

## Gastronomy: An Overview of Molecular Gastronomy Awareness

Farhan Faat<sup>1,2</sup>, NurSyafiqah Selahi<sup>1</sup>, Rafidah Aida Ramli<sup>1</sup>, Zubaidah Ali Tan<sup>1</sup>, Firmanshah Faat<sup>3</sup>

<sup>1</sup> Faculty of Hotel and Tourism Management, Universiti Teknologi MARA, Cawangan Pulau Pinang, 13500 Permatang Pauh, Pulau Pinang, Malaysia

<sup>2</sup> Food Processing: Production Research Group, Universiti Teknologi MARA, Cawangan Pulau Pinang, 13500 Permatang Pauh, Pulau Pinang, Malaysia

<sup>3</sup> Saudia Airlines, Inflight Chef, Al khalidiah District, Jeddah 23421, Kingdom of Saudi Arabia

Email: farhanfaat@uitm.edu.my<sup>1</sup>

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### ABSTRACT

*The world of gastronomy is no longer peculiar anymore for young culinarians and kitchen instructors. A current trend of modern cuisine incorporated with molecular gastronomy knowledge has widely been used all over the world. It is a study comprises of science and food for a better understanding. Varieties of food additives and equipment have been developed and used, as a result, most of the dish has been improvised and developed with surprise elements. In molecular gastronomy, science is a crucial subject needed to know and understand, others like art and creativity give additional value to the end product. Since Malaysia is a developing country and the understanding of molecular gastronomy knowledge is still in the introduction phase. Therefore this study will be conducted as a qualitative approach due to the lack of information and data in Malaysia.*

**Keywords:** *Molecular Gastronomy, Molecular Cuisine, Awareness*

### 1.0 Introduction

The world of gastronomy is no longer peculiar anymore for young culinarians and kitchen instructors. As Santich (2007) mentioned, gastronomy is a study of any disciplinaries and food as the central axis. Faat and Zainal (2013) stated that there is a trend of modern cuisine incorporated with molecular gastronomy knowledge and widely used all over the world. Molecular gastronomy is defined as the chemistry and physics behind the preparation of any dish (This, 2013; Faat & Zainal, 2013). It is worth noting that, a culinary that utilizes the science of physics and chemistry is called molecular gastronomy (Budiono, 2022). Meanwhile, Caporaso (2021) defined molecular gastronomy as the process to explore the phenomena or changes that occur when dishing preparation and consumption. Due to the usage of various food additives and new equipment, molecular gastronomy developed a dish with surprising elements. For example, the application of spherification, gelification, and foam techniques in producing food. In molecular gastronomy, science is a crucial subject that needs to know and understand while art and creativity give additional value to the end product. Various types of arts are well known as painting, music, literature, poems, and dance, but the least people know that good food is also an art. Food as well needs a perfect combination in terms of taste, texture, flavor, and food pairing to create food art. The combination of perfect colours is needed to attract the interest of someone. In another word, it needs creativity in producing good dishes and beautiful plating.

As mentioned by Pedersen and Hein (2012), the human brain has an unlimited function but most of it is unexplored, including creativity and creative thinking. Creativity is usually linked with something called arts. Hence, the objective of this study is to investigate the understanding and awareness of molecular gastronomy knowledge among kitchen instructors in higher institutions. As mentioned by Faat and Zainal (2016) molecular gastronomy in Malaysia is still in the introduction phase and has the potential to bring the status of Malaysia cuisine to be at par with, modern western cuisine, especially, Malay cuisine. Yet, it required the culinary practitioner to learn and apply the knowledge in their cooking.

## 2.0 Literature Review

### 2.1 Molecular Gastronomy

McGee (2004) quotes one of the words said by Nicholas Kurti which was “It is a sad reflection on our civilization that while we can and do measure the temperature in the atmosphere of Venus, we do not know what goes on inside our soufflés”. This refers to the situation where at that time it shows that even though the technology is already advanced, we did not know what goes into our bodies. That curiosity leads to the coined molecular gastronomy in 1988 by Kurti and This. What is molecular gastronomy? As mentioned by This (2013, as cited in Faat & Zainal, 2013), molecular gastronomy can be defined as the chemistry and physics in the process during the preparation of one dish. It is a new term to describe the connection between two food disciplines which was food science and the art of science (McGee, 2004; Barham et al., 2010) Molecular gastronomy is one of the scientifically approaches to understanding the basic elements and changes that occur during preparing dish (Guinét al., 2013). Furthermore, Burke et al., (2016) defined molecular gastronomy as the process to explore the phenomena or changes that occur when dishing preparation and consumption. Authors also mentioned that molecular gastronomy was to describe the process and the procedure of preparing food since there are many steps that chefs follow when preparing foods and molecular gastronomy is a great way to describe it scientifically. Besides, they also mentioned that molecular gastronomy has grown and gone through an evaluation of highly traditional cooking and food preparation by applying scientific principles such as the usage of ingredients and science to develop foams, gels, and other food textures. On the same note, Burke et al., (2016) stated molecular gastronomy involves the process of producing new dishes by using new tools, ingredients, or changes in method. Thus, molecular gastronomy cuisine has the improvement in their recipes time by time along with the improvement of technology nowadays. Molecular gastronomy cuisine is designed to stimulate the sense of smell, taste, sight, texture, and touch to give a different experience to the guest (Pressreader, 2017). Brenner and Sorensen (2015) observe the cooking process of eggs. Whereby, the chefs cooked the eggs in boiling water but at different temperatures. They observed the sensitive changes in the texture and noted them down. This experiment might be simple, but it helps a well-trained chef nowadays to predict the temperature of the water bath and the time taken to produce perfectly cooked eggs. As mentioned by Barham et al., 2010; Faat and Zainal, 2013) where authors believed that by application of molecular gastronomy can define and explained why another food is delicious and another one is not. Molecular gastronomy is also described as the culinary trend that was created by the collaboration between chefs and scientists as the scientific study of deliciousness (Guinét al., 2013). Notably, the molecular movement was pioneered by Herve This and Kurti in 1988 and talented chefs, like Heston Blumenthal, Ferran Adria, Pierre Gagnaire, and Grant Achatz were the first generation and prominent chefs to collaborate with scientists and applied the elements of molecular gastronomy in their cooking (Faat & Zainal, 2013). As mentioned by (McGee, 2004; Barham et al., 2010) in Faat and Zainal (2013), molecular gastronomy is a collaboration between scientists and chefs in creating and improvising food for a better understanding of food, especially on molecule reaction during the cooking process. Authors also mentioned that molecular gastronomy is science-based cooking to design and stimulate taste and provide the surprise elements in food.

Brenner and Sorensen (2015) also mentioned that modern chefs nowadays used various types of techniques to extract and concentrate the flavors and aroma of molecules which sometimes used the application of methods and equipment from the labs. It is noted that the improvement of taste in the dish is caused by the application of molecular gastronomy. The researcher also believed that molecular gastronomy was replacing and improving the traditional way since it has a different way of cooking, able to cook better and healthier, and not to forget that it able make it more attractive. As mentioned in the same article, Valverde et al., (2011) said that molecular gastronomy and the improvement in taste and flavors are the new scientific discovery and creativity. Furthermore, the application of molecular gastronomy knowledge in creating new elements in gastronomy and culinary is proven. Navarro et al. (2012) mentioned in their article that the evaluation of gastronomy has led to the creation of new ingredients and new technologies that can affect the nutrient and contribute to the dish's overall diet. They also said that innovation is designing delicious foods with new textures and new flavours which able to give new experiences and sensations to the customers. Moreover, Brenner and Sorensen (2015) mentioned that the revolution can produce new ingredients and these new ingredients can be used to create new textures in different types of forms such as emulsions, foams, and gels. The authors also asserted that flavours can arise from the combination of several sensory experiences. The phenomenon is referred to as flavour compounds which tended to be small molecules where many flavours are combined which will release new flavours. It also can exist through the application of heat and different procedures. The uniqueness of molecular gastronomy attracts the customer to pay, enjoy and experience the elements of surprise in molecular cuisine.

## **2.2 Application of Molecular Gastronomy in the Kitchen**

At the beginning of molecular gastronomy, This (2013) told that he and Kurti want to use what has been applied in scientific disciplines such as chemistry, physics, and biology to modernize culinary practices. However, in 1969 Kurti only mentioned the usage of physical techniques while in early 1980, they started to utilize chemical substances. He also stated that new tools, ingredients, and methods are the definitions of molecular gastronomy. Furthermore, they also believed that laboratory equipment can be used and applied in the kitchen too. For instance, the usage of siphoned in making foams, circulator machine for lower temperature cooking, and liquid nitrogen in making ice cream.

Some of the ingredients are not new and are already used in daily chemistry laboratories but the idea is to modernize the cuisine. Mojca (2015) stated in his article that molecular gastronomy is a combination of art and science. The author also said that before the invention of molecular gastronomy, there is no scientific study that observes the chemical changes in food. In addition, the author also stressed the miniature apple that tastes like meat, cocktail in ice spheres, fake caviar, and transparent ravioli in molecular gastronomy cuisine. Spherification or reverse spherification only occurred with a contact of calcium and sodium alginates, which the process of gelation creates a very thin gel membrane formed around the liquid mixture (Faath & Zainal, 2013). The usage of agar in the gelatinization process by notably molecular movement Chef Ferran Andria in western modern molecular cuisine has changed the value and perception of the westerners, as agar (85 Celcius) melting point is high as compared to gelatine (35 Celcius) and then by using siphon espuma (equipment designed to make whipped cream by using carbon dioxide 'CO<sub>2</sub>' and nitro oxide 'NO<sub>2</sub>') to produce mousses and foam with unusual ingredients like vegetables, fruits, fish and meat (Faath and Zainal, 2013). Meanwhile, liquid nitrogen with a temperature of the liquid is -196 Celsius and has been utilized for various industrial purposes. This technique can reduce the crystallization of the product, due to the fast process of freezing (Ivanovic et al., 2011; Faath & Zainal, 2013).

### **3.0 Research Methodology**

Before conducting this study, a good plan and research design are required to have comprehensive research. This research will be conducted in a qualitative approach as this type of research enables receive words or information to be used in the explanation of direct experiences or events (Ponterotto, 2005) and can be conducted with a small group of people that relates to attitudes, and behaviour (Gillham, 2005). In addition, it helps the researcher to enhance the understanding of the issues, and to answer the research questions. Research instruments will be adapted and altered accordingly from previous literature with regards to awareness of molecular gastronomy knowledge in higher institutions. For data collection, a semi-structured interview will be conducted, and collected in-depth information, as for this study, a total of twelve (12) kitchen instructors will be interviewed. The interview will be conducted at Universiti Teknologi MARA Cawangan Pulau Pinang and the focused group is kitchen instructors. This focused group will be given an open-ended question about the awareness and understanding of molecular gastronomy knowledge. During the interview session, it will be recorded by using a voice recorder to aid the researcher to have an accurate answer. The recording tool is required to help the researcher during the interview session, especially to analyse what the informants respond to (H. Rubin; I. Rubin, 2011). Next, the rich data will be interpreted and coded to find suitable themes by using the thematic analysis method. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data and minimally organizes and describes the data set in detail. Thus, the data will be compiled and presented in the form of a descriptive approach to correspond with all research questions and objectives (Sangpikul, 2013). The findings will develop awareness of molecular gastronomy knowledge in education and the culinary realm.

### **4.0 Significance of Study**

Restaurants that applied molecular gastronomy knowledge have been nominated and won in The World's 50 Best Restaurants. For instance, Noma (Denmark), Elbulli (Spain), El Celler de Can Roca (Spain), OsteriaFrancescana (Italy), Fat Duck (United Kingdom), Alinea (USA), and Eleven Madison Park (USA) (Faat & Zainal, 2013). As mentioned by Faat and Zainal (2016) molecular gastronomy in Malaysia is still in introducing phase and the culinary realm in Malaysia is developing. Perhaps the current phenomenon and knowledge of molecular gastronomy could give benefits and able to be used in Malaysian restaurants. Due to the lack of information on molecular gastronomy in Malaysia, this study can contribute to a body of knowledge theoretically. Thus, give a glimpse or idea for the chef, restaurateur, or restaurant management as well the education institution to learn molecular gastronomy knowledge and try to apply and incorporate it into their dish or menu. Therefore, it requires further investigation of the highlighting issue.

### **5.0 Conclusion**

Molecular gastronomy is no longer peculiar in the culinary realm and this knowledge incorporated into culinary created a current trend of modern cuisines known as molecular cuisine. It is well noted that molecular gastronomy is knowledgeable to create spectacular dishes and tremendous effects due to the understanding of various techniques and the usage of substances. It shows the importance of molecular gastronomy and the requirement to learn at an early stage. Having said that, young culinarians and kitchen instructors are considered essential elements for the future to understand and learn how to venture food with molecular gastronomy knowledge. By doing this able to create splendid dishes and bring National Malaysia Cuisine to another level and be at par with Modern Western Cuisines. Perhaps, this study finding will help to better understand and escalate the awareness among kitchen instructors in higher-level institutions towards molecular gastronomy knowledge.

## 6.0 Author Contribution

The authors affirmed that there is no conflict of interest in this article. 1st and 2nd authors, Faat., F and Selahi, N., S., carried out the conceptualization and literature review. Meanwhile, 3rd author Ramli, R., A., prepared the methodology and overlook the write-up of the whole article. Then, 4th author Tan, Z., A., writing-review, and editing. Last but not least, 5th author, Faat, F carried out the fieldwork and technically shared the knowledge of applications due to their expertise and experience.

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