sodium Alginate bath*

Water	500ml
Sodium alginate 0.5%	5g

- Mix all the ingredients together
- Mix well with a hand blender
- Vacuum pack to remove air
- Mix both ingredients to create the sodium bath.
- Using a syringe, take the mix and proceed to gently drop into the sodium bath
- Once the pearls form removes them from the bath as a thick skin will form
- Wash the pearls in water
- Serve

### *Lemon curd*

Corn-starch	15g
Milk powder	10g
Water	100ml
Citric acid	2g
Food colouring yellow	4 drops
Dextrose	Pinch

- Mix all ingredients in a pot on the heat
- Allow the mixture to set, place into a mould if desired.

### *Jam*

Low sugar pectin	1.5g
Dextrose	Pinch
Citric acid	1g
Water	100ml
Note by note flavouring	3 drops

- Mix all ingredients in a pot over a steady heat
- Use a blender to ensure all the ingredients are mixed well

### *Scone*




Gluten	5g
Corn starch	10g
Baking powder	4g

Dextrose	Pinch
Water	Add to bind

- Add all ingredients into a bowl
- Using hands, work the ingredients, adding water to bind.
- Bake in a mould such as a ramekin for ten minutes.



*Equipment*

<p>Whisk</p>		
<p>Blender</p>		
<p>Stove top</p>		

Blast chiller, -18



Syringe

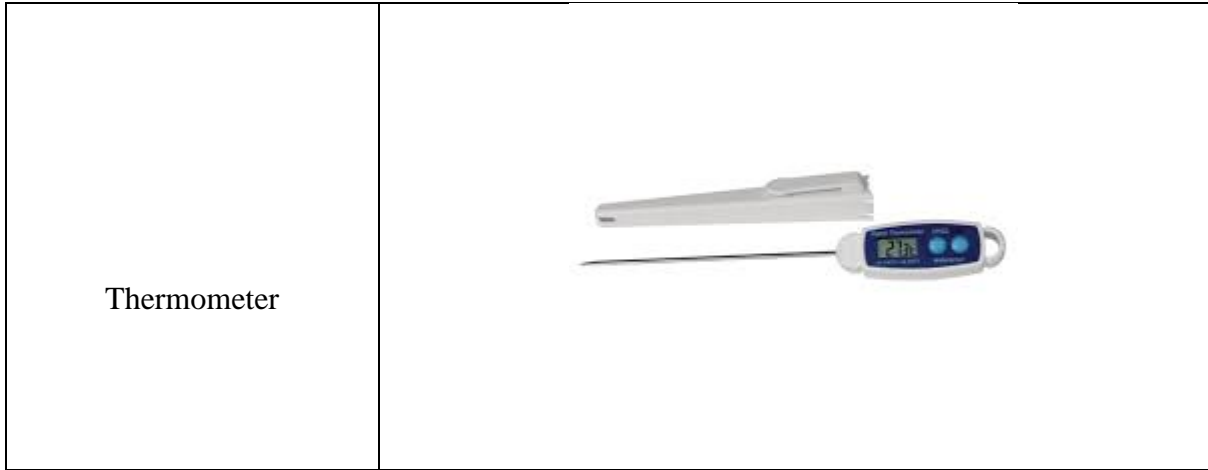


Vacuum packer



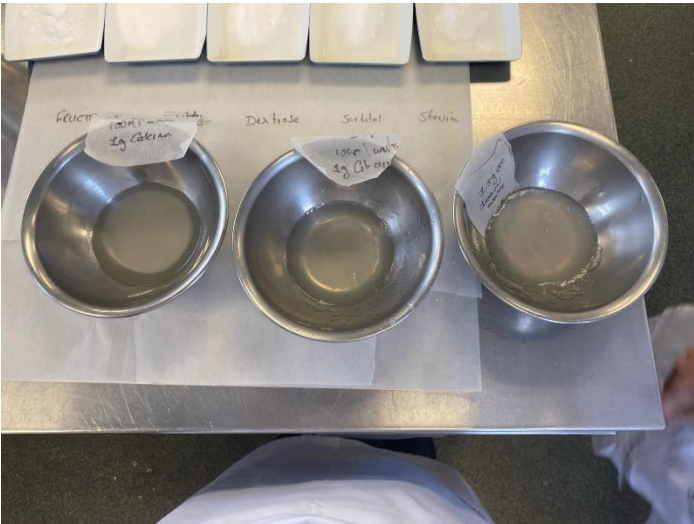
<p>Oven</p>	
<p>Micro scales</p>	
<p>Stainless steel pot</p>	

<p>Measuring jug</p>	
<p>Bowl</p>	
<p>Spatuala</p>	

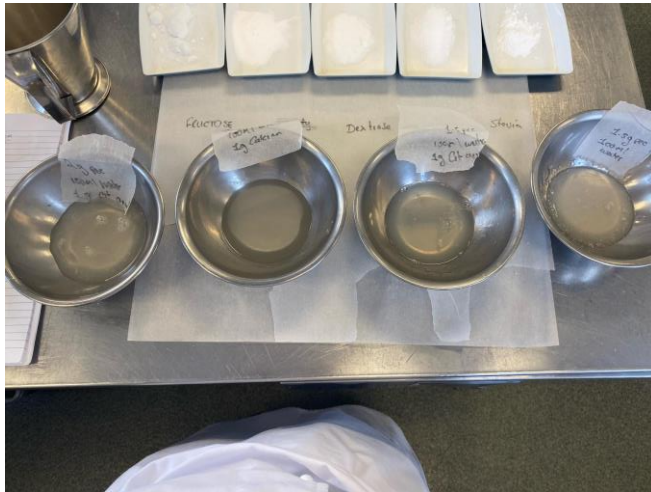


**Results**

**Week 1**



Experimenting into which ratios gel well with pectin.



<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
2g pectin	2g Pectin	1.5g pectin	1.5 pectin
100ml water	100g water	100ml water	100ml water
1g citric acid	1g calcium	1g citric acid	1g calcium
****	**	***	*

Weak = \*

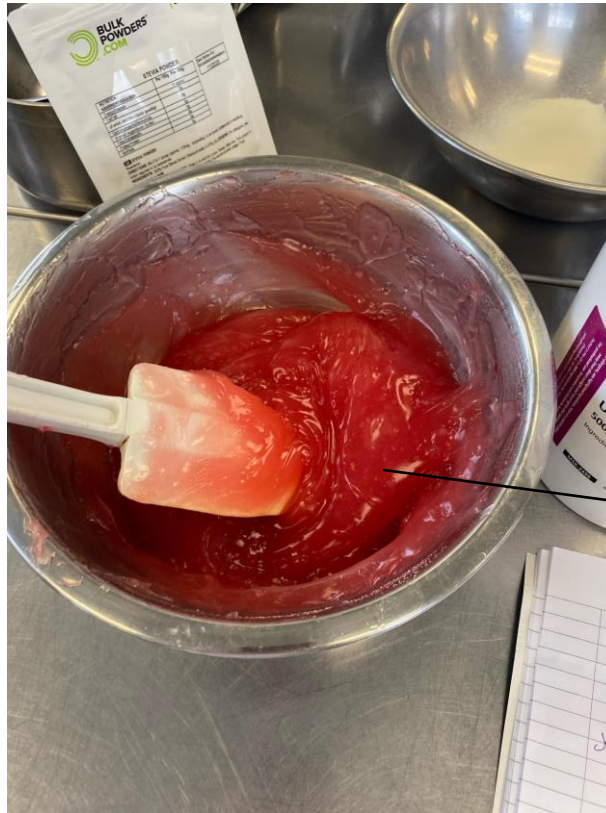
Gelled = \*\*

Strong = \*\*\*

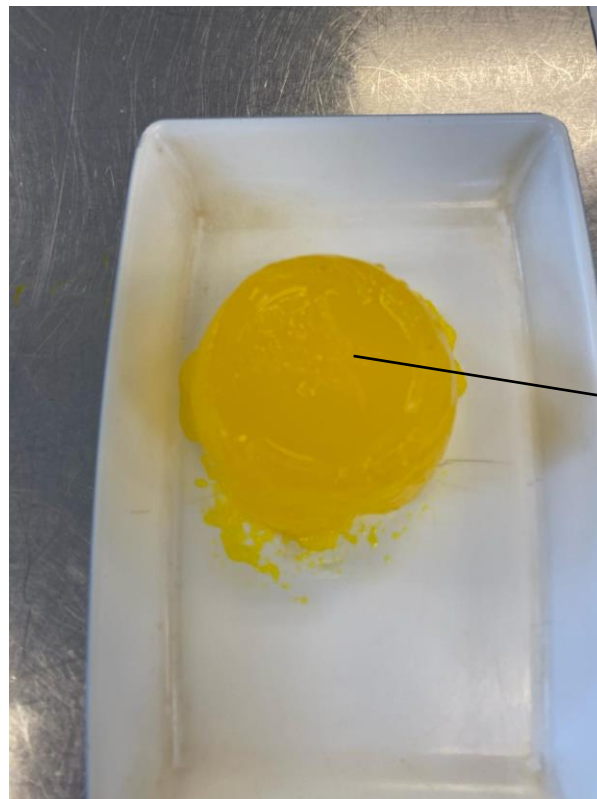
Extremely strong = \*\*\*\*

**Week 2**

Working on making a jam and lemon curd using gelling techniques



Jam



Lemon Curd



***Week 3***

Working on cream pearls. Experimenting with different ratios of milk powder





**Week 4**

The final week bring all aspects together.





Lemon Curd

Jam

Scones

Milk pearls

*Week 1*

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
2g pectin	2g Pectin	1.5g pectin	1.5 pectin
100ml water	100g water	100ml water	100ml water
1g citric acid	1g calcium	1g citric acid	1g calcium
****	**	***	*

Weak = \*

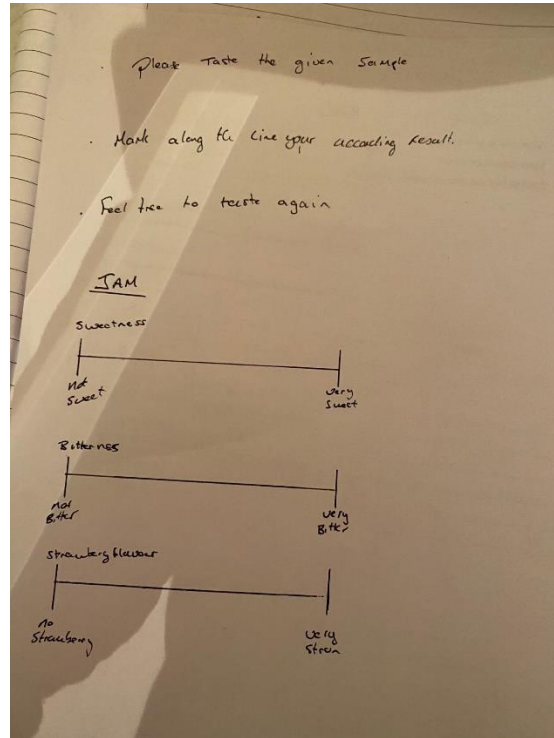
Gelled = \*\*

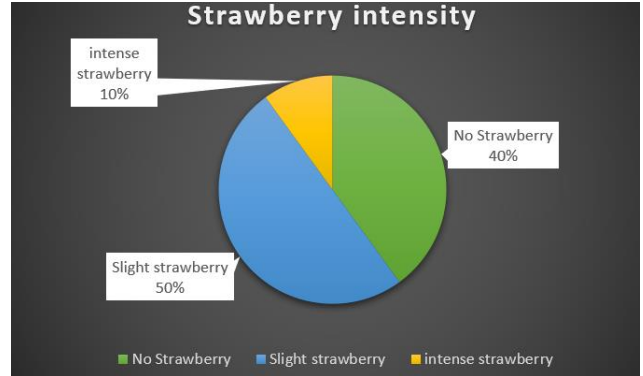
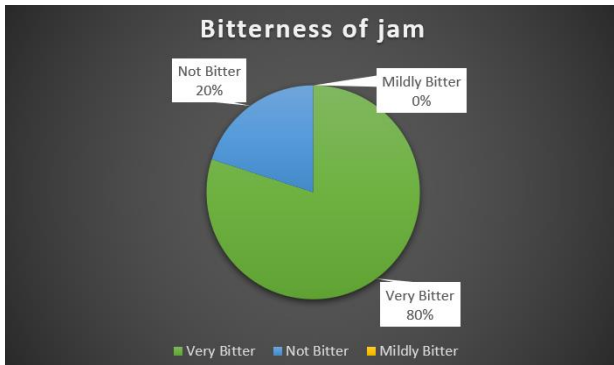
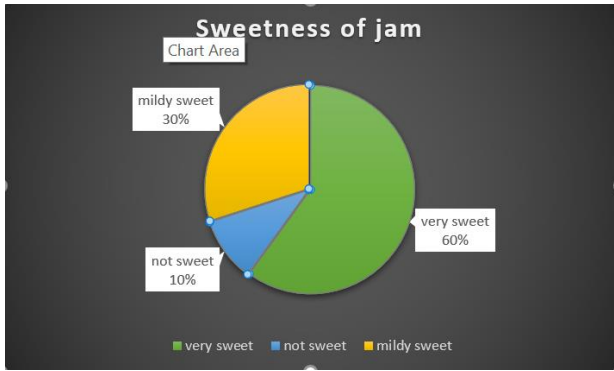
Strong = \*\*\*

Extremely strong = \*\*\*\*

## Week 2

In week two I carried out a sensory test to further help me understand the aspects of the dish that needed work. Using a scaling test, I tested the jam and lemon curd.





Please Taste the given sample  
 Mark along the line your result  
 Taste again if needed

**Lemon Curd**

Sweetness

not sweet ————— very sweet

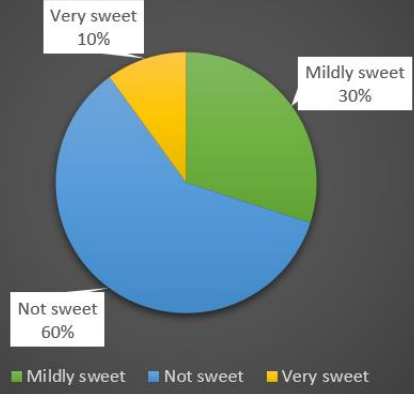
**Lemon Juice**

no flavor ————— strong flavor

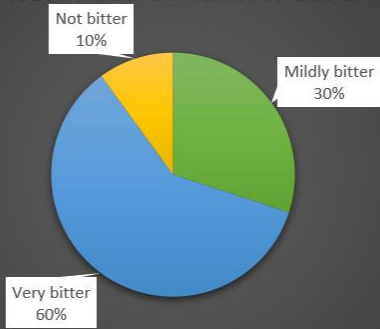
Bitterness

very Bitter ————— not Bitter

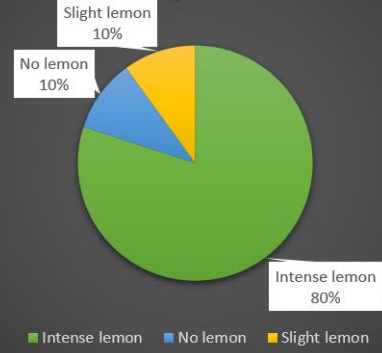
### Sweetness of lemon curd



### Bitterness of lemon curd

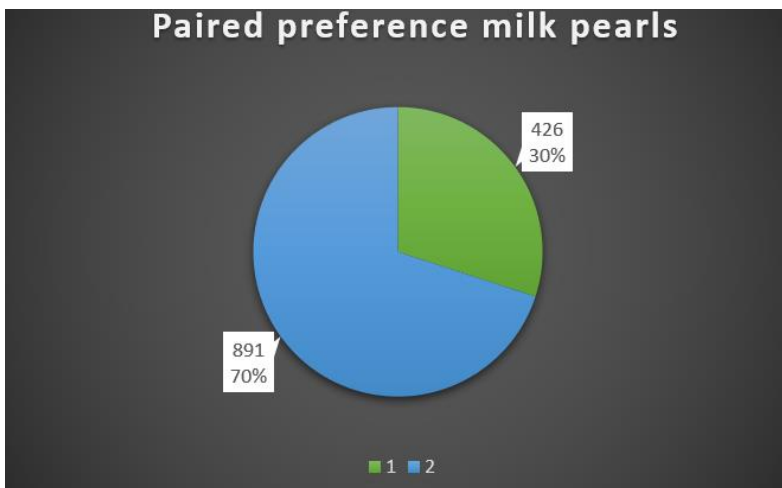
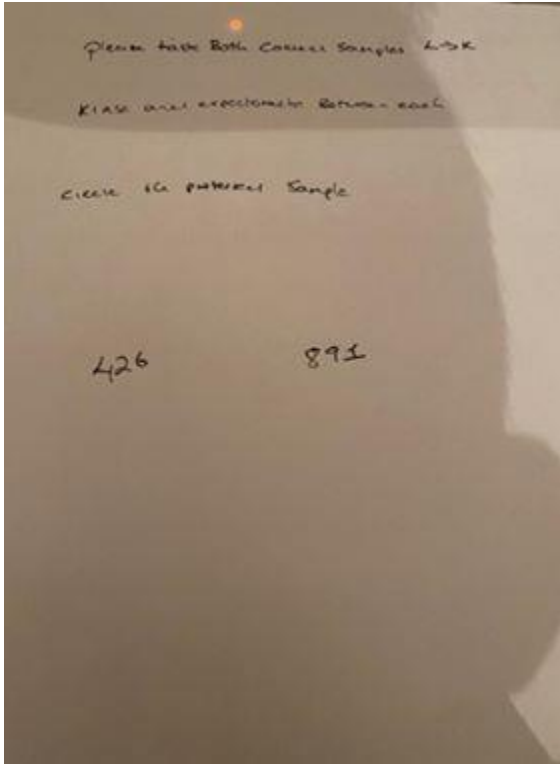


### Intensity of Lemon

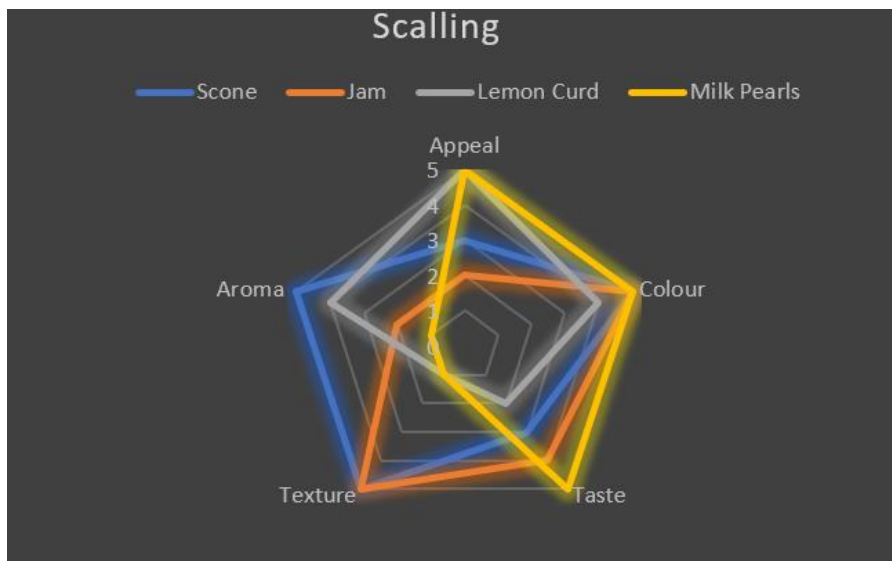


### Week 3

A simple paired preference test was carried out to see where the preference lies between two recipes.



## Week 4



**1** = Very much dislike

**2** = Dislike

**3** = indifferent

**4** = like

**5** = Really like



## *Discussion*

Week one was aimed towards gaining an understanding into how pectin's gel, from doing this it was observed that making pectin's gel is relatively difficult and require the correct conditions. Pectin's require different additional ingredients and different methods to help them gel. During week one, once the optimal ratios of ingredients was found, making mould and shaping the gels was next. Some of these jells didn't hold a shape very well and other did. The optimal ratio of gelling for jam was using 1.5 g of low sugar pectin with the addition of 1 g of citric acid, citric acid lowered the solutions pH making the gelling process work well.

Week two involved more gelling, this week also involved the addition of flavours colours and sweeteners. Once the gel ratios were decided on, perfecting the strawberry flavour using pure compounds proved a challenge. This process was trial and error using different sweeteners, colours and flavours. Often the flavour was far to sweet. Reducing the sweetener content and the addition of a small bit of citric acid helped give a realistic sweet and bitter contrast in the jam. During week two the process of making a lemon curd began, originally the recipe developed was using gelling techniques using pectin, this recipe did taste verusing pectin, this recipe did taste very good, but it was more suited to a jelly sweet. With further thought a recipe was developed using milk powder to try and make a custard. Using Corn-starch as a thickener and citral note by note flavours this. This development created a creamy lemon flavoured sauce, the goal was to have a high viscosity to spoon this onto a scone.

The following week, week 3 was the last week before all steps had to be put together and presented, the milk pearls were trialled. These milk pearls were to represent clotted cream. Working from trail and error the quantity of milk powder was changed to create a creamier, heavier pearl. From learning how to work with the sodium alginate bath, it was gathered that it is best to leave the pearls in the sodium alginate for as little time as possible. Leaving the pearls there any longer increases the size of the skin on the outside making for a nasty mouth feel. The scone was development using pure compounds. This proved to be very difficult. With the use of gluten as a pure compound, to make a product that can be baked while keeping a good shape made for a very hard product that could not be eaten by a human. After some work, the scone was baked in a mould to ensure the typical scone like shape was created and that in had a soft fluffy center.

The following week was the final week where a dish had to be presented. The preparation of the weeks before instilled great confidence into the presenting of this dish. Some tweaks were made to the colour of products, but the recipes all remained the same. A drop more of yellow food colouring was added to the lemon curd to give a brighter appearance. The same was done with the jam, a drop more of red food colouring. The scone was dusted with the slightest bit of icing sugar for ascetics.

## ***Conclusion***

The presented dish met the briefing with a very low sugar content continued throughout the whole dish. The only sugar was a dusting of 3g of icing sugar for aesthetic reasons. Overall the taste of the dish was great, it appeared better than it did taste. The scone has an extremely fluffy center but some parts were very hard, this can be due to the use of pure gluten and poor technique in dispersing this through the scone mix. The mix pearls began to break after a few minutes of serving. This may be due to not enough time in the sodium alginate bath. The lemon curd tasted very similar to a lemon curd made with egg yolks and sugar, this is the most positive part of the dish. The jam turned out to be extremely sweet but also extremely bitter. The presentation of the dish would appear better if it was plated on a tiered stand similar to the way it is served for a traditional afternoon tea.

## ***References***

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