

# Ice Green Banana with Coating Iota, Kappa and Its Characteristics (Experimental Study of Molecular Gastronomy)

Robiatul Adawiyah.<sup>1</sup> Vienna Artina.S<sup>2</sup> and Wijayanti Dewi.P<sup>3</sup>

<sup>1,2,3</sup> Sekolah Tinggi Pariwisata Trisakti

robiatul.adawiyah@stptrisakti.ac.id, vienna.artina@stptrisakti.ac.id, wijayanti@stptrisakti.ac.id

**Abstracts:** Molecular gastronomy is a scientific study on gastronomy that studies physiochemical transformations of food ingredients during the cooking process and sensory phenomena when they are consumed. this knowledge is characterized by the use of scientific methods to understand and control the molecular, physiochemical, and structural changes that occur in food at the stage of manufacture and consumption. Molecular gastronomy is not the same as the type or style of cooking. The type of research conducted is experimental research. conducting experiments, experiments are carried out in the form of finding out the comparison of the results of the application of iota and kappa coating techniques from the types of carrageenan and agaratin. In serving food using iota and kappa can be applied using other food ingredients which can be served cold. Chef Andrian Ishak will make a menu at Namaaz Dining using ice banana green and combine several gastronomy molecular techniques so that the ice banana ijo can be known by various groups and become an equally unique dessert with an existing menu.

**Key words:** Ice Green Banana; Molecular Gastronomy; IOTA and KAPPA

## 1. Introduction

Two hundred years ago, the word gastronomy first appeared in modern times precisely in France in the poem written by Jacques Berchoux (1804). Although the word's popularity has been increasing ever since, gastronomy is still difficult to define. The gastronomic word comes from the ancient Greek *gastros* which means "stomach" or "stomach" and *nomos* which means "law" or "rule".

In addition, gastronomy also includes detailed knowledge of national food and beverages from various major countries around the world. The role of gastronomy is as a basis for understanding how food and drink in certain situations through gastronomy is possible to build a picture of differences or similarities in approaches or behaviors towards food and beverages used in various countries and cultures. Namaaz Dining is a restaurant that applies gastronomy molecular into the culinary archipelago. Maybe the word "Molecular Gastronomy" sounds strange to us, because its age is still fairly young. There are still many things that can be explored and further developed in this field. This certainly can be an opportunity for those who are interested in pursuing and developing it. In fact, this field was first created in mid 1992. Molecular Gastronomy was first triggered at a culinary event entitled "Science and Gastronomy" in Errice, Italy. Physicist Nicholas Curti and chemist Herve This at that time along with professional chefs discussed how to serve food in a completely different view.

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and consumption. Molecular gastronomy is not the same as the type or style of cooking. The art of cooking based on the science of molecular gastronomy is called the art of molecular cooking as a modern gastronomic determinant.

### 1.1 Research purposes

The purpose to be achieved in writing and observing this paper is based on the formulation of the problem as follows:

1. To find out the results of changes in color, taste, aroma, and texture of green bananas developed with Methode of coating Iota and Kappa.
2. To find out the method of serving food using techniques coating iota and kappa.

**Tabel 1.** Previous Research about Ice Green Banana

No.	Research Topic	Method	Result
1	Studies of the Quality of Microbiology of Ijo Banana Ice for Sale in Several Places in Malang City Viewed Based on Plate Numbers Total Bacterial Colonies and Coliform MPN Value. <i>Florentina Renge</i>	This type of research is observational descriptive research. The research was conducted at the Microbiology Laboratory of the Biology Department, Faculty of Mathematics and Natural Sciences, State University of Malang, from January 2011 to March 2011. The samples used were ice banana ijo which was sold by traders in 5 sub-districts in Malang, namely Lowokwaru, Sukun, Klojen, Blimbing and Kedungkandang.	Shows that: 1) Plate Number The total bacterial colonies in banana ice samples sold in several places in Malang City are $6.7 \times 10^7$ cfu / mL samples. 2) MPN coliform values and faecal coliform MPN values in ijo banana ice samples sold in several places in Malang City are $> 2.4 \times 10^3$ cells / mL samples. 3) Plate Number The total bacterial colonies in ijo banana ice samples turned out to exceed the standards set by the Head of POM Agency, RI Number HK.00.06.1.52.4011 in 2009, which is a maximum of $1 \times 10^4$ cfu / mL sample. Judging from these figures, it can be concluded that the microbiological quality of green banana ice sold in several places in Malang City does not meet the requirements for consumption eligibility. 4) The MPN coliform value and the coliform faecal MPN value exceeded the standards set by the Indonesian Food and Drug Administration, Number HK.00.06.1.52.4011 in 2009. Judging from the MPN coliform value and the coliform faecal MPN value, it can be concluded that the quality of ice microbiology Green bananas sold in several places in Malang City do not meet the requirements for consumption eligibility
2	Optimization of Activities Bacteriosin by <i>Lactobacillus brevis</i> Froms Banana Green. Nia Purnama Ningsih <sup>1</sup> , Rafika Sari <sup>2</sup> , Pratiwi	Antibacterial activity test against indicator bacteria using agar diffusion method.	The results showed that <i>Lactobacillus brevis</i> has the potential to be used as a biopreservative agent in food which can inhibit Gram positive ( <i>Staphylococcus aureus</i> ) with the highest activity at pH 6 and a temperature of 40 ° C with inhibitory zones of 12.10 mm and 12.40 mm and Gram negative ( <i>Escherichia</i>

No.	Research Topic	Method	Result
	Apridamayanti <sup>3</sup>		coli) with the highest activity at pH 6 and temperature 40 ° C with inhibitory zones in a row which is 9.30 mm and 8.5 mm. Confirmation using inhibitory zone enzymes when added to the catalase enzyme of 7 mm and in Escherichia coli bacteria and 10 mm in Staphylococcus aureus bacteria. Brevicin is activated by the trypsin enzyme so that it does not form a inhibitory zone in the colony.

## 2. Literature Review

### 2.1 Traditional Indonesian Food

Traditional food is food and drink that is usually consumed by certain people, with a distinctive taste that is accepted by the community. Traditional foods are food and beverages, including snacks and mixed or ingredients that are used traditionally and have long been developing specifically in Indonesian regions or communities (Nuraida and Dewanti, 2001). Traditional food is one of the most important things in human life. This type of food also has a symbolic meaning, in the sense that it means social, religious, and others. Ice banana green is one of the typical foods of South Sulawesi, especially Makassar. This food is made from the main ingredients of bananas wrapped in green flour mixture. Which is cooked in a way steaming on the cage. The dough is made from flour, water, coconut milk and green coloring made from solid leaves and or suji leaves.

### 2.2 Molecular Gastronomy

According to Jozef Youssef (2013), molecular gastronomy (molecular gastronomy) is a field of study that investigates / studies chemical and physical reactions and transformations that occur from food ingredients during the cooking process and sensory phenomena when they are consumed. Molecular cooking is a modern cooking technique that emphasizes several important elements in a food, between texture, taste, sensation and eating experience, and also some important elements in the five human senses, such as vision, smell, mind. In essence, molecular gastronomy aims to provide a new experience and sensation, when a familiar dish is reconstructed so that it becomes a shocking emotional and sensory experience with manipulation form. Molecular gastronomy can be interpreted as "art and science" in choose, prepare, serve, and eat food. According to Paul Hamlyn in his book entitled Larousse Gastronomique (1988) the definition of gastronomy is:

"The art of good eating which monselet defines as" the joy off all situation and of all age ". The result was from the Greek gastros (Stomach) and Nomos (Law), which came to general use in France in 180, the year that La Gastronomie and I des champs a table by J. Berchoux was published. Two years later, Le Gastronomes a Paris by CrozeMagnanAppere ". Molecular Gastronomy is a scientific study of gastronomy or more fully is a branch of science that studies the physicochemical transformation of food ingredients during the cooking process and sensory phenomena when they are consumed. This science is characterized by using scientific methods to understand and control the molecular, physical, and structural changes that occur in food at the stage of manufacture and consumption. The word "molecular" in molecular gastronomy refers to molecular biology that reviews materials ingredients to the molecular stage. Then the scientific method used includes in-depth observation, making and testing, experiment control, science objectivity, and reproducibility of experiments. It should be noted that molecular gastronomy is not the same as type or style of cooking (Paul Hamlyn, 1988).

Another term used to refer to molecular gastronomy is avant-garde cuisine where the avant-garde comes from the word advance guard which literally means the front row of a soldier heading to the battlefield. The term is used to describe disciplines that have crossed the boundaries that are considered normal, for example because of the discovery of new techniques or other uses of existing techniques (Paul Hamlyn, 1988).

Molecular gastronomy is the science of investigating physical and chemical transformations in cooking techniques, which focus on several important elements in food such as texture, taste, sensation, and eating experience. Molecular gastronomy tends to be considered complicated, and very

lack of information explains what Molecular Gastronomy is and it is quite an obstacle to its development in Indonesia. One example is fake caviar made from a mixture of chemicals such as sodium alginate from seaweed and calcium chloride as a membrane coating.

For chefs, knowledge of molecular gastronomy can enable them to explore the world of culinary scientifically further which can be applied one of them as molecular cooking art. As a result, technology or interesting new dishes can be created. While for consumers it is expected to get a surprise and satisfaction with delicious and interesting food. The person mentioned as the father of Molecular Gastronomy is Herve This, a French physicist. It is said that his interest in molecular gastronomy originated from his failure to make soufflé cakes, realizing that cooking is actually the same as science. There must be a systematic preparation and method with the right calculation so as not to damage the ingredients and nutrients in the food, but also maintain the taste. Molecular gastronomy was first triggered at a culinary event entitled "Science and Gastronomy" in Erice, Italy. Physicist Nicholas Curti and chemist Herve This at that time along with professional chefs discussed how to serve food in a completely different view.

In this case, Curti and This combines general principles in the realm of physics and chemistry such as the extraction of boiling points, the texture of food, and the properties of certain chemicals. Through this workshop, Curti and This separately spread its extreme culinary knowledge to all corners of the world. Molecular gastronomy also expanded as many new recipes were discovered, until finally this development reached Indonesia by involving traditional cuisine when Namaaz Dinning opened in 2012.

Basic Techniques for Molecular Gastronomy

According to Jeremia Kevin (2006), there are 4 types of Molecular Gastronomy Technique namely:

- a. Foams, natural flavors (juices, fruits, herbal aromatic infusions) are mixing processes of natural-flavored by stabilizing the taste using gelatin or lecithin. Using hand-held blenders for the mixing process to produce the desired foam. The foam adds a significant flavorless substance that integrates new flavors without changing physical composition.
- b. Spherification, a modern cooking technique, makes foods that are bubble-shaped and filled with liquid or spherification. The concept is a simple reaction between Calcium and Alginate.
- c. Gelification or jelly, the process of making food into bentul gel, made from gelatin, carrageenan, gelatin or gellan gum.
- d. Emulsification, the emulsifying process usually used is soy lecithin. This can make the liquid turn into super soft granules. Based on the explanation above, the writer will make ice banana ijo using one of the gelification techniques in serving ice banana ijo:

### 2.3 Definition of Carrageenan

Carrageenan is a compound extracted from hydrocolloid seaweed. Carrageenan is used in food as a gel-making thickener and emulsification. Dissolved in water or alkaline then deposited using alcohol. Carrageenan can be used in foods up to a concentration of 1500mg / kg (Adria, 2006).

a. IOTA

One of the fewest types of seaweed in nature that is the most stable carrageenan in an acidic solution is accompanied by forming a strong gel in a solution containing calcium salts.

b. KAPPA

Is the type of seaweed that is most widely found in nature. This type of carbohydrate will be cut off by acidic solutions, but after the gel is formed, this carrageenan will be resistant to degradation. The carrageenan Kappa forms a strong gel in the solution that forms potassium salts.

### 2.4 Coating Technique Using Iota and Kappa in Presentation of Ice

Banana Green Iota and kappa coating is a combination of agar agar and gelatin which together play a role in being able to cover objects with frozen conditions and this iota and kappa coating has a hot nature and when it encounters frozen objects, iota and kappa can work to quickly coat objects frozen and can follow the shape of the object, this iota and kappa coating technique can also be called a gel coating or solid spherification because it can release objects with gelatin produced by iota and

kappa can be a quick coating made of gellatin used in Namaaz dinning as a substitute for spherification which is usually made from calcium lactate and alginate which is commonly used to make artificial membranes and can coat objects in it using gel.

### 3. Material & Methodology

The research method according to Sugiono (2004) is a scientific way to obtain data with specific purposes and uses. The research method used in this study is an experimental method. The experimental method is the effort of the researcher intentionally manipulating a variable (with the intention of raising or not giving rise to a variable) then examining the effect or effect (Purwanto and Sulistyastuti, 2017). The number of trained panelists used in this study were 5 people who worked as Executive Chefs, and Chefs to find out the difference in taste, aroma, texture and color of the experiments carried out.

**Table 2.** List of Panelist

No.	Panelist	Establishment	Gender	Age
1	Andrian Ishak	Namaaz Dining	Male	38 years
2	Jufriadin	Namaaz Dining	Male	42 years
3	Budi Supriyadi	Hotel Ciputra	Male	28 years
4	Eko Adi Setiawan	Hotel Ciputra	Male	27 years
5	Nopika	Hotel Ciputra	Female	27 years

(Source : cookpad, 2018)

Innovation is a renewal process by creating things that are different from before. By conducting experiments, experiments are carried out in the form of finding out the comparison of the results of the application of iota and kappa coating techniques from the types of carrageenan and agaratin. The type of research conducted is experimental research.

1. Not knowing the shape, taste, texture, color and aroma of the making of green ice banana developed by coating techniques using Iota and Kappa in its implementation using the research method conducted by the author is a method of data analysis in this study in the form of experiments. The author conducted an experiment by making iota and kappa coating techniques, iota and kappa coatings will be used in the presentation of ijo banana ice, the authors will observe the differences in ijo banana ice with the presentation using iota and kappa and ijo banana ice coating techniques in general in terms of shape, taste, texture, color and aroma.
2. Not knowing the method of serving ice banana ijo using iota and kappa coating techniques To find out about the results of the food presentation using the iota kappa coating technique, the authors conducted observations and interviews with Chef AndrianIshak in Namaaz Private Dinning to get an assessment and the opinion of Chef AndrianIshak as molecular gastronomy chef in Indonesia.

**Tabel 3.** Recipe of Ice Green Banana

No.	Ingredients	Quantity
1	Multipurpose Flour	50 gr
2	Rice Flour	50 gr
3	Extract Coconur Milk	100 ml
4	White Sugar	1 table spoon
5	Salt	¼ tea spoon
6	Pandan Paste	As needed
7	Banana	2 pcs
8	Water	150 ml
9	IOTA	1,8 % of water used
10	KAPPA	1,4 % pf water used

(Source: study experiment, 2019)

**Table 4.** Process of Making Ice Green Banana

No	Picture	Process
1		Prepare all ingredients and measure it
2		Put all ingredients and mix well
3		Wait until the temperature low and put into the piping bag
4		Steam banana with steamer
5		Crush it and put into piping bag
6		Continue with making vla for serving ice green banana with slow cooking methode
7		Put vla into the piping bag
8		Prepare <i> mold</i> and then fill up $\frac{1}{4}$ with outside of skin of ice green banana, start with green color first.
9		Then fill up <i> mold</i> $\frac{1}{4}$ part of vla with pink color amd put the rest until done. Next, Put in the freezer
10		Wait until freeze and make whole round nicely.

(Source: study experiment, 2019)

**Tabel 5. IOTA and KAPPA**

No	Name of Ingredients	Picture	Quantity
			Doze
1	<i>Iota</i>		1,8% from water content
2	<i>Kappa</i>		1,4% water cintent

#### 4. Result and Discussion

After the process of making ice banana ijo coating using iota and kappat has succeeded, it has been known the shape, taste, texture, color and aroma of the green banana ice. The following are differences in the shape, taste, texture, color and aroma of the development of Ijo ice banana techniques using iota and kappa techniques From the table above, it can be seen that Ijo ice banana uses iota and kappa coating techniques that have a very good shape by 5 trained / expert panelists and it can be seen from the color of ijo banana ice using iota and kappa which have less bright colors because they have to use double steam on the skin mixture green banana ice before frozen.

Not knowing the method of serving food using iota and kappa coating techniques To find out about the results of serving food using the iota kappa coating technique, the authors conducted observations and interviews with chef andrianishak in Namaaz Private Dinning to get an assessment and the opinion of Chef Andrian Ishak as molecular chef gastronomy in Indonesia.

Research on the presentation of green banana ice using iota and kappa received a good response from Chef Andrian because with this method of coating iota kappa, Chef Andrian called it a solid spherification because it is similar to general spherification. In serving food using iota and kappa can be applied using other food ingredients which can be served cold. Chef AndrianIshak will make a menu at Namaaz Dining using ice banana ijo and combine several gastronomy molecular techniques so that the ice banana ijo can be known by various groups and become an equally unique dessert with an existing menu.

#### 5. Conclusion

##### 5.1 Conclusion

Conclusions about results of changes in color, taste, aroma, and texture of green banana ice were developed with iota and kappa coating techniques. Conclusion about color, taste, aroma and texture The overall conclusion from direct observation of the results of changes in color, taste, aroma and texture of ice banana ijo with coatingiota and kappa techniques are:

1. The process of making ice banana ijo through printing and frozen so that it can be served using a coating technique with iota and kappa requires a longer time compared to ice banana ijo in general. The aroma of ice banana ijo with the presentation using iota and kappa was preferred over the original ice green banana, this was revealed by 5 expert panelist. Shape / Texture of ice green banana with presentation using iota and kappa preferred expert panelists. Ice green banana flavor by serving using iota and kappa was more delicious compared to ice green banana in general.
2. Ice green banana with iota and kappa has a finer texture than ice green banana in general, while ice green banana generally gives a chewy taste. Colors produced from serving ice green banana with iota and kappa more interesting. The method of making ice green banana in general is almost the same only at the presentation stage using coating techniques using iota and kappa.

3. Iota and kappa coating methods can be applied for Indonesian food to make it more attractive. The taste of serving ice green banana with iota and kappa is quite tasty. The texture of serving Ice green banana uses iota and kappa judged soft. Overall, from the respondent's assessment results, the presentation of ice green banana using iota and kappa can be well received by expert panelists.

## 5.2 Suggestion

In this study it is recommended to:

1. Innovate using molecular gastronomy techniques and formulas that do not yet exist in terms of serving ice banana ijo or any food that can be served more interesting especially Indonesian food.
2. Iota and Kappa can be agaratin for fast coatings with the condition of freezing or cold base material meeting with hot iota and kappa coatings and made of agar alloy and gelatin.
3. For further research it can be investigated the hedonic test / preference test and the nutritional content contained in green banana ice products with Iota and Kappa techniques.

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