Modern Cooking Techniques Portfolio

Averie Riel

Combined Culinary & Baking Class

Paul Smiths College
Capstone 2018
CUL 462

Portfolio

TABLE OF CONTENTS

Research Paper

INTRODUCTION

Cooking is such an important part of our world that is worth specific scientific studies. The scientific discipline devoted to culinary transformations, and to gastronomical phenomena in general has been called molecular gastronomy. Of course, this discipline is part of food science, but research is focused on (mainly home or restaurant) culinary transformations and eating phenomena rather than physical and chemical structure of ingredients.

Molecular gastronomy is a discipline practiced by both scientists and food professionals that studies the physical and chemical processes that occur while cooking. It is also the use of such studied processes in many professional kitchens and labs. Molecular gastronomy seeks to investigate and explain chemical reasons behind the transformation of ingredients, as well as the social, artistic and technical components of culinary and gastronomic phenomena in general.

"Molecular Gastronomy" also refers to a modern style of cooking, which takes advantage of innovations from scientific discipline.

Molecular Gastronomy is also known and addressed as experimental cooking, which has become widespread and increasing with fine dining. It has given chefs the ability to transform the tastes and textures of food in revolutionary ways. Learning how ingredients work and behave in certain ways is the only way these chefs are being able to transform these foods. Much of the focus of this modern cuisine is on extracting flavors from ingredients and presenting them in new and surprising textures. Grant Achatz explained it as – "we lean towards science to figure out way to extract flavor and aroma." Experimental cuisine goes beyond simple cooking, to performance, the chef is creating a multi- sensory experience for the diner. The tastes and textures are playful and surprising, they evoke memories, and more than likely have never been experienced before – each meal produced is an exploration of culinary possibilities. The equipment used and the methods undertaken from this newfound knowledge may seem more fitting in a laboratory than a kitchen.

When people first hear of this cooking technique they often mistakenly view it for being unhealthy, synthetic, chemical, dehumanizing and unnatural. This isn't too surprising given that molecular gastronomy often relies on fuming flasks of liquid nitrogen, led-blinking water baths, syringes, tabletop distilleries, PH meters and shelves of food chemicals with names like calcium lactate gluconate, alginate, transglutaminase, agar, locust bean gum, activia YG, angostura bitters, and pure cote B790.

The truth is that the "chemicals" used in molecular gastronomy are all of biological origin. Even though they have been purified and some of them processed, the raw material origin is usually marine, plant, animal or microbial. These additives are also used in very, very small amounts and have been approved by EU standards. The science lab equipment used just helps modern gastronomy cooks to do simple things like maintaining the temperature of the cooking water constant (water bath), cooling food at extremely low temperatures fast (liquid nitrogen) or extract flavor from food (evaporator). There is still a debate out there about the healthiness of molecular gastronomy but I personally believe there are other bigger health issues in every day food we consume. In the end, you are not going to be eating liquid pea spheres every day anyway.

HISTORY

The term "molecular gastronomy" came about in 1988 by a French chemist named Harvé, and his partner Nicolas Kurti, an Oxford physicist. In 1992 there was a meeting organized with scientists in Italy to discuss what happens to food on a microscopic level when it is cooked. The scientists explored the science behind the preparation of dishes, such as determining why soufflé swells or why mayonnaise becomes firm. The scientists and two men were focusing on the traditional techniques in preparation and trying to make improvements on them. This was when molecular gastronomy was originally focused on the traditional preparations, until they began to get more experimental with it.

The shift to experimenting with this type modern cuisine started in 2001 when a chef joined in on the scientists' meetings, and subsequently, the focus of their work shifted to how the fundamentals of cooking could be manipulated to create new dishes. This fusion of science and cooking set the stage for the growth of the molecular gastronomy movement. Some chefs to this day reject the term "molecular gastronomy" and refer to it as "experimental cuisine" or "modernist cuisine."

Molecular gastronomy today has been about chefs thinking outside the box by scientifically examining traditional cooking techniques and adjusting them as needed. The three main cities practice this type of cooking technique has been Chicago, San Francisco and New York. Chefs need to use high-tech equipment and chemicals, also combine textures, ingredients and tastes to create multi-sensory dining experiences for their customers, all while prioritizing quality and flavor. Some of the techniques they use is frothing and foaming, dehydration, spherification and sous vide.

SOUS VIDE

Sous vide is a cooking technique that used to be used as a high- end cooking style used in upscale restaurants right into the home kitchen. It is a term that means “under vacuum” in French. The process of a sous vide is an immersion of a sealed packed of food in water that is held at a specific temperature for a long period of time. It is almost the same process of poaching something but since it is in a plastic bag, sealed around the food, it is protecting the flavor and textural properties, instead of being diluted by direct contact with the water. It was officially documented as a way to cook food way back in 1799, long before it had any commercial implications. Later in the 1970s, it was further developed by a French restaurant most notably for keeping the texture of foie gras perfectly intact. It did not attract much attention until the early 2000s. While doing this method most people question what type of bag it has to go in, and if it will be harmful to consume the food cooked in this method. The answer to those questions are most people use regular Ziploc style freezer bags or vacuum bags for food, it is perfectly safe and has been studied and documented extensively. The temperatures that break down plastic are way out of range for what you need to cook with the sous vide.

DEHYDRATION

Doing this technique instead of putting a steak out on the grill or on a hot skillet leaves out the whole guessing game of under cooking or over cooking that piece of meat, it is making it a less reliable for the desired outcome. By utilizing a sous vide, the meat can evenly cook and stay at the exact point of pretty pint medium- rare for long periods of time, only needing a quick sear in the pan for the crisp outer surface once completed in the sous vide. It is also a proven method to cook food predictably and evenly to the exact level of done-ness wanted through the piece of food, it pasteurizes food while at a low temperature. It creates tender morsels out of tougher cuts of meat, while still retaining moisture and absorbing seasonings with more intensity flavor. This process is usually a low and slow process with temperatures staying well below the boiling point.

Food preservation has been around nearly every moment in time, to survive ancient man ha to harness nature. In frozen climates, he froze seal meat on the ice, or in tropical climates he dried foods in the sun. Food begins to spoil the moment it is harvested, but ancient man figures out ways to preserve and allowed them to make their roots and live in one place and form community. In ancient times the sun and win would have naturally dried foods as early as evidence shows that in the Middle East and oriental cultures, they actively dried foods as early as 12,000 B.C. in the hot sun. Later on, more cultures left more evidence and each would have methods and materials to reflect their food supplies- fish, wild game, domestic animals, etc. Vegetables and fruits were also dried from the earliest of times. The Romans were particularly fond of any dried fruit they were able to make. In the Middle Ages purposely built “still houses” and they were created to dry fruit, vegetables, and herbs in areas they did not have enough sunlight their drying process. A fire was also used to create the heat needed to dry foods and some cases even smoking them as well.

The method of dehydrating foods would be blanched, cooled and laid out to dry with no delay in between. Drying cannot be interrupted, once beginning the process, cooling down the food to start drying again later causes mold or other spoilage organisms to grow on partly dried food. This day in age many places and homes people purchase dehydrators to make their own dehydrated fruits and vegetables but also game jerky and other dried meats. Even with modern refrigeration, people still dehydrate foods by naturally drying them to get the desirable changes to the texture, creating firm dried fruits, chewy beef jerky, crisp kale chips, etc. Restaurants want to create something unique for the customer so they may try out fruit leathers with a dessert dish. Dehydrating at home has now been easier doing new modern things such as DIY fruit roll ups or making their own chips instead of going to the store and purchasing a bag of them.

LIQUID NITROGEN

Liquid nitrogen is currently a new development in the culinary world that is a colorless, odorless and tasteless gas. The pioneer who had been experimenting with this spectacular culinary technique was the French physicist and chemist Harvé in the mid-nineties. Chef Heston Blumenthal introduced liquid nitrogen in the world of molecular gastronomy through Peter Barham, a physics professor and author of the book "The Science of Cooking." When cooking with nitrogen, it is used in its liquid state which is characterized by a temperature of -320 degrees, which means everything it comes into contact with freezes. The cold has a similar effect on food as heating, removing the liquid content. Not only does it change the original appearance of the food, but also the texture, so you could obtain powdered oil or frozen foams for an example. This technique also allows people to play with temperature contrasts so a dish can be served where the inside of the ingredient is cooked and kept at its ideal temperature while the outside is completely frozen. It produces better results with products that have a higher fat content, but the results are less eye catching on foods with higher water content.

Apart from its creative potential in cooking, the liquid nitrogen technique can also speed up coking times by eliminating any bacterial growth or freeze fluids with a minimum ice crystal formation. It can also freeze foods that normally cannot be frozen in a normal freezer or products with high alcohol content.

DECONSTRUCTION

A culinary term that has been around but just started to become up and coming is deconstruction. Deconstruction is cooking, also known as "deconstructed" cooking, emerged in the early nineties from the Spanish chef Ferran Adrià. He produced dishes that were physically unlike the originals but with all their flavors preserved. It is during the plating and presentation stages that everything is brought together and completely makes sense on the flavor profile. It is more than a technique, deconstruction is a gastronomic trend that uses creative flair to change the form and not the basic nature of the dish, with an end purpose of awakening all the senses, and not just those of taste and smell. This approach enables innovative techniques to be created and developed to change the texture of food, such as gelefication or foams. This gastronomic concept involves changing the appearance of the various ingredients used in the dish, but preserving and even reinforcing the intensity of their flavors. Each of the components is treated separately, changing and transforming presentation, textures and forms and playing with the temperatures. The appearance of the deconstructed dish differs radically from the original, although it should retain much of its essential character.

When a deconstructed plate is put down in front of someone for the first time, their ears perk, brows furrow, nostrils swell and something unusual happens. Deconstructed food seems to elicit one of several reactions in newcomers, sometimes the person is intrigued; other times they are baffled. There is a multitude of in-betweens; but, one thing seems to be universally true, people react to the sight. Food like everything else has the ability to morph, at times eating should be fun and playful, while other times the endeavor should be restrained and precise.

Originality is the main thing the chef or restaurant is going for when trying out this type of technique. The customer should be able to relate the dish's final flavor to the starting point of the original recipe, although there may be no direct similarity with the initial presentation. The dish is "reconstructed" through the tasting memory of the person who is eating it, although the appearance and even the way it is eaten is completely different. During this type of method there are many tools or chemicals that are used to make the whole allusion of deconstruction happen in a way that is surprising and fun to the customer.

CALCIUM LACTATE GLUCONATE

The chemical Calcium lactate gluconate, also known as calcium gluonolactate which is a mixture of two calcium salts (calcium gluconate and calcium lactate). Calcium lactate gluconate is white, odorless and tastes like neutral crystalline solid. It changes the calcium content of the main ingredient without changing the flavor or altering the consistency in any way. It plays a major role in the molecular cuisine as auxiliaris to create spherifications of liquids.

The term" spherification" as coined by Ferran Andriá in 2003, and refers to the small droplets that tend to be spherical. This shape occurs for the same reason that bubbles and balloons are round. This type of technique was patented in the UK in 1942 and has been widely used in the industry since then. The classification of spherification as a hydrocolloid-ion reaction that can result in a solid droplet with a liquid center.

Spherification is a modern cuisine technique that involves creating semi-solid spheres with thin membranes out of liquids. As a result of this, a burst-in-the-mouth effect is achieved with the liquid. Both flavor and texture are enhanced with this culinary technique. Spheres can be made in various sizes as well as various firmness. This makes it possible to encase liquids within the solid spheres.

The difference between spherification and reverse sperification is that the reverse sphereification produces a thicker membrane than the basic spherification making it more durable and manageable. Unlike basic spherification, once the sphere is removed from the sodium alginate bath the jellification process stops because of the sodium alginate which forms the gelatinous membrane is not inside the liquid itself. This allows you to be able to hold the spheres for a long period of time. Basic spherification has a much thinner membrane around the liquid leaving it for a much better mouthfeel when consuming it, customers will not feel the gelatin membrane in their mouth when they go to swallow it. Both of these methods work well with high levels of acidity with no adjustment needed.

SODIUM ALGINATE

The other chemical that is used is molecular gastronomy and spherification is “sodium alginate,” it is extracted from brown algae found on the coasts of the North Atlantic, Asia and South America. Its discovery was made by a chemist named Edward C.C. Stanford, who described the molecule for the first time in 1881. The food industry uses the algae extract in many different processes and depending on the desired properties, manufactures prefer several varieties of marine plants (Laminaria hyerborea, Lminaria digitata, Laminaria japonica, Ascophyllum nodosum, and Ecklonia maxima). Alginate is a polysaccharide, or a sugar chain from the cell wall of algae. First extracted in the form of alginic acid, the product is then neutralized with salts that make it soluble and stable in a water solution.

The culinary industry has taken advantage of many of the sodium alginates properties. Its resistance to heat makes it an ingredient of choice in bakeries to make cream fillings or fruit jellies, allowing them to keep their shape during cooking. In aqueous solutions, it is used to create thicker cheese sauces that adhere better to pasta. It also prevents separation of emulsions such as salad dressings or mayonnaise. Gels form more easily when alginate is added to products with higher calcium concentrations.

There are two main ways sodium alginate is used for, the first is direct spherification, where the sodium alginate is blended into the flavorful liquid, which is then added by the spoonful into a calcium lactate or calcium chloride bath. The second one happens to be reverse spherification, where the calcium is added to the flavorful liquid and then spoonful's of the liquid are added to the sodium alginate bath.

TRANSGLUTAMINASE

Transglutaminase, also known as meat glue, is an enzyme that stimulates a bonding process at the cellular level with the amino acids lysine and glutamine in proteins. It contains maltodextrin (a bulking agent derived from starch), sodium chloride (enhanced binding), gelatin (a high-quality source of proteins for stronger binding), trisodium phosphate (an alkaline salt that helps solubilize proteins in muscle tissue and extends the shelf life of and activia slurry), safflower oil (anti-dusting agent), and transglutaminase (the functional enzyme). It is not technically glue, though that is what it is often referred to as. It is a protein that is present naturally in both plant and animal systems. The product used in kitchens is created from natural enzymes using a fermentation process. The commercial transglutaminase products are called Activia. The common question when it is being applied or added in to the products is, “is it safe for consumption,” yes, it is safe, it will not harm you no matter how much you consume.

Some of the primary uses of transglutaminase are being able to make even cooking happen, make the meats and proteins look good and reduce waste while producing products. Transglutaminase can also be used for creative applications in modernist cuisine such as making shrimp noodles, binding chicken skin to scallops or even making checkerboards with different types of fish or meats. This technique was introduced into the modernist kitchen by Heston Blumenthal and is currently being used by some of the world best chefs to bind ground meat mixtures like sausages without casings, make meat combinations like chicken skin and scallops, and produce creative dishes like meat noodles, fish checkerboards, etc.

Transglutaminase and maltodextrin contains a water-soluble milk protein called sodium caseinate. This protein is a helper protein that compensates for any protein deficiencies by sticking to the surface of food and bonding with TG. It makes Activia to use on already cooked meats quite difficult. Activia can be sprinkled on as powder, or it can be mixed as a slurry with 4 parts water. Also, it can be added directly into ground meat mixtures, but they are safe and easy to use.

LOCUST BEAN GUM

Locust bean gum is also known as carob bean gum, it is an all-natural food additive derived from the locust bean tree, prevalent in the Mediterranean region. The tree pods of the tree are separated into pulp and seed, and the gum is derived from the split, milled seed. While carob powder with a sweet flavor somewhat similar to chocolate is produced from pods. Often referred to as LBG for short, locust bean gum falls into the category of hydrocolloids or things that help water molecules stick together. Hence why it is used as a thickening and gelling agent in food production, and it commonly found in salad dressings, sauces, meat products, breads and breakfast cereals as well as dairy products. It is excellent for freeze/ thaw applications, but it is invaluable for frozen dairy preparations. It can help stabilize foods by preventing sugar or ice from crystalizing, without adding additional fat or calories. Makes for an ideal ingredient to create light foods like reduced- fat desserts or creamy sauces that still taste satisfying.

Some may think that locust bean gum powder is a recent discovery, but in reality, there are archaeological records that show the carob tress grew in Israel in 4000 B.C., and the locus bean was recorded in the writings of Theophratus in 4 B.C. Sometimes it is referred to as the Egyptian Fig, LBG was even used to prepare bodies for mummification, and remnants of locust beans have been discovered in ancient Egyptian tombs as well as in Pompeii from circa 79 A.D.

Today, government programs utilize locust bean trees for their ecological benefit: the trees aid the soil and water conservation efforts, as well as help provide shade to keep animals cool.

The production starts with the carob pods arriving at the processor, they are stored in ventilated areas to allow their moisture to settle down to about 8%, this improves their storage life. The first operation is kibbling the pods to separate the seed from the pulp. The pulp is then ground to various sizes or dried, or fine milled to produce carob powder for the food industry. The seeds have their skins removed by either an acid treatment where sulpheric acid at a raised temperature is used to carbonize the outer skin which then can be removed by a combination of washing and brushing or by roasting process where the skins are roasted so they literally peel off. The deskinned seed is the split and gently milled. This causes the brittle germ to break up while not affecting the more robust endosperm. The separated endosperm can then be milled by a roller operation to produce the final LBG powder. The other products obtained are residual pod, which can be ground and used as a food ingredients high in fiber and antioxidants, and the germ which is rich in protein. LBG producers are concentrated around the Mediterranean, including Spain (5 producers), Portugal (2), Morocco (2), Italy (1).

The germ contains 52% protein and the protein level in LBG is used as a quality indicator reflecting the efficiency of germ removal from endosperm. The germ also contains about 8% lipids and 27% carbohydrates. High levels of the yellow germ in LBG powder cause the solutions to degrade faster due to polysaccharide degrading enzymes presents.

AGAR

Agar-agar, sometimes referred to simply as agar, is also called Kanten, Japanese gelatin, or China grass. It is a gum derived from red seaweeds of the genera Gelidium Gracilaria and Eucheuma or from others of related species of the class Rhodophyseae. It contains the polysaccharides agarose and agaropectin and is usually used to form gels for cooking, to make dental impressions, or as a culture for bacteria. It is mainly used in the West but I the East it is rarely used in cooking. It is produced in Spain, Portugal, Morocco and Japan. The seaweeds used to derive it are gathered in similar ways as the seaweeds for carrageenan production, but it more expensive than all other seaweed products.

Unlike gelatin, agar both melts and sets at a higher temperature, it needs 203 degrees to melt, and so it will not dissolve in a bowl of soup and is insoluble in cold water. To gel it requires 90 to 104 degrees, making refrigeration completely unnecessary, although the cold would speed up the cooling and the gelling of the desired mold. Agar's advantages in foods comes from the heat tolerance of the gels, stability in acids and a lack of reactivity of other ingredients. It can gel in a wide range of PH conditions, except in very high temperatures, where it may be hydrolyzed by acid. Since it does not inhibit the growth of bacteria, it is useful in fermentation like yogurt or sour cream. Some of its general uses are: artificial caviar, icings and glazes for pastries, cakes and doughnuts, dairy products like flans, puddings, custards, creams, flavored milks and ice cream, canned meat and fish products, clarifying agent for wine juice and vinegar, a fiber component in health foods, etc.

It is grayish white in color, agar-agar is used extensively in Japanese, Chinese and Southeast Asian cooking. Is is used to make gelatinous, slippery sweets which are flavored with almond, coconut, and black soybeans as well as small molded jellies flavored with jasmine, pandan, or, in Southeast Asia, creamed corn. In those countries, it is sold in most food markets where it comes as either long strands or feather rectangular sticks. The long strands are sometimes used as noodles in cold Chinese salads with chicken, meat, and vegetables. It is called the “bird’s nest” in the famous Chinese soup called *Bird’s Nest Soup.* Otherwise it is boiled until it dissolves (sometimes with sugar) and then molded along with other ingredients. It may be sold also in powder form, and can be used as a general thickening agent for soups and sauces.

Ager is used differently for manufactured foods in different parts of the world, where it is closely linked to tradition. Even though it was introduced in Europe and the United States over a century ago, it has only had limited use in food products, although professional chefs are growing more and more familiar with it. The powdered form has come to largely replace the traditional strips and sheets.

PURE COTE B790

Pure-Cote is a modified corn starch that is a special low viscosity starch, which is great for forming flexible films and for adhesions. The clear flexible films with excellent sheen made with Pure-Cote dry quickly and without changing the original flavor profile. Liquids thicken with Pure-Cote dry into a film at room temperature or in a dehydrator. Finished films made with this additive become water soluble. It is also a useful binding agent in cereal and puffed snacks coating. Pure-Cote aids de glacage for baked goods and confections, forming and smooth and glossy coating.

Pure-Cote B790 hydrates easily in cold, warm or hot water. To hydrate this ingredient, place the liquid to be thickened in a propeller mixer, create a vortex and add in the Pure-cote on the top edge of the vortex to prevent lumps. This mixture then needs to be agitated for at least 20 minutes to become fully hydrated. If this starch isn't fully hydrated, the resulting film will not be clear. Flexible and strong films can be made with 15% of Pure-Cote in water, casting the film by spreading this solution on a plastic or glass surface at room temperature overnight. Professional chefs are creating Fruit leather, flowers and glass with this starch. Going out to gardens and picking edible flowers and encasing them in this clear edible glass to emphasize their dishes. The way this solution turns into a glass is, it first has a leather/ fruit rollup texture that when you peel it off and dehydrate it in the oven it will create a glass like object that is eye appealing and still questionable to what the customer is about to consume.

ANGOSTURA BITTERS

Angostura Bitters were created in 1824 by Dr. Johann Siegert, they were originally called "Dr. Siegert's Aromatic Bitters" and later renamed Angostura Bitters. The bitters were created for tropical stomach ailments in Venezuela, as Dr. Siegert was the Surgeon General of Simon Bolivar's army. The bitters were first exported to England in 1830. After Siegert died in 1870, his sons relocated the business from the politically unstable Venezuela to Trinidad in 1875. That is when the company was renamed Angostura Bitter in 1904. The label is known to be too big for the bottle and the reasoning behind this there was a competition of some sort, one brother designed the and the other brother designed the label. By the time it was all figured out, they should have consulted each other on the size of each, but at this point it was too late to change. On the advice of the judge of this contest, they kept it as their signature.

Today it is a staple for bartenders and cocktail enthusiasts, professional and home cooks alike, bounded by the creativity and imaginations of those who use it. Today the brand remains the only bitters brand due to such high credentials. In 1960, it was promoted as a flavor enhancer for both food and cocktails since the 1920s, but the aromatic bitters in culinary applications surged in the 1960s. Adding a dash of bitters to every day cooking can give the dish a splash of international flair.

CONCLUSION

Cooking has a big impact on this world wither people notice it or not, since you're born you have to eat to survive. Ancient man has figured out ways to create a place to start villages and save food from spoiling, growing crops to help them survive, using the land and region to their own advantage. But now that we are so advanced people in general want to do more with what we have, doing just simple meals aren't cutting it anymore, even chefs are pushing boundaries of their own limits but also in the eyes of customers. We used to eat to survive, or eat when we are bored, but now people are looking for the excitement and a "show" at the dinner table. It has become much more than just an authentic or hearty dish your grandmother has whipped up, but now it has taking new heights, the flavors are all there but the look of the dish has completely changed. Learning to use small additives or cooking with new and upcoming techniques never thought possible are becoming so known that people are now able to use them in their own homes instead of just in commercial kitchens.

Technology has helped in so many ways for normal people other than professional chefs get their hands dirty with new cooking techniques and different equipment being produced. Ancient man used to have to let their food dehydrate out in the sun for who knows how many days and banking on how the weather would be, while new people can just plug in their dehydrator and make any type of jerky or dehydrated vegetables or fruits they desire, and it only takes a few hours instead of days. Also learning about these different additives that can manipulate food into things that you didn't think were possible have made way for a better experience at the dinner table. It's more of a form of creating a form of conversation instead of just sitting and eating. An example I did for my capstone was tomato soup formed into a sphere, so when you consume it, it pops in your mouth and you get a quick rush of flavor. That's a movement someone has a "how does one person come up with something like this", or "how does this even work."

Manipulated food happens in all shaped in sizes with the new form of cooking is molecular gastronomy. From cocktails, to appetizers, soups, deserts, main courses, the list is endless. Chefs are manipulating and changing food in ways you could never think possible with nitrogen, or additives, and so on and so forth. It takes a type of person who sees endless possibilities while looking at a fruit, vegetable, meat, or authentic dish. Its thinking outside the box, it's a type of artistic talent.

Work Cited

"Pure-Cote B790." *MolecularRecipes.com Store*, store.molecularrecipes.com/pure-cote-b790/.
http://store.molecularrecipes.com/pure-cote-b790/

"Our Story." *Angostura,* angosturabitters.com/our-story/.
http://angosturabitters.com/our-story/

Shingler, Tom Great British Chefs, (2015)
https://www.greatbritishchefs.com/features/sous-vide-history

(MOLECULARRECIPES.COM, 2014)
http://www.molecularrecipes.com/about/

Myhrvold, N., Young, C., Bilet, M., & Smith, R. M. (2011). *Modernist cuisine: The art and science of cooking*. Bellevue, Wash. (3150 139th Ave. SE, Bellevue, WA 98005): Cooking Lab.

Written Menu

Tomato Soup Spheres:
Parmesan cheese bread crisps topped with basil tomato soup and basil drizzle

Scallop:
Mixed spring vegetables with a garlic lemon butter sauce

Braised Beef:
Beet noodles with goat cheese dumplings

Orange Cream Sickle:
White chocolate vanilla mousse, with a orange cream soda sauce and orange paper

Course 1

Course 2

Course 4

Course 3

Recipes

Basil Oil:

- 2 C fresh basil
- 1 C Olive Oil
- ½ tsp salt

1. Blanch basil in boiling water (10 seconds), have an ice bath ready.
2. Gently squeeze out excess water
3. Put into blender, add in oil & ½ tsp of kosher salt
4. Blend until basil is pureed, let settle 30 minutes
5. Strain through cheese cloth
6. Refrigerate covered, no sun light
7. Take out for room temperature before using

Lemon Butter Sauce:

- 6 lemon juice
- 3 clove garlic
- ¼ cup butter
- tt salt
- tt pepper
- 4 oz shallot

1. In a pan melt butter, add shallots and sweat until translucent
2. Add in garlic, cook 1 seconds
3. Add in lemon juice, seasonings and turn off heat
4. Move to small sheet pan and harden in fridge over night
5. Cut out necessary circles for use with cookie cutter

Scallop with Spring Vegetables:

- 24 U10 scallops
- 32 oz cherry tomatoes
- 32 oz asparagus
- 32 oz oyster mushroom
- 24 oz rainbow carrots

- Meat glue

Scallop Prep:
1. Clean all scallops and remove side muscle
2. Slice in half through the middle (horizontal)
3. Dry out the inside and add a layer of filling and the meat glue
4. Seal all edges of every individual one
5. Set in fridge until ready for use

Vegetable Prep:
1. Concosee cherry tomatoes, slice in half and set aside in quart container
2. Trip off the bottle of the asparagus, cut into thirds about 1 ½ - 2 inches long
3. Wash, peel and cut rainbow carrots
4. Chop mushrooms

Braised beef:

- 7 lb chuck roast
- 2 oz oil
- 6 sprigs of thyme
- 1 whole onion
- 5 clove garlic
- 1 quart beef stock
- tt salt
- tt pepper

1. Pre-heat over to 300 degrees
2. Season the beef, salt and pepper & olive oil in the pan
3. Dice the onion up and add it to the pan with beef stock
4. Add in the thyme on the beef and in the stock
5. Cover with tin foil and braise for 4 hours, check the amount of liquid in the pan

Pan Sauce:

- ½ C white wine
- reserved meat juice
- tt salt
- tt pepper
- ½ C beef stock

1. Remove beef from the pan and pull, move to a new pan with some of the reserved meat juices

2. Add wine into pan to deglaze
3. Taste and season, add beef stock if needed and reduce till it thickens

Beet Noodles:

- 64 oz water
- 64 oz beets (grated)

- 60 oz beet water
- 8.4 g agar
- 2 oz locust bean gum

- tt pepper
- tt salt
- tt lemon zest
- tt oil (warm)

1. Combine the grated beets and water and bring to a boil
2. Remove from heat and infuse for 1 minute at room temperature
3. Strain through fine sieve lined with cheese cloth and let cool
4. Measure 60 oz of beet water
5. Dry blend agar and locust bean gum and disperse into cold beet water
6. Bring to a boil and hold for 2 minutes to fully hydrate, skim surface scum that appears
7. Fill texturas- style syringe immediately with beet water
8. Pipe quickly into coiled pvc tubes, hold opposite ends of tubes
9. Seal tubes
10. Submerged filled tubes in ice water bath until set, about 2 minutes
11. Shoot air foam soda siphon into one end of each tube to extrude the noodles
12. Season and serve

Goat Cheese Dumplings:

- 21 oz goat cheese
- 15 oz ricotta
- 2 egg yolks
- 10.8 g ctivia YG
- tt salt
- tt cayenne

1. Blend all ingredients completely together
2. Transfer mixture into a pastry bag
3. Pipe into silicone mold
4. Tap molding sheet on counter to eliminate bubbles
5. Refrigerate covered, 12 hours to set
6. To serve warm, gently put into simmering water

Orange Paper:

- 200 g orange juice
- 1 g salt
- 2 dashes angustura bitters
- 24 g pure cote B790

1. in a small pot, create a slurry with Pure- Cote B790 and a little bit of the orange juice
2. Blend the rest of the orange juice to disperse the starch
3. Over medium heat bring the mixture to a minimum (160 degrees) and hold for 10 minutes to allow the pure- cote B790 to hydrate fully
4. Mix in angustera bitters and salt
5. Press through fine sieve
6. Spread on glass or acetate sheets, making a thin layer, pour a small amount in the center and tilt the sheet or glass to spread the liquid close to the edges
7. Let dry at room temperature for 12 hours or more
8. Carefully peel off orange sheets from the acetate or glass

Orange Zest Whipped Cream:

- Heavy cream
- Orange zest
- Sugar

1. Add heavy cream, sugar and orange zest into a mixing bowl
2. Whip with a whisk until soft peaks form
3. Move into piping bag, pipe

Vanilla White Chocolate:

- 1 ¼ C heavy cream
- 2 tbsp sugar
- 2 egg yolks
- 7 oz white baking chocolate
- 2 vanilla beans

1. In a small sauce pan, combine ¼ cup heavy cream & sugar; cook over medium heat until it simmers
2. In a small bowl whisk a small amount of the hot mixture into egg yolks; return all to a pan and immediately add in chocolate

3. Cook over low heat until mixture is nape, DO NOT ALLOW IT TO BOIL, remove from heat and immediately add chocolate
4. Split vanilla beans length wise using a knife, scoop seeds into mixture and mix well
5. Transfer into a big bowl and let cool 10 minutes
6. Whisk remaining heavy cream and fold into mixture

Orange Dust:

- 4 oz orange peels
- 1 tbsp sugar

1. Clean all white out of the inside of the peels
2. Dehydrate in a dehydrator or in an over at 200 degrees for 2 – 2.5 hours

Orange Cream Soda Reduction Sauce:

- 16 oz cream soda

1. Put in a pan on medium and reduce by half

Order Sheet

Ingredients	Qunatity
Calcium Lactate Gluconate	0.28 oz
Sodium Alginate	0.35 oz
Agar	8.4 g
Locust Bean Gum	.90 g
Activia YG	10.8 g
Angustera Bitters	2 dashes
Pure Cote B970	24 g
Shallot	4
Garlic	1 cup
Cherry Tomatoes	32 oz
Asparagus	2 bundle
Rainbow Carrots	24 oz
Beets	8
Lemon	4
Oranges	8
Basil (Fresh)	1 cup
Thyme Sprigs	8 sprigs
Scallops	32
Beef Chuck	7 oz
Goat Cheese	21 oz
Ricotta	4 cup
Butter	2 cup
Heavy Cream	4 cup
Vanilla Beans	2
White Baking Chocolate	21 oz
Sugar	3 cup
Salt	1 cup
Pepper	1 cup
Cayenne	2 tsp
Olive Oil	2 cup
Eggs	5
Oyster Mushroom	32 oz

Costing Sheet

Tomato Soup Sphere

Product	US Food Price	US Food Quantity (oz)	Price per oz	Product Price
Tomatoes	$19.88	160 oz	$0.12	$0.96
Onion	$14.92	160 oz	$0.09	$1.08
Garlic	$22.43	176 oz	$0.12	$0.24
Basil	$16.20	16 oz	$1.01	$2.02
Tomato juice/ plum tomato	$2.99	16 oz	$0.18	$2.99
Thyme	$11.14	8 oz	$1.39	$1.39
Butter	$147.59	576 oz	$0.25	$0.50
Salt	$40.33	192 oz	$0.21	$0.10
Pepper	$23.23	8 oz	$1.29	$0.64
Calcium Lactate Gluconate	$10.96	8.81oz	$1.24	$0.34
Alginate	$15.90	16 oz	$0.99	$0.34

Basil Oil

Product	US Food Price	Us Food Quantity (oz)	Price Per oz	Product Price
Basil	$16.20	16 oz	$1.01	$6.06
Olive Oil	$17.81	128 oz	$0.13	$1.04
Salt	$40.33	192 oz	$0.21	$0.10

Scallop with Spring Vegetables

Product	US Food Price	US Food Quantity (oz)	Price Per oz	Product Price
Scallop				
Cherry Tomato	$27.43	192 oz	$0.14	$4.48
Asparagus	$45.90	176 oz	$0.26	$8.32
Oyster Mushroom	$20.58	48 oz	$0.42	$13.44
Rainbow Carrots				
Transglutaminase	$85.49	35.2	$2.42	$2.42

Lemon Butter Sauce

Product	US Food Price	US Food Quantity (oz)	Price Per oz	Product Price
Lemon Juice	$60.67	490 oz	$o.12	$0.72
Garlic	$22.43	176 oz	$0.12	$0.24
Butter	$147.59	576 oz	$0.25	$1.00
Salt	$40.33	192 oz	$0.21	$0.10
Pepper	$23.23	18 oz	$1.29	$0.64
Shallot	$50.42	80 oz	$0.63	$1.89

Braised Beef

Product	US Foods Price	US Food Quantity (oz)	Price Per oz	Product Price
Beef Chuck	$22.26	96 oz	$0.23	$22.26
Butter	$147.59	576 oz	$0.25	$1.00
Thyme	$11.14	8 oz	$1.39	$1.39
Shallot	$50.42	80 oz	$0.63	$3.78
Garlic	$22.43	176 oz	$0.12	$0.36
Salt	$40.33	192 oz	$0.12	$0.21
Pepper	$23.23	18 oz	$1.29	$1.29
Oil	$17.81	128 oz	$0.13	$0.06

Goat Cheese Dumplings

Product	US Foods Price	US Food Quantity (oz)	Price Per oz	Product Price
Goat Cheese	$38.66	64 oz	$0.60	$12.60
Ricotta	$32.58	160 oz	$0.20	$3.00
Egg Yolk	$57.99	291.6 oz	$0.19	$0.22
Salt	$40.33	192 oz	$0.21	$0.10
Cayenne	$14.26	16 oz	$0.89	$0.89
Activia YG	$85.49	35.2 oz	$2.42	$0.38

Beet Noodles

Product	US Foods Price	US Food Quantity (oz)	Price Per oz	Product Price
Beets	$104.90	160 oz	$0.65	$10.40
Lemon Zest	$60.67	490 oz	$0.12	$0.12
Pepper	$23.23	18 oz	$1.29	$0.64
Salt	$40.33	192 oz	$0.21	$0.10
Oil	$17.81	128 oz	$0.31	$0.13
Agar	$18.12	4 oz	$4.53	$0.99
Locust Bean Gum	$13.29	2 oz	$6.64	$0.26

Pan Sauce

Product	US Foods Price	US Food Quantity (oz)	Price Per oz	Product Price
Reserved Juices				
Salt	$40.33	192 oz	$0.21	$0.10
Pepper	$23.23	18 oz	$1.29	$0.64

Vanilla White Chocolate Mousse

Product	US Food Price	US Food Quantity (oz)	Price Per oz	Product Price
Heavy Cream	$65.92	384 oz	$0.17	$1.70
Sugar	$25.61	400 oz	$0.06	$0.03
Egg Yolks	$57.99	291.6	$0.19	$0.22
White Baking Chocolate	$274.46	400	$0.68	$4.76
Vanilla Beans	$509.71	16 oz	$31.8	$6.36

Orange Dust

Product	US Food Price	US Food Quantity (oz)	Price Per oz	Product Price
Orange Peels	$48.73	226 oz	$0.21	$1.68

Orange Paper

Product	US Food Price	US Food Qunatity (oz)	Price Per oz	Product Price
Orange Cream Soda	$4.49	72 oz	$0.06	$1.44
Pure-Cote B790	$13.99	14 oz	$0.99	$0.99

Production Sheet

Week Before: Thursday

Tomato Soup – Averie
Basil Oil- Averie
Dehydrate Orange Peels – Averie

Monday:

Orange Paper (layout, let set over night, just to see how it turned out) - Averie
10-10:30 am: Beet Water (set aside, cool in fridge overnight) – Averie
10:30-10:45 am: Scallop Sauce (set aside in fridge to harden) –Averie
10:45 – 11:20: Portion and cut the asparagus, mushrooms. Blanch and peel cherry tomatoes – Averie
2:30-3:00 pm: Goat Cheese Dumplings (let them set in fridge overnight) – Averie

Tuesday:

9:15- 9:30: Prep and Cook off beef (3.5 – 4 hours) – Averie
9:30-10:00: Cream soda reduction sauce – Averie
9:30- 10:15: Scallops (slice, fill, meat glue) – Averie
10:20- 1:45: Beet Noodle's (test them out) – Averie
1:00-1:15: Pull Beef Roast – Averie
11:00- 11:30: Vanilla White Chocolate Mousse – Taylor
11:00-11:30: Shave carrots and blanch – Brenna
12:00- 12:45: Carmel leaves (mess with them) – Brenna & Taylor
1:00- 1:45: Orange Paper (layout, let set overnight) – Taylor

Wednesday:

10:00- 10:30: Cut out and bake-off orange paper at 200 degrees – Averie
10:30-11:00 Make beef pan sauce for main dish – Averie
11:00 – 11:45: Finish filling the scallops and meat gluing them – Averie
12:00 – Whenever: Go Over Plating

Thursday:

9:00 – Whenever: Make the tomato soup into spheres –Brenna & Taylor
3:00- 3:30: Cheese bread crisps –Averie
Set up desert Plates –Brenna
Run through everything

Table settings:

Course 1: Spoon

Course 2: Fork & Knife
Course 3: Fork & Spoon
Course 4: Spoon

Self-Analysis

Taking this class this semester has taught me so much about the topic I have chosen but it has also made me learn a lot about myself as a person as well. Picking my topic was challenging to say the least. Modern cooking techniques seemed like something fun at the time; being able to test my culinary skills I have learned these past four years, but also doing something not many people at this school have really done besides in Culinary Futures. I ran into a few bumps while trying to figure out how certain things would work, but in the back of my head while choosing this topic I knew it'd be a given to have a few issues. Having that sense of mystery of how was this even made while someone is eating it, that is exactly what I wanted out of this whole project.

I started the first dish with tomato soup spheres that pop in your mouth, and these were by the far hardest one to make since we've never really done them in class. I found the recipe in the modernist cuisine book and decided to go for it. I would do something different for this dish next time since they were so precise and popped very easily and took an un reasonable amount of time to plate. But in the end, I'm happy I tested myself and pushed my limits to make things I wasn't 100% comfortable in making or knowing how the end product would be.

My second dish was the scallops filled with lemon butter garlic sauce, this was a nice simplistic concept but still was fun for the customer who was eating it since they had no clue that when cutting into them that the sauce would come out of them. Only issue I ran into was Emily ordering too small in size, so I just had to be more careful filling without cracking the tops or making a hole in them, and change the plating to 2 on a plate instead of 1.

The third dish was one I wasn't really sure how it'd look plated until the day of since I didn't know how the noddle our stand because they were so gelatin like and slippery. The beet noodles were the only other time-consuming thing I had made, the mystery of how hot can the meat and sauce get in the dish before making them melt was one of my biggest concerns. But turns out they can hold up to high temperatures and in the end at service time they held up just fine. The goat cheese gnocchi didn't set as much as I wanted them to, so instead of warming them up in simmering water I just plated them and poured the sauce over them to heat them up.

The final course was a fun one for me because I wanted to try and make orange paper, having no idea how it'd turn out. Once it was set overnight it had a fruit roll-up texture to it until you baked it off and turned into hard thin paper that was easily breakable. The only issue I had with it was what I was spreading it on, parchment paper didn't work the way I wanted them too, but worked better than the none stick sheets.

All in all, I would do some things differently, but I am happy I chose the topic I chose, this has intrigued me since I was in bocce's in high school. There's so much more to food and cooking than what most people see who aren't in the culinary field. They see a tomato, we see handfuls of things you could do to it and make it into. Pushing my limits for this project made me realize I need the confidence in my cooking abilities because you can make anything work as long as you have the drive to achieve the end goal.