

Review Article

A REVIEW OF FOOD DECORATION TECHNIQUES

ABSTRACT

The visual sensation of a dish is as important as its flavour. Although it may seem trivial, decorating the food in an appetizing manner is an art and requires lots of proficiencies. Research on the topic of food decoration on eating behaviour has grown rapidly over the last decade or so. In particular, the relative contributions of the various sensory cues (i.e., olfactory, gustatory, somatosensory, auditory, visual, and trigeminal) to multisensory flavour perception have been examined for a wide variety of different food and beverage items. Here, the latest evidence of demonstrating the importance of contextual variables of food decoration on the eater's behavioural and hedonic response to a variety of food and drink items are reviewed. A number of recent studies have also highlighted the importance of colour, shape and texture of the food and plateware, and balance of the elements on a plate, atmospheric/ environmental cues in determining what, how much, and how quickly, people eat and drink, and even how much they report liking the experience; the role of the tableware on eating, drinking, and flavour perception and how a size-contrast illusion leads unknowingly consumers to serve and eat more food while using larger dinner plates and serving spoons. These results of the studies are consistent with the claim that people "eat first with their eyes", and that a diner's experience of the very same ingredients can be significantly enhanced (or diminished) simply by changing the visual layout of the food elements of the dish. The aim of this study is to explore the impact of food decoration on the microstructure of eating behaviour and the subjective motivation to eat. It can be concluded that the visual presentation of food influences various food impressions, including satisfaction and eating behaviour of the people.

INTRODUCTION

“The first taste is always with the eyes.”

A dish is the canvas where chefs express their skills and creativity, and plating can be more than a canvas, where innovation in terms of flavour and presentation can be seen as going hand in hand. Aesthetics and

elegance are important to the eye, as it is through the sense of sight that other senses can be stimulated. An attractive and appealing appearance stimulates the desire to taste the food. By the same token, an improper or unattractive display can help to hide the magic and excitement that could tempt the guest to try food that may be excellently flavoured. Eating is an opportunity to satisfy all our senses, beginning with sight. Food should be presented in an artistic manner playing with colours and forms, and the plate has to be arranged as a work of art similar to a sculpture or a painting.

BRIEF HISTORY OF FOOD DECORATION

In 1700s, the wealthy classes in both Asia and Western Europe laud chefs who prepare and serve beautiful dishes. In the court of Louis XIV, multi tiered tables are arranged with extravagant structures made of carefully decorated and luxurious food. The first real shift in standard food presentation in the twentieth century happens in 1960s. Vegetables and starches are served on the same plate as the main course as it becomes trend occurred after labour costs at the 1956 Olympics required that meal service be tweaked to remain on budget. In 1975–1985, the creativity of the chef became a recognizable and important part of the dining experience. Decorative garnishing becomes extremely trendy and dishes are dressed with “roses” made from wound tomato skins and other such embellishment. Paper doilies are used excessively, both under and in between plates. In 1990s, food takes on new heights, with a tall single stack comprised of meat, starch, and vegetable piled in the centre of the plate becoming etiquette. Chef Emeril Lagasse, one of the TV’s first celebrity chefs, introduces and popularizes the idea of sprinkling herbs, dry seasonings, powdered sugar, or cocoa powder on the rim of every plate.

In 2000s, the sprinkling of food and plate rims transitions to the heavy use of squirt bottles and the “drizzling” of sauces both on the plate and over the food , plates sodden with zigzags of sauce. With the progressive individualization and experimentation currently introduced by chefs and designers to the presentation of food comes the possibility of understanding the principles of harmony, balance and attraction.

The increasing variety and originality introduced to multisensory food presentations and plate ware marks not only a new step in the history of the progressive aestheticization of our food experiences, but also a growing importance of visual elements in eating experiences and a blurring of the boundaries between the edible and the non-edible. that make some of these attempts more successful than others.



FOOD PRESENTATION OF ANCIENT PERIOD

FOOD DECORATION TECHNIQUES

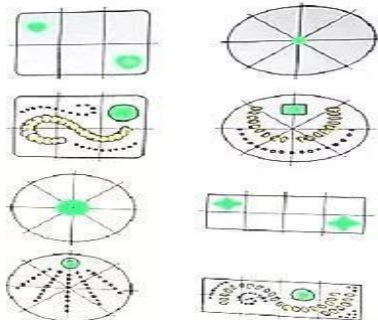
Food decoration depends on the prepared dish. A dish can be divided into four parts –

1. Main dish – The main dish is usually the heaviest, heartiest, and most substantial dish in a meal. The main ingredient is usually meat, fish or another protein source.
2. Side dish-A side dish is a food item that accompanies the main course at a meal such as rice, roti, salad, potatoes and bread.
3. Sauces –Sauces are liquid or semi-liquid foods devised to make other foods look, smell, and taste better, and hence be more easily digested and more beneficial. It can be gravy, puree, and dip.
4. Garnish - A garnish is an item or substance used as a decoration or embellishment accompanying a prepared food dish. It can be herbs, or other food like chopped raw onion, tomato and fresh coriander, reserve some watercress for garnish candies, edible flower and etc.

Here are some decoration techniques for aesthetic and pretty serving:-

- ***Planning the basic decoration***

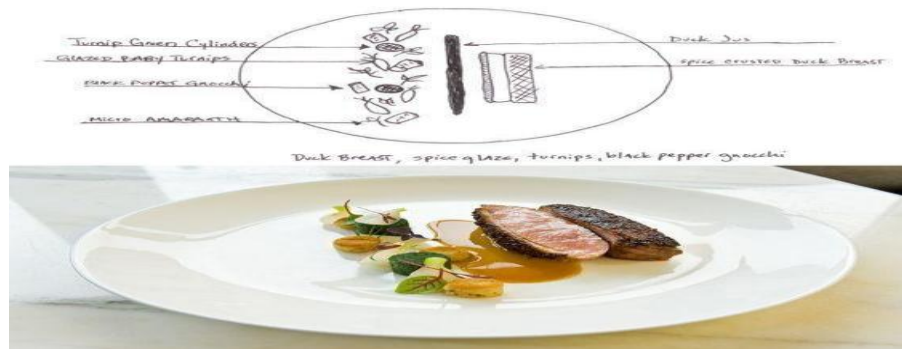
First , the flavours and textures, the quantities, and the ratio of solids like rasogollas , jalebis , cake and crumble to liquids like sauces, jellies and jams that is decided to use has to be planned along with visualise the flavours to complement or contrast. A good arrangement makes the eyes move across the platter. Attractive dishes usually consist of portions arranged in rows or lines, and they can be curved or angled.



Planning for visual variation

The most chefs sketch out their food presentations either on paper and pencil or using paper cut outs before presenting. They visualise the final dish just like a fine artist.

The plate is their blank canvas. The best way to start is to mentally divide the platter into equal parts. This will help to avoid lopsided arrangements by using equally spaced markers as guides. It is then not difficult to sketch a symmetrical, balanced layout. It's necessary to plan the elements in terms of substance, textures, flavours and colours on paper rather than just going with the flow and ending up with a chaotic and unappetising plate.



UNDER PEER REVIEW



Balance The best way to compose a pretty plate is by starting to fill it from the centre of the plate. The textures and colours has to be balanced, limited colours should be used; two or three to enhance their appeal and have to be careful of how placing them on the plate by touches of colour using mithais, cakes, chocolate sauces, herbs, jellies, crumbled cakes, candied fruit, spices and more.

For instance, one can compose a plate with orange Jalebi, white Rabdi and Pista Barfi. But one have to be careful to add just the right amount of ingredients as the flavours need to complement each other like a few drops of orange sauce to uplift a chocolate tart, a spoon of tart citrus jelly to contrast with a Rabri , Malpua or a drizzle of Cointreau sauce to complement a Gulab Jamun. But never overdo the plates. It is better to keep it simple than to create a dish that is just as difficult to eat. Remember when it comes to the audience, not only in India but everywhere, less is always more!

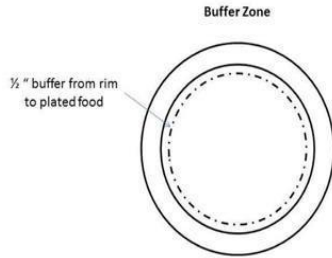
Highlight The Key Ingredient Usually to enhance visual elegance in decoration ,add that touch of oomph with one eye catching star ingredient - a sprinkle of edible dust, some flakes of warq, edible flowers or candied jewel fruit and instantly showcasing to diner that this is something special .

Supporting Elements Vegetables and herbs often constitute the supporting elements of a dish. The plate should not be overcrowded with too many elements. They contribute to the overall appearance by providing variety in taste, colour, shapes, and textures. Other elements should complement the main ingredient , rather than hide it.

Proportioning Proportioning food is crucial. Correct proportioning of a dish is essential not only to its attractiveness but also plays an integral role in controlling the costs as portion control can reduce food costs and improve restaurant business here.

It should be clear that the main food items (meat, fish, etc) on the platter should look like main items. The garnish and decorations should not be so large or tall that they dominate the platter and overwhelm the main items in size, height, or quantity. The size of platter should be proportional to the amount of food. Small platters should be avoided that appear crowded, or large ones that look almost empty. Leave enough space between food items should be maintained, so the platter doesn't look jumbled.

Attention on Focal point



Focal point should be determined before beginning the plating. The focal point should be the highlight of the plate and where the eye is drawn to first. Bright or contrasting colours, elevation, and food placement helps to highlight items. Usually our eyes scan a food plate much like a picture, from the lower left to the upper right.

- The quantity of food on the plate, which as a general rule means no more than 2/3 of the plate should be filled with food, while the other 1/3 of the plate is negative or empty space.
- Avoiding the rim while creating a buffer zone of 1/2 inch/13 mm of space from the rim to the flat of the plate.
- Food plating should start from centre of the plate and build outward.



Complimentary Colours Consideration of colour is important, for example, if the food is basically white or brown, it should be brightened by adding contrasting colour. Colour adds energy and contrast to dish. Bright vegetables and fruits, such as beets, carrots, and cauliflower make a striking difference on a plate.

Create Layers & Height On The Plate Foods should be placed on the plate so it build height. Height enhances visual appeal and creates the illusion of more food. Taller ingredients can also be balanced out by leaning flat, long items up against them but it should not be so high that it falls or tilts over in transit









Skeleton” Of Plate Design Simple geometric shapes are the “skeleton” of plate design, the base upon which decoration is done. This simple geometric shapes: lines, arcs, circles and etc.

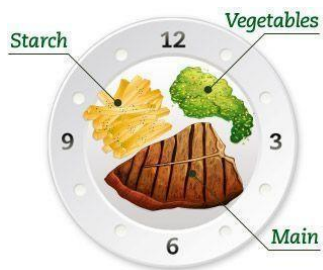
- o Strong, clean lines that are vertical, horizontal, or angled, provide neat and logical dimension to the plate. Lines can be created by the placement of proteins, vegetables, or sauces. Patterns emerge by repeating these lines, and variety is introduced through intersecting or overlapping lines. The monotony of repetitive lines is interrupted by the addition of other food shapes and carefully placed garnishes.
- o Arcs, and swirls soften hard angular lines of the plate giving them fluidity and movement in appearance. Sauces and purees are commonly used to create curves.

- o The organized randomness of free-form plating presents an arbitrary yet natural appearance, however it still requires thought and planning using similar visual rules of composition.

Table 1. SOME GEOMETRIC SHAPE PLATING

Single Line		
Two Lines		
Horizontal Lines		
Vertical Lines		
Two Lines – Crossing (like an X)		
Cantered Circle		

Circle and Line		
Arcs		
Arc & Line		
Swirl		



Timing (CLOCK METHOD PLATING)

Food plating is all about timing. One could not take too much time to decorate, modify or plate a dish that it turns cold when it was supposed to be served hot or vice versa. It is recommended to remember to include the plating time in the preparation of the dish. Chef should follow the traditional clock pattern plating technique:- dividing the plate as zones of a clock from the customer's point of view and then presenting -

- Main: Between 3 to 9 o'clock
- Starch: Between 9 to 11 o'clock
- Vegetables: Between 11 to 3 o'clock



Design and Creativity with Sauces Sauces can be plated beneath the main protein that provide visual interest. One sauce should be used for flavour and presentation. One way to do this is to create accent dots on one side of plate or by lightly drizzling sauce over the main ingredients .

Match with Surrounding Theme The way of plate and presentation should reflect the surrounding nature .For example if it is a small, ethnic restaurant, then guests expect a simple, rustic, hearty food presentation. But at a high-end, pricey and hip restaurant, guests would expect to see some form of delicacy in dish presentation – from the presentation on the plate to the dish it’s served on.

Garnishing The food decoration should be simple and clean. Garnishing should be done with an edible ingredient that is in the dish. Decoration should not be overlooked by chefs as people eat with their eyes, and creative and thoughtful plating enhances both the look and taste of the food.

Styling The next food presentation technique is related to the way putting a dish together or style a dish. The most important rule of this food presentation technique is balancing contrast and variety. Decorating the dish more than it is required too can end up ruining it or making it hideous. Herbs and vegetables bring colour and flavour to the dish also colours and textures of the dishes is enhanced by adding different sauces.

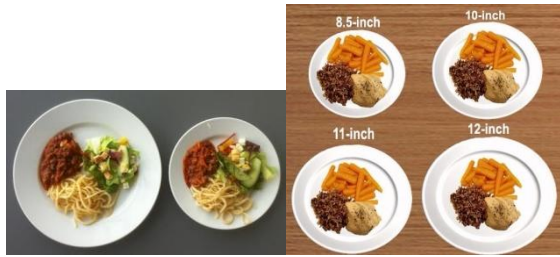
Each technique focuses on five key food presentation factors: colour, arrangement, balance, texture, and how easy it is for guests to eat.

PLATING TOOLS FOR DECORATING

- **PERFECT PLATE SELECTION**

Plates come in a variety of colours, shapes, textures and sizes. They may be simple white, starkly black, or earth tone colours. Other materials may also be incorporated including metal or wood. The style of dinnerware used depends on the type of operation whether casual or formal. Plating choices also are influenced by the style of food, the chefs vision, and the overall image the operation is trying to convey.

Plate Size



The size of the plate is dependent on the style of restaurant; for example a family-style restaurant might use larger plates, while a restaurant that features small plates for sharing would logically use small plates. Fine dining restaurants tend to use oversized plates, for example a 12 inch/30 cm dinner plate or a 7-9 inch/18-23 cm appetizer plate. Oversized plates act as a canvas providing negative space the frames the items , provides focus, and brings out the colours and characteristics of the food. Large plates also prevent crowding and food overflowing on the rim . The size of the plate affects the perception of quantity and portion size because the larger the plate, the smaller the portion appears to the guest. Smaller plates, bowls, or ramekins can be nested to accent or highlight components. A small portion of food cannot be served in a large plate as it will look scant and similarly a good amount of food should not be served in a small plate as it will look crowded and messy. But all is not lost because it is easy to trick the eye (stomach and brain too) into accepting smaller, more acceptable, portions with just using a smaller plate. So the plate should be wisely chosen by making sure it's big enough to allow the food to stand out, but small enough that the portions don't look too small.

A Complementary Plate Colour



The colour of the plate is also significant. The colour of service ware effects the overall presentation as well as our taste perceptions and even our appetite. White plates are a traditional colour flavoured by chefs because it makes the vibrant colours of the food more visually appealing to the guest.



White plates are like a blank canvas that chefs can design without concern for colour clashes from contrasting plate colours. Black plates provide an opposite contrast that can be used effectively with brightly coloured foods. However, earth tones of brown, tan, warm grey, and greens that emulate the natural colours found in dirt, moss, trees and rocks can be used when paired with the right food colours.

Green foods, including salads and vegetables pair well with yellow plates. Beige foods including biriyani, pulao, pasta, chicken and even white rice pair well with black and brown plates. Red foods including tomatoes, beef, and red sauces pair well on white plates, while yellow and orange foods including eggs, corn, and curries pair well with blue colours. Solid colours tend to dominate but some restaurants use patterns as a signature style.

Colours effect not only how the food appears but also how appetizing it looks to us. Foods served on white plates tend to enhance sweet flavours in food, while black plates bring out more savoury flavours, and serving food on a red plate has shown to reduce the amount diners eat. Service ware should be chosen to match the food, its shapes, and colours.

Plate Texture

Careful consideration of the customers and the venue when choosing the style of service ware is important . Before the modern plates were invented, people ate off of large leaves, gourd halves or seashells. Then clay was discovered and early pottery dinnerware was used. Early trenchers made out of slabs of hard bread, wood, earthenware, or metal were used until the 16th century. Out of all these, it was the bread trenchers that were the most popular.

Plates of pewter were used in the Middle Ages but only by those who could afford them. The poor ate off of wooden trenchers instead. Pewter, however, led to lead leakages when it came into contact with highly acidic foods such as tomato. On the other hand, hygienic practices weren't a norm then so people passed off bacteria and worms from the wooden trenchers that resulted in mouth sores.



- **Ceramic** These types of plates are incredibly useful and can be used for many years without any problem. Of course, ceramics are a very versatile type of plate as well. Ceramic plates can range from common plates that you would use all of the time all the way to extremely decorate plates that you would only dare to bring out for special occasions.



- **Glass Plates** Many people have sets of glass plates to use on a regular basis. They're so popular because they fall somewhere in between special plates and casual ones. Also one can choose to seek out clear glass plates or look for something that is coloured.

Glass has lots of advantages. For example it's inert, so it won't react with the food . It doesn't affect the flavour of the contents, and unless it's cracked, it doesn't let food or fluids out. Glass is also easy to recycle.

It does have its downside, however, which may make it inappropriate for use.

Fragility: Usually glass is strong –but a strong impact can fracture the plate.

Weight: Glass is heavy compared to the other plate. So it is also difficult to hold it for longer duration, usually at a buffet.



- **Stoneware Plates** Stoneware is a type of non-porous ceramic dinnerware made from stoneware clay. Stoneware is more opaque than porcelain or china because of its thicker construction and material makeup.
- **Earthenware Plates** For everyday dining and casual entertaining, earthenware are practical and decorative choices. Attractive and affordable, earthenware is a common ceramic material used in pottery that has been fired to make it hard.
The major difference between earthenware and stoneware is that earthenware is one of many terms for a clay that matures at lower temperatures where stoneware (both mid range and high fire) is a clay that matures at higher temperatures.
- **Bamboo Plates** They create a very natural vibe and if one is into being environmentally friendly, then using plates such as these is quite sensible. Bamboo plates are highly durable, making them ideal for serving the heaviest of meals without risking bends, cracks or snaps. Their sleek, unique design adds a touch of style and personality to all culinary creations.
- **Paper Plates** Paper plates are the most frequently used option for people seeking out disposable plates. These have been in use for many years and are commonly seen at birthday parties or any small get together. They are not environmentally friendly.
- **Kansa** Kansa, the Indian name for Bell metal, is a hard alloy usually formed from bronze, with approximately 4:1 ratio of copper to tin. Different places call it with a different name like Assam calls it kanh while in West Bengal and Odisha, Kansa. It is widely used for cooking and eating utensils. It is suitable for daily use because it is wear and tear resistant, bright, scratch and wrinkle resistant for decades.
- **Porcelain or China** Porcelain and China are both terms that refer to dinnerware made of a fine-particle clay—typically comprised of metal, kaolin, and quartz—that is fired at a higher temperature. Porcelain often has an upscale look, lending itself to more formal dining occasions, but it also can be used every day to make any meal a little more elegant.







Bone China is another type of plateware. Bone ash (which is made from animal bones) is combined with porcelain clay and fired at a slightly lower temperature than







porcelain to produce a material that is very lightweight, delicate in feel, and translucent with a milky appearance.


- Stainless steel** Stainless steel is an iron-based alloy of several different types of metal that, when combined, are stronger and more durable than when they are separate that contain a minimum of approximately 11% chromium, a composition that prevents the iron from rusting as well as providing heat-resistant properties.



Table 2. Other types of plate

<p>Service Plate</p>	<p>The service plate is the largest plate, ranging in size from 11 to 14 inches across. The service plate is laid in the centre of the cover before the diners come to the table, food is never served or eaten directly from the service plate, which acts as a base plate for appetizers, salad, and soup.</p>	
<p>Dinner Plate</p>	<p>The dinner plate is used more than any other plate. It is used to serve the main course at all meals, formal and informal. Modern dinner plates measure from 10 to 11 inches across.</p>	
<p>Luncheon Plate</p>	<p>Luncheon is a lighter, simpler meal than dinner, a repast served on a plate about 9 to 9.5 inches in diameter. Although the luncheon plate is used for formal and informal meals, it is not essential for either occasion.</p>	
<p>Round-Salad Plate</p>	<p>The larger salad plate is about 8 to 8.5 inches in diameter, the smaller 7 to 7.5 inches. At a formal meal, the salad plate is laid before the guest after the main course is cleared, an arranged salad is presented to the diner on a platter.</p>	

<p>Fish Plate</p>	<p>The fish plate is a specialized plate about 8 to 9 inches in diameter. It is not made as part of a dinnerware set, but is recognizable by ornamentation in a fish pattern.</p>	
<p>Dessert Plate</p>	<p>Dessert plates are ornately decorated. They are specialized plates about 7.25 to 8.5 inches in diameter, used at formal and informal meals, and made not as part of a dinnerware set.</p>	
<p>Cheese Plate</p>	<p>Cheese plates are recognized by ornamentation in a cheese pattern. They are specialized plates about 7.25 inches in diameter, used at formal and informal meals, and made not as part of a dinnerware set.</p>	
<p>Tea Plate</p>	<p>Tea plates are specialized plates, about 7 to 7.5 inches in diameter. The purpose of the tea plate is to hold the teacup without a saucer. Some tea plates feature a shallow well.</p>	
<p>Fruit Plate</p>	<p>Fruit plates are recognized by ornamentation in a fruit pattern. They are specialized plates about 6.25 to 8 inches in diameter, used at formal and informal meals, and made not as part of a dinnerware set.</p>	
<p>Bread-and- Butter Plate</p>	<p>Bread or and butter are served at informal meals and luncheons. When a plate is not provided for a slice of bread a roll, it is laid on the tablecloth or rim of the dinner plate, where the butter is also placed.</p>	

<p>Fruit Saucer</p>	<p>Also known as a fruit dish, side dish, or berry bowl, the fruit saucer is a small shallow dish about 4 to 6 inches in diameter by 1 inch deep. The fruit saucer separates juices that flow from foods.</p>	
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Among these, which one will be selected depend on many factors. For example, a fine dining restaurant might consider china or porcelain that conveys a sense of elegance. A casual restaurant may choose ceramic or stoneware that matches a more rustic dining experience, while a quick service operation could opt for economical plastic and melamine. An off-premise catered venue might decide that eco-friendly, disposable and compostable service ware made of bamboo or other recycled materials is a good fit. Service ware also includes materials like glass, wood, slate, tile, and metals of cast iron or stainless steel. Some chefs choose custom-made plates as a way to distinguish their cuisine using natural materials, reclaimed wood, or architecturally unique designs that are as artistic as the food itself.





Plate Shape

Plates and service ware come in a variety of geometric shapes including classic round, as well as square, oval, or rectangular. They may be teardrop shaped, oblong, or spoon-shaped.

Matching the shape of a plate to the dish is important factor in decoration. Like some research found angular plateware is needed to emphasize the sharpness of the taste of a dish.

Table 3. *Types of plate shape*

Types	Picture reference
Round shaped plate	
Oval shaped plate	
Square shaped plate	
Rectangular shaped plate	

Drop shaped plate	
Oblong shaped plate	
Leaf shaped plate	
Spoon shaped plate	

ADDITIONAL PLATING TOOLS FOR DECORATING

Having the proper food presentation and plating tools is essential to high-quality plating. Here are a few items that are essential for food decoration.

Decorating Brushes

As one of the most important products in any chef's toolkit, decorating brushes have a variety of applications. They can be used for both detailed line work and broad strokes when applying sauces, or plating purees and coulis beneath meat or vegetables.



Garnishing Kits

Garnishing kits come with everything which are needed to garnish all of the signature dishes, including plating wedges, tongs, squeeze bottles, and brushes.



Molds

Molds are also very important when plating food. By cutting ingredients to a specific shape and size, it will provide visual appeal and keep the plate tidy. Ring molds also help to develop height and structure when stacking ingredients.



Plating and Precision Tongs

Last but not least, it is important to have precision tongs on hand for placing garnishes or small, delicate foods. Many tongs also feature micro-serrations for improved grip and stability.



Plating Wedges

Plating wedges come pre-cut with flat, round, or pointed edges and are perfect for smearing sauces and other soft ingredients into designs on your plate.



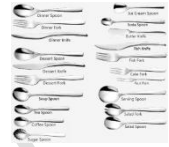
Shavers

Shavers work well when shaving or grating chocolate, hard cheeses, or soft vegetables on top of the finished creations.



Spoons and Knives

It is also important to have a variety of spoons on hand. Saucier spoons help to drag smears of sauce across the plate, and one can also choose a utensil with a tapered bowl that's perfect for drizzling and pouring. Additionally, slotted spoons quickly separate solids from liquids after completing the presentation.



Palette Knife

A frosting spatula or palette knife is a kitchen utensil designed especially for the use of spreading a substance onto a flat surface, such as frosting on a cake. It is also an ideal tool for applying spreads onto sandwiches in mass quantities.



Squeeze Bottles

Squeeze bottles are ideal when applying sauces or aiolis to the finished plate. Many of these items come with adjustable, precision control tips that allow the perfect amount of product to be applied.



Peeler

A peeler is an easy to use nifty kitchen tool that works well on a variety of fruits and vegetables, quickly cutting them into thin, elegant strips.



As the popular expression goes, we 'eat with our eyes', the visual presentation of food turns out to be almost as rich and important as the sensory qualities of the food itself in terms of determining the expectations, experience and memory of a dish.

The dishes presented must be appealing and appetizing. But not only just the food. The venue itself must also be presented well. After all, first impressions count and it is said that the first three seconds set the scene!

AIMS & OBJECTIVES

Decoration of a dish is just as important as the flavour of the dish because food decorations help a great deal in enhancing meal presentations, whereas simple and boring food is quite unattractive and unappetizing. A well-decorated food not only makes it more beautiful and appealing but also makes it more appetizing-

Visual Appeal: All experience food with their eyes before tasting it, and the garnish adds a spot of colour for eyes to feast on before the taste touches our tongue or the smell reaches our nose.

Stimulating The Appetite: Eating is a sensuous experience. Before our mouths have tasted a thing, our eyes have already judged it. Garnishes and colourful foods stimulate appetite by making it appealing.

Flavour Enhancement: Garnishes enhance the flavour of some dishes. Lemon wedges served with seafood not only add a yellow colour to the plate, but the diner can use the juice from the lemon to flavour the food. A mint sprig on top of a fruit dessert lightly infuses the dish with the

herb's refreshing flavour. This is why it is important to choose garnishes that complement the flavour of the food they are served with.

Dish Identification: Some dishes are not readily identifiable just by looking at the food. For instance, it can be difficult to determine if it is a bowl of savoury soup of pureed carrots or a sweet dessert soup of pumpkin just by appearance. Both dishes are deep orange in colour and thick in texture. Adding a carrot curl on top of carrot soup or a sprinkling of brown sugar and a swirl of cream on a sweet pumpkin soup can help the diner identify what he is about to enjoy.

REVIEW OF LITERATURE

Food decoration is the art of modifying, processing, arranging, or decorating food to enhance its aesthetic appeal. The visual display of food matters a lot to many chefs and food consumers, too. It is not only about decorating the food, but also making it taste more delicious psychologically for the customers. Customers love it when the food is arranged and served correctly. So, it should not be seen merely as decoration, but as an integral part of the multisensory eating experience. This view is too limited by far, as plating has become central to the eating experience, and should now be recognized both as a drive to the culinary creation and central to the reception of a dish.

Everyone should be aware that food presentations are likely to bear on all three key components of pleasure, as identified by *Daniel Kahneman* in his work on hedonic psychology: *the pleasures of expectation, experience and memory*. (“*Well-being: The Foundations of Hedonic Psychology*”; *Michael Kubovy, D. Kahneman, E. Diener, N. Schwarz, 2003*)

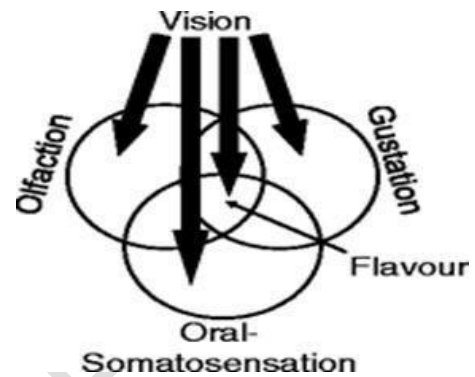
Plate shapes and sizes, surrounding lighting and layout, colour and convenience-these are a few of hidden persuaders that can contribute eating of a person. The decorative arts contribute something more than utility: they are also there to celebrate the value of the cultural practice for which they are used. In this respect, decorative plate ware constitutes a frame, highlighting the food and its consumption. Chefs carefully select their vessels, utensils, and other inedible garnishes so as to ensure that each dish complements the food that is going to be served from it.

Vision and Eating Behaviour

In “*A Review of Visual Cues Associated with Food on Food Acceptance and Consumption Devina Wadhera*” ; *Elizabeth D. Capaldi-Phillips* found that Several sensory cues affect food intake including appearance, taste, odour, texture, temperature, and flavour. Although taste is an important factor regulating food intake, in most cases, the first sensory contact with food is through the eyes. Few studies have examined the effects of the appearance of a food portion on food acceptance and consumption. The purpose of this review is to identify the various visual factors associated with food such as proximity, visibility, colour, variety, portion size, shape, number, and the surface area and their effects on food acceptance and consumption. So, some ways that visual cues can be used to increase fruit and vegetable intake in children and decrease excessive food intake in adults. In addition, the need for future studies that can further establish

the relationship between several unexplored visual dimensions of food (specifically shape, number, size, and surface area) and food intake is important .

Food selection is primarily guided by the visual system. Multiple functional neuro-imaging studies have examined the brain responses to visual food stimuli. However, the results of these studies are heterogeneous and there still is uncertainty about the core brain regions involved in the neural processing of viewing food pictures. The aims of the study were to determine the concurrence in the brain regions activated in response to viewing pictures of food and to assess the modulating effects of hunger state and the food's energy content. (*“The first taste is always with the eyes: A meta-analysis on the neural correlates of processing visual food cues”*: L.N. van der Laan , D.T.D. de Ridder , M.A. Vieregger P.A.M. Smeets).



Presentation order and preceding samples are known to influence the perception of sensory attributes. In conventional testing procedures these effects are normally allowed for by the use of suitable experimental designs for assessment order and averaging responses over assessors. (*“The influence of presentation factors on the sensory Assessment of beverages”*: Anthony A. Williams).

DECORATION INFLUENCE EATING BEHAVIOR

People eat with eyes; for that reason the food must be presented with the balance of the colours, textures and flavour . People attracted to the foods simply by looking at foods that being presented and it became as an essential part of the multisensory eating experience.

Food presentation is truly known as an art form; start from the arrangement of the food and garnishes to the dishes. Effective plating can be achieved when the plating is able to make the foods looks appetizing to the diners. foods are considerably attractive presented on plate till to the ending response of the dish by the diners. It is clearly emphasized that person who is plating, serve the food as a vital element of the multisensory eating experiences. (*Deroy et al, The Plating Manifesto (I): From Decoration to Creation. 2014*).

Food presentation is presenting and decorating the food attractively as a tangible cues for the customers' perception of quality. Aforesaid, presentations are essential to indicate the first expectations of the food to the customer. In the food perspective, the presentation is the adaptation of sauces and garnishes to menu items; soup, entrées(dishes served before main course of meal), main courses and desserts. Moreover, the perfect combination of food presentation along with the perfect ambiance of the surrounding allows the diners to enjoy the dining experiences to the fullest. (*Radzi, S.M., Bakhtiar, M.F.S., Mohi, Z., Zahari, M.S.M., Sumarjan, N. & Chik, C.T. Theory and Practice in Hospitality and Tourism Research, 2015*)

Therefore, the visual quality of food presence eventually affects the eaters' expectations on the qualities of taste and smell and also their hedonic value as customers' perception is usually

dominated by what they see on their eye in regard to having better dining experience. (Spence C. (2010). *Multisensory Flavour Perception. Curr Biol*, 2010)

Researches show that a good food presentation can affect the customer's perception during dining added that the customers' perception towards foods can be increase by enhancing the colour of the surroundings in which food is being presented; for example, instead of the lighting of the ambient, it may include the selection of table's cloth, plate ware and table setting. (Piqueras, F., Giboreau, B.P. & Spence, C. "Assessing the Influence of the Colour of the Plate on the Perception of a Complex Food in a Restaurant Setting. *Flavour*", 2013). Consumers reliably match a variety of tastes (bitterness, sweetness, and sourness), oral-somatosensory attributes (carbonation, oral texture, and mouth-feel), and flavours to abstract shapes varying in their angularity.

PLATE IN FOOD DECORATION

Choosing the right format of plate for a specific dish is very important. For instance, the food should not appear too crowded, but should instead convey the notion that the portion size is adequate and not too measly. The plate affected consumers' perception mainly for the attributes based on visual appraisal (liking the presentation of the dish, how appetizing the dessert looked and the colour intensity of the dessert). The attributes of the desserts, such as the flavour and sweetness intensity, were affected mainly by the type of dessert served, but the extent to which these attributes were affected depended on the plate as well.

- **THE COLOUR OF THE PLATE**

Colour is the single most important product-intrinsic sensory cue when it comes to setting people's expectations regarding the likely taste and flavour of food and drink. White plates are used most by chefs and cooks to showcase their culinary offerings, though black is sometimes used too. In various restaurants, chefs uses charger plates (large flat dishes, placed under one's normal plate, that are used primarily for decorative purposes) presented in the primary colours (blue, red and green, a different coloured plate for each diner), as the base on which to place the different white dishes on which the food will actually be served.

Colour preference is an important aspect of visual experience, but little is known about why people in general like some colours more than others.

With plates comes the idea that food should be presented in the most attractive manner possible, and that presentation, from the choice of the plate itself to the complex spatial arrangement of colours and ingredients on the plate, matters to the final reception of a dish .

A prominent example is ,a dessert on a round white plate tasted up to 10% sweeter than when served on an equivalent black plate. The atmosphere, the setting, heat, sound, colour – as well as tactile and cognitive cues – are digested by our brains, generating particular perceptions of

flavour before the food even reaches our lips.(*Charles Spence and Betina Piqueras-Fiszman's own research in "The Perfect Meal: The Multisensory Science of Food and Dining, 2014"*)



There was in terms of the choice of coloured plates were intuitions and untested rules, there is a trend that purple grapes do not look quite right when served from a blue plate. Other popular beliefs include the notion that, 'The colour brown is another dark colour that tends to make people not feel very hungry. Brown reminds people of food that has been overdone or burnt. A few people might think of homemade bread or other baked goods when looking at the colour



brown, but for the most part this is a colour not associated with an increase in one's appetite'. On the other hand, the colour green is such a healthy colour. Salads are filled with green foods and most products considered being more natural than others are usually contained in green packaging. Many people are attracted to the colour green and associated it with abundance. This is a good colour to promote healthy eating and lots of it. It is, however, only over the last couple of years or so that such anecdotal claims have been assessed empirically (specifically that the colour of the plateware might exert a significant impact on the appetite or even the taste or flavour of whatever happens to be served from it). (*Lyman in his 1989 book on "A Psychology of Food : More Than a Matter of Taste"*) One of the classic studies to investigate colour's influence on taste sensitivity investigated the effects of colouring an aqueous solution red, green, or yellow on perceptual thresholds for four of the basic tastes (salty, sour, sweet, and bitter). In many cases, it has been observed that the concentration of the tastant(it's a water soluble chemical that produces taste sensation) had to be increased in order for his participants to be able to detect its presence in the coloured (as compared to the uncoloured) solutions. So, for example, the addition of green colouring to a sweet solution significantly increased taste sensitivity, while yellow colour decreased taste sensitivity . Interestingly, red colouring had no significant effect on sensitivity to sweet taste. With respect to sour taste sensitivity, both the yellow and green colouring of solutions decreased participants' sensitivity, with red colouring again having no effect. Colouring a clear solution red decreased bitter taste sensitivity, while the

addition of yellow and green colouring had no such effect. Finally, adding colour had no effect on taste detection thresholds for salt solutions. (*"Influence Of Colour On Taste Thresholds"* by J. A. MAGA)

In a research, it was found that higher values might be given by diners to the foods presented on white (conventional) plates simply because that is the colour that most western diners will be more familiar with (note here the literature showing that familiarity very often breeds liking - as in the mere exposure effect. (*"In Touch with the Future: the sense of touch from cognitive neuroscience to virtual reality"*; Alberto Gallace, Charles Spence, 2014) .

✓ THE RELATION BETWEEN COLOUR AND FLAVOUR OF THE PLATE

Colour and flavour are two of the primary factors that can influence food acceptability. Several studies have demonstrated that people normally associate certain food with specific colours and when the colours of these products are intentionally altered, their recognition is diminished .

Following this interpretation, the colour of the mousse served in another study may have appeared more salient when set against the background of the white plate than when served from the black plate. Thus, the rated intensity of the food's taste (that is, its sweetness or saltiness) will presumably have been influenced by its perceived colour saturation, which, in turn, will have been influenced by the colour saturation of the plate itself. Another possibility, coming from the documented effects of colour saturation on smell intensity is that the contrast improved the olfactory component of the food, and in this way affected the participants' overall flavour appreciation. (*"Tasting spoons: Assessing how the material of a spoon affects the taste of the food"* by Betina Piqueras-Fiszman , Zoe Laughlin , Mark Miodownik , Charles Spence)

Another study investigate how the sensory properties of food can lead to a decrease in the pleasantness of that food after it is eaten. After eating chocolates of one colour the pleasantness of the taste of the eaten colour declined more than of the non- eaten colours, although these chocolates differed only in appearance. The presentation of a variety of colours of chocolates, either simultaneously or successively, did not affect food intake compared with consumption of the subject's favorite colour.(*"How Sensory Properties of Foods Affect Human Feeding Behavior "*:B J Rolls, E A Rowe, E T Rolls,1982)

Visual cues are found to influence odour judgements significantly and, when presented with conflicting stimuli, the visual cues appear to override the olfactory sense and distract the subjects from making the correct assessment. A study investigated the role of food colouring in the understanding of the depth of a particular taste (e.g., strawberry, banana, etc.) or taste attribute (e.g., sweetness, saltiness, etc.) and their role in the perception of flavour identity. (*"Does Food Colour Influence Taste and Flavour Perception in Humans? By Charles Spence & Carmel A. Levitan & Maya U. Shankar & Massimiliano Zampini"*)

A study revealed how the colour of the bowl affects the taste of the food it contains. To answer this question they served popcorn in four different coloured bowls, and participants rated sweetness, saltiness, and overall liking. The sweet popcorn, in addition to being sweet, was perceived as saltier when eaten out of a coloured (as compared to a white) bowl, and vice versa for the salty popcorn. These results demonstrate that colour in bowl design can be used to elicit perceptions of sweetness and saltiness in real foods. (“*There's more to taste in a coloured bowl Perception*”

:Vanessa Harrar, Betina Piqueras-Fiszman, Charles Spence, 2011)

More recently, researchers tested the extent to which the colour of the plateware (black and white plates were used) influenced the gustatory and hedonic experiences of a complex food (desserts with layers and decorations having different colours, textures, tastes and flavours). Over the course of two-week of the study, three different desserts were served. The results demonstrated that the colour of the plateware exerted a significant influence on people’s perception of the food, but that this effect varied as a function of the type of dessert that was served.



Desserts served on different coloured plates at the Institut Paul Bocuse Research Centre in the study by Piqueras-Fiszman et al.2011

Interestingly, the perceptual pattern for each dessert was constant for each plate used. For all of the attributes rated, including how appetizing the food was, its appearance, colour intensity, flavour intensity and the participants’ overall liking, higher scores were obtained with the same plate, for each of the desserts. However, these results could not be accounted for solely in terms of contrast effects, because it was the dessert that had a darker brownish hue that participants rated more highly when served on the black plate (the other two desserts, which were red and creamy in colour, were rated as looking more delicious when served from the white plate). It could be that the desserts simply looked better (that is, more visually appealing) on a plate of a certain colour, and that this visual appraisal of the overall offering was what produced a halo effect on the other scores generated by the eating. (“*Is it the plate or is it the food? Assessing the influence of the colour (black or white) and shape of the plate on the perception of the food placed on it*” by Betina Piqueras Fiszman, JorgeAlcaide CharlesSpence,2011)

In conclusion, although explanations for the fact that the colour of the plate impacts taste and flavour perception have not yet been fully elucidated, the results of a growing number of

laboratory and restaurant studies now demonstrate that the colour of the plate has more than a decorative role and could be chosen for more functional reasons. It is our hope that such results will hopefully make innovative chefs, and those working in catering, think more carefully about the colour of their plateware and its potential effects on their customers' perception of taste and flavour.

- **THE SIZE OF THE PLATE**

Psychologists find that eating is influenced by the size of the plateware, mostly when it comes to calculating how much food to serve themselves and/or how much they eventually consume. Since early in the last century the average size of plates has increased by around 20% , as has the average waist size of humans .

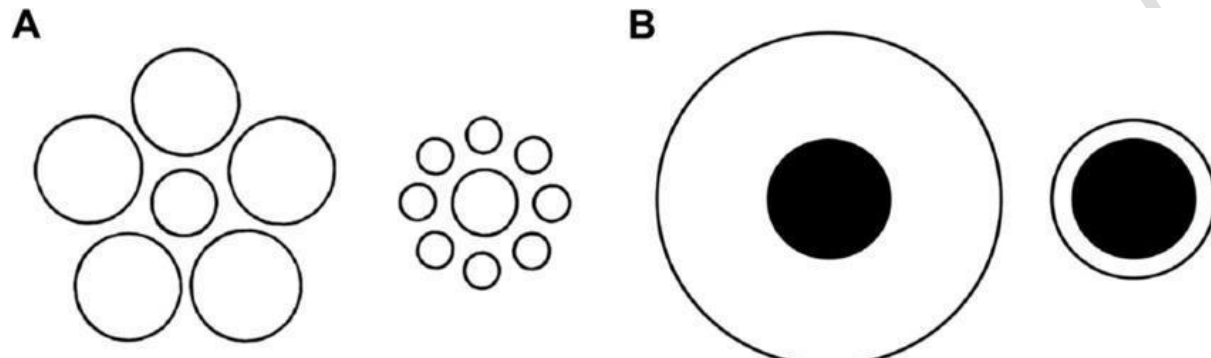
In one study, researchers investigated the effect of the size of the bowl on people's food consumption at a social event. When the participants in this study were given a larger bowl to eat from, they served themselves over 50% more ice cream than those given a much smaller bowl. Furthermore, since the participants nearly always finished their food , those eating from a larger bowl ended up consuming far more ice cream overall. (*"Ice Cream Illusions - Bowls, Spoons, and Self-Served Portion Sizes"* by Brian Wansink, Koert van Ittersum, James E. Painter, 2006)

Another researcher obtained similar results when the bowls that differed in size were the everyday containers from which a pasta dish was served in the setting of a canteen. In this case, the difference in capacity was nearly double (3.8 versus 6.8 L). Despite the fact that the diners' individual plates were all of the same size (approximately 23 cm in diameter), those who served themselves from the larger communal bowl ended up with 77% more pasta and (perhaps unsurprisingly) felt more satiated than those serving themselves from the smaller communal bowl. (*"Serving bowl selection biases amount of food served"* by Ellen van Kleefa, Mitsuru Shimizu , Brian Wansink – 2012)

A smaller bowl may remind people that the food needs to be shared with others. As a result, people do not want to give the impression that they would take too much, leaving less for others. Maybe they also do not want to be the one who nearly finishes a bowl or package as this may be perceived as selfish behaviour. With a large serving bowl, it may seem that more food can be spooned out before there is a noticeable difference that supply has decreased. It could also seem that there is less risk that one would run out of food. (*"Serving bowl selection biases amount of food served"* by Ellen van Kleefa, Mitsuru Shimizu , Brian Wansink – 2012).

Wansink and colleagues attempted to account for the results in terms of the *Ebbinghaus-Titchener* size-contrast illusion and/or the *Delboeuf* illusion . In perhaps the most well-known version of the former illusion, a circle appears larger when surrounded by smaller circles than another identical circle surrounded by bigger circles . The latter illusion makes one think that, of two identical circles, the one that happens to be surrounded by a larger ring will look smaller

than the other one without a ring or else surrounded by a smaller ring. *Wansink and colleagues* suggested that such visual illusions may have caused a given amount of food to be perceived as much smaller against the background of a larger bowl, and as larger when presented in a smaller bowl instead. (*Wansink B, Cheney MM: "Super bowls: serving bowl size and food consumption" 2005*)



Representations of the (A) Ebbinghaus- Titchener size-contrast illusion and (B) Delboeuf illusion.

It is important to note that the effects of the size of the plate on a diner's consumption behaviour are somewhat inconsistent. For instance, *Rolls et al.* were unable to find a significant difference between the diameter of the plate (17, 22 or 26 cm) and the amount of food that was consumed at a meal in three separate laboratory-based studies. (*Rolls BJ, Roe LS, Halverson KH, Meengs JS: "Using a smaller plate did not reduce energy intake at meals". Appetite. 2007*).

Here one thing is important that *Rolls et al.*(2007) tested consumption behaviour in the laboratory, whereas *Wansink et al.*(2005) had their participants fill out questionnaires at a company picnic (that is, at a real-world event), so the discrepancy between the significant results reported by *Wansink et al.* and the null results reported by *Rolls et al.* may point to the existence of important differences between people's food consumption behaviours when tested in the laboratory and those seen under more realistic dining conditions.

Portion size has mostly been interesting because of its relevance for people's health, specifically in relation to various quantitative approaches to eating. For example, *Rozin et al.* explained that one of the main reasons for the so-called 'French paradox' stemmed from differences in portion size between France and the US. The French remain slimmer than their North American counterparts, and have a lower mortality rate from heart disease, despite the fact that they eat meals containing a higher proportion of saturated fat and consume less fat-reduced foods than do Americans. The reason for this is apparently that, in France, portion sizes are much smaller in full-service restaurants, buffets and supermarkets. The same is apparently also true if one looks

at estimated portion sizes based upon the recipes found in cookbooks in the two countries. (Rozin P, Kabnick K, Pete E, Fischler C, Shields C: “The ecology of eating: smaller portion sizes in France than in the United States help explain the French paradox”. *Psychol Sci.* 2003)

The portion size of foods has been identified as an important environmental factor known to affect short-term energy intake. Experiments that were conducted both in the free-living environment and in laboratory-based settings to investigate the effects of portion size on energy intake unanimously showed that as the portion size of food increased, so did subjects' energy intake. Despite the fact that the profound effects of portion size on energy intake are well documented, the mechanisms by which portion size affects energy intake are poorly understood. There is some evidence that sensory influences (e.g. visual and olfactory cues), cognitive factors (e.g. learning, social norms, monetary considerations), and post-ingestive consequences (e.g. sensations of hunger and fullness) related to the portion size of foods may interact to affect the amount of food that is consumed during a meal.

- **THE SHAPE OF THE PLATE**

Plates differ by more than one parameter. Besides colour, plates also present a variety of shapes. Certain restaurants use a wide range of eye-shaped, triangular and rectangular plates which they try to match to the food.

One of the studies provided results that are potentially relevant here, reported that people (over 200 university students) rated cheese as tasting significantly sharper (by around 10%) after having been made to stare at jagged shapes (as opposed to staring at rounded shapes. (Gal D, Wheeler SC, Shiv B: *Cross-modal influences on gustatory perception.* 2007)

Piqueras-Fiszman et al. investigated whether the shape of the plate itself might similarly influence people's taste/flavour perception. However, these researchers failed to find any effect of the shape of the plateware on the taste of a strawberry-flavoured mousse. The plates used in their study were square, round and triangular. (*Piqueras-Fiszman B, Alcaide J, Roura E, Spence C: “Is it the plate or is it the food? The influence of the colour and shape of the plate on the perception of the food placed on it”, 2011)*

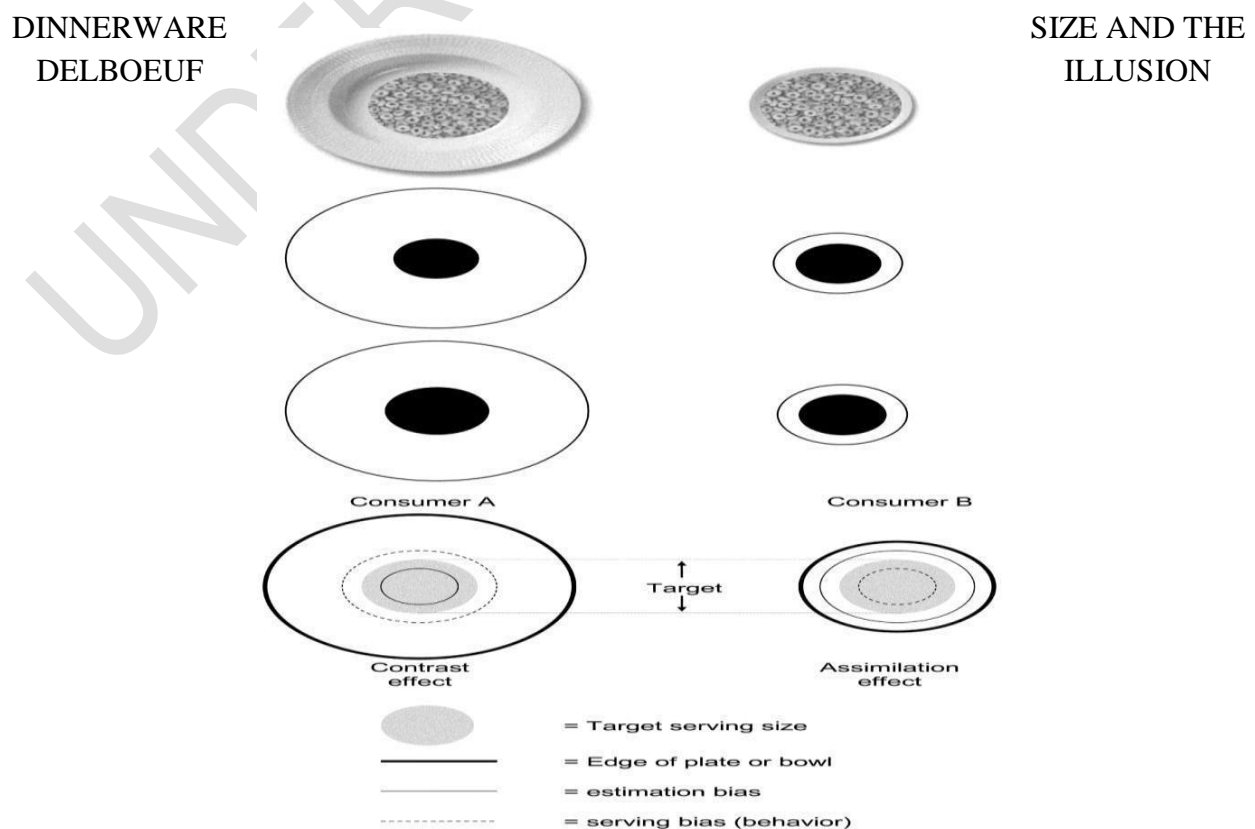


The strawberry-flavoured mousse served from square, round and oval shaped plate

In general, round, white plates tend to enhance sweet flavours in food, whereas black, angular plates tend to bring out more savoury flavours, and serving food on a red plate tends to reduce the amount diners eat. (“*The Perfect Meal: The Multisensory Science of Food and Dining*”: Spence, Betina, Piqueras-Fiszman)

According to Yang, ‘When selecting tableware, a law of opposites is employed. If the food is round in shape, then a square or long, narrow flat dish is used.’ Here it is certainly possible to wonder how shapes suggested during the eating experience (the plate or other items placed on the dining table) might be transferred to the sensory-discriminative terms that a diner uses to describe the food that they are eating. (Yang J: *The art of food presentation. 2011*)

Despite the challenged contention that consumers serve more onto larger dinnerware, it remains unclear what would cause this and who might be most at risk. The results of five studies suggest that the neglected ‘Delboeuf illusion’ may explain how the size of dinnerware creates two opposing biases that lead people to over serve on larger plates and bowls and underserve on smaller ones. A countercyclical sinus-shaped relationship is shown to exist between these serving biases and the relative gap between the edge of the food and the edge of the dinnerware. Although these serving biases are difficult to eliminate with attention and education, changing the colour of one’s dinnerware or tablecloth may help attenuate them. By showing that the ‘Delboeuf illusion’ offers a mechanistic explanation for how dinnerware size can bias serving and intake, we open new theoretical opportunities for linking illusions to eating behaviour and suggest how simple changes in design can improve consumer welfare. (“*Plate Size and Colour Suggestibility: The Delboeuf Illusion’s Bias on Serving and Eating Behavior*” :KOERT VAN ITTERSUM BRIAN WANSINK)



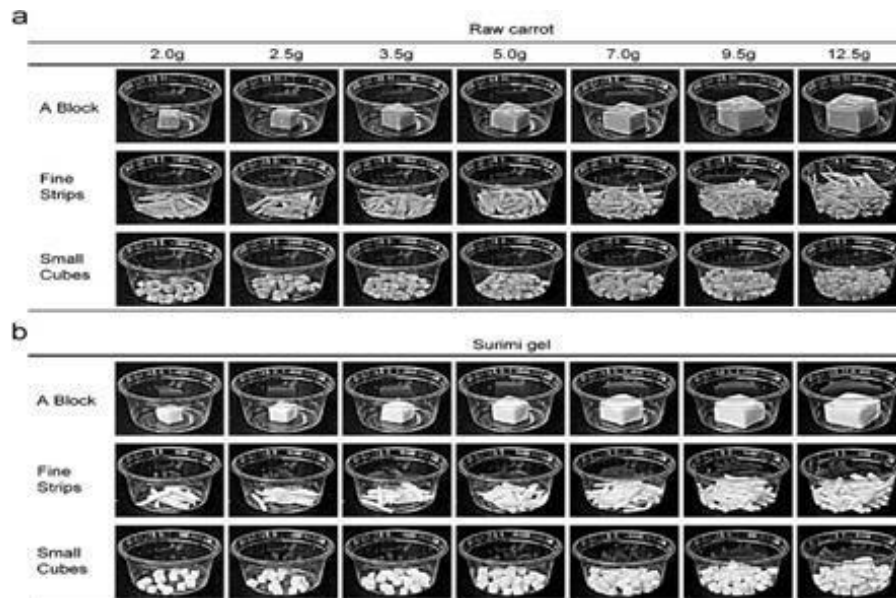
Food on large vs. small plate (first row); standard Delboeuf illusion (second row); nonstandard Delboeuf illusion (third row); estimation and serving biases (fourth row)

In the another study, there are a research in order to investigate whether people also exhibit robust crossmodal correspondences between shapes and cheese. To this end, participants in Experiment 1 (conducted at a Gastronomy event) tasted three aged farmhouse cheeses (Keen's Cheddar, Tunworth, & Berkswell,). Participants rated each cheese using a single response scale anchored at either end by a rounded and an angular shape. Significant differences in shape symbolism were observed across the three cheeses. In Experiments 2 (conducted with cheesemongers and cheese experts) and 3 (conducted with customers in a cheese store), participants separately rated the olfactory, gustatory, and oral-somatosensory attributes of different cheeses (Tunworth, Lancashire, and Stawley) on the angular-round continuum. The results revealed that participants' crossmodal correspondences were based primarily on the taste, rather than the smell or texture of the cheeses. Implications of these findings for the marketing of dairy products are discussed. (Charles Spence, Mary Kim Ngo, Bronwen Percival, Barry Smith; *Crossmodal correspondences: "Assessing shape symbolism for cheese"*, 2012)

- **SHAPE OF FOOD**

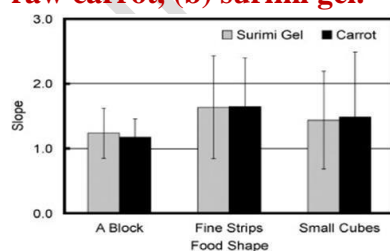
The shape of a food can affect the perceived volume of a food. Researchers asked college students to determine if a square or circular pizza was larger. More than 70% of the participants perceived the square pizza to be greater in quantity than the circular pizza. Similarly, the shape of food pieces can also affect food quantity estimations. (*"Pizzas: Pi or Square? Psychophysical Biases in Area Comparisons"* by Robert E. Krider, Priya Raghur, Aradhna Krishna)

Sensory-specific satiety also occurs for the visual appearance of food, such as shape. Changes in the shape of food (which affects both appearance and mouth feel) were introduced by offering subjects three successive courses consisting of different shapes of pasta, as a result they ate 14% more compared with when they were offered their favorite shape throughout. (*"How Sensory Properties of Foods Affect Human Feeding Behavior"*: B J Rolls, E A Rowe, E T Rolls, 1982)

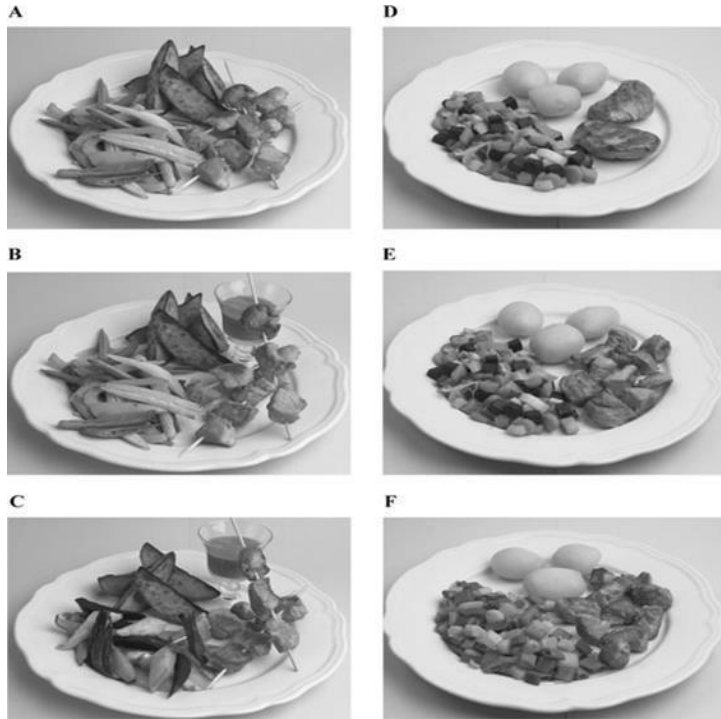


One study investigated the effect of the appearance of cut food on visual mass estimation. In the experiment, they manipulated the shape (e.g., a block, fine strips, or small cubes) of food samples of various masses, and presented them on a CRT display as stimuli. Eleven subjects participated in tasks to choose the picture of the food sample which they felt indicated a target mass. Raw carrots and surimi (ground fish) gel as hard and soft samples, were used respectively. The results clearly confirm an existence of an illusion, and this indicates that the appearance of food interferes with visual mass estimation. Specifically, participants often overestimated the mass of finely cut food, especially fine strips, whereas they could accurately estimate the mass of block samples, regardless of the physical characteristics of the foods. The overestimation of the mass of cut food increased with the food's actual mass, and was particularly obvious with increases of apparent volume when cut into fine strips. These results suggest illusions associated with the visual presentation of food so that the apparent volume of a food sample effects the visual estimation of its mass. (*Visual illusion in mass estimation of cut food*: Yuji Wada, Daisuke Tsuzuki, Naoki Kobayashi, Fumiyo Hayakawa, Kaoru Kohyama .2007)

**Example of the pictures used as stimuli:
raw carrot, (b) surimi gel.**



Slope of regression line for each



Shapes of food pieces can also affect liking of foods. For example, children liked pictures of vegetables served in the shape of stars than when cut into slices or sticks (“*Serving styles of raw snack vegetables. What do children want?*” Olsen, Ritz, Kramer, & Moller, 2012) and adults preferred pictures of meats cut into pieces than slices (“*Consumer Preferences For Visually Presented Meals*” Reisfelt, Gabrielsen, Aaslyng, Bjerre, & Moller, 2009).

A–C. PHOTOS OF THE MOST PREFERRED CHOICES; D–F. PHOTOS OF THE LEAST PREFERRED

However, food cut into various shapes had no differential effect on snack food consumption. Children showed no greater intake of snack foods cut into fun shapes (animals, hearts, or hands) than those served in normal shapes (“*Shape of snackfoods does not predict snack intake in a sample of preschoolers: a cross-over study*” ; Boyer, Laurentz, McCabe, & Kranz,2012).

Van Ittersum and Wansink (2011) found that subjects poured less soup into a smaller than larger bowl due to overestimation of the diameter of the smaller bowl. This overestimation of foods served in smaller bowls, may also explain why the amount of food served in smaller bowls is less

than the amount of food served in larger bowls, resulting in less energy intake from smaller than larger bowls (*Plate Size and Colour Suggestibility: The Delboeuf Illusion's Bias on Serving and Eating Behavior*).

Matching the shape of a plate to the dish may seem too fancy for many diners, and as yet there is surprisingly little research on the topic of the shape of the plateware on people's perception of the food that is served from it. It can be concluded that shape of the dinnerware can affect taste as well.

- **THE MATERIAL OF THE PLATE**

The material properties of the plate ware or cutlery bring additional cultural effects into the dish. Several studies suggest the relationship between plate material and behaviour of eating.

Back in the first century, in his book "Cookery and Dining in Imperial Rome", Apicius suggested as a plating tip for his Apician Dish (number 141), 'an expensive silver platter would enhance the appearance of this dish materially'. Today, a silver or gold finish charger plate might be used as part of the tableware and convey that touch of luxury and sophistication to the guests (although one does not tend to see them anymore, unless dining in a more traditional and elegant restaurant). (*"Cookery and Dining in Imperial Rome"; Apicius, Joseph Dommers Vehling*)

Besides cultural and semantic associations, the material properties of plates, and even more of cutlery, stress the need of a division between visual and non-visual properties. The expectations of different weights for plastic versus silver spoons, for instance, might already trigger the association between weight and quality noticed. (*"The weight of the bottle as a possible extrinsic cue with which to estimate the price (and quality) of the wine?" ; Piqueras-Fiszman B, Spence C Observed correlations, 2012*)

So it can be concluded that no one expects to eat from a porcelain plate in a fast-food joint or on an aircraft (unless a regular business- class traveller), just as no one would expect to be served from a plastic or paper plate in a smart restaurant. Silverware, although it is not a common material nowadays, has always been associated with high quality plate ware, an association that we have from our ancestors.

- **MAINTAINING BALANCE IN PLATING**

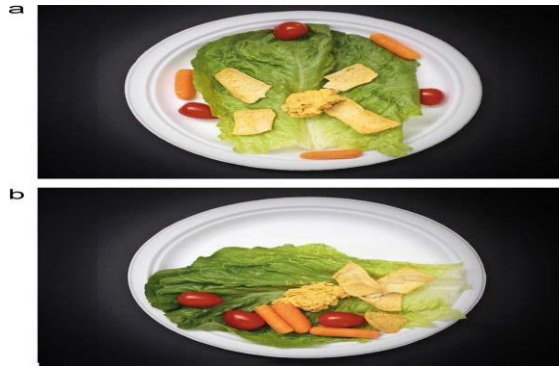
Maintaining the balance of a dish is an essential prospect of decoration. Every sole ingredient used in plating foods influence foods presentation. Other elements in food presentation such the foods' colour, temperature, variety, freshness, shape and the materials of the tableware used; need to be balance on plate to increase the level of palatability. These elements in a food's plate may act as the communication and marketing tool to the customers. A study was done through a

survey participated by 300 students of University Technology Mara (Penang). The purpose of this study was to examine the elements that manipulate customers' expectation on food presentation and to investigate the degree of customer perception toward food presentation. In this study, the researcher found that the food presentation has significantly impacted on the way in which customers consume their foods, the different colour, shape, size and variety of food, the used of tableware and arrangements of foods must work together pleasantly in order to stimulate customer appetite. It may be beneficial to all the food developers as the art may significantly change by manipulating the factors and resulting in influencing the customers' food choices. ("The Study of Customer Perception and Expectation toward Food Presentation"; Noorliza Zainol, Hashim Fadzil Ariffin and Abdul Rahman Ahmad Rozali)

In a study, Zellner et al. investigated whether balance and complexity (increased by the addition of colour) in the presentation of food on a plate affect the attractiveness of the presentation much as those factors affect the attractiveness of works of art. In addition, the willingness of the participants to try the food and liking for the food in four presentations (monochrome-balanced, coloured-balanced, monochrome-unbalanced, and coloured-unbalanced) combining these two variables was measured. While colour increased the attractiveness of the balanced presentation it did not increase the attractiveness of the unbalanced one. Subjects were more willing to try the monochrome than coloured presentations, but there was no effect of colour or balance on people's overall liking of the flavour of the food itself. So, while manipulating the colour and balance in a dish may affect how attractive it is rated as being, Zellner et al.'s results suggest that it does not necessarily alter how much people like the flavour of the food ("Art on the plate: Effect of balance and colour on attractiveness of, willingness to try and liking for food"; Debra A. Zellner, Mia Lankford, Lisa Ambrose, Paul Locher; 2010)

However, when Zellner et al. extended this research in a subsequent study with dishes composed of lettuce, carrots, tomatoes and hummus (note that the colour manipulation in their earlier study was achieved by artificially colouring the tahini), they observed that even though their participants did not report different attractiveness ratings for the two presentations (again balanced and unbalanced) as they had in the earlier study, the hummus from the more balanced presentation was liked more than that from the less balanced presentation. In a second experiment (part of the same study), these researchers found that chicken salad placed in a messy arrangement in the centre of a lettuce salad was liked more than when the chicken salad was moulded as a half sphere in the centre of the salad; consequently, Zellner and colleagues concluded that their results on participants' liking probably had more to do with the degree of neatness than with the degree of balance of the food on the plate. Only the animal-based food was judged as being more contaminated when presented in a messy rather than a neat way. Neatness of the food presentation increases liking for the taste of the food by suggesting greater care on the part of the preparer. (*Neatness counts. How plating affects liking for the taste of food*)

Debra A. Zellner , Evan Siemers, Vincenzo Teran, Rebecca Conroy, Mia Lankford,Alexis Agrafiotis, Lisa Ambrose, Paul Locher,2011) .



a. Balanced presentation of the hummus plate.

b. Unbalanced presentation of the hummus plate.

Choosing the right plate: size, colour, material and shape together:

While many studies reviewed have tended to vary a single attribute at a time (that is, the colour of the plate or the shape of the plate), in the future it will become increasingly important to vary a number of factors regarding the plate ware at the same time to see how they interact. One step in this direction comes from a recent experiment conducted by Stewart and Goss . They had their participants taste a cheesecake from a black or white plate that could be either round or square. The participants rated the dessert as 20% sweeter when tasted off the round white plate than off any of the other three plates. The effects of the plateware on flavour intensity were even more dramatic (30% higher when served off the round white plate than when served from any of the other plates). Taken this, the results of the study supports the conclusion that one of the best ways in which to keep the calorie count down while keeping our expectations fulfilled may well be to serve the food on a round white plate.(“*Plate shape and colour interact to influence taste and quality judgments*”; Peter C Stewart & Erica Goss, 2013)

Arranging food on the plate: on the visual composition of a dish Besides the support for the food (namely the plate ware), it is important to consider how the food itself is placed on the plate. Customers love it when the food is arranged and served correctly. Customers in India especially judge the hygiene standards, quality, and taste of a dish without actually tasting it based solely on the way food is presented to them.

The various aspects of visual composition include, for example, the colour of the food or elements of the dish, the visual texture of the components and their combination (also important but little studied), the shape of the individual components, and the higher-order spatial arrangement of the various elements. Even the number of items on the plate (odd versus even) can potentially make a difference to a diner's impression of a dish. Researchers are now just beginning to conduct some intriguing studies that are starting to address the impact of the layout of the elements in a dish on people's responses to it. Interestingly, the framing of these experiments shows just how many different routes and hypotheses research can take when it comes to understanding the principles of plating.

For instance, *Reisfelt et al.* investigated preferences for variations of a visually presented convenience meal among a large group of consumers (768 respondents) in a computer-based study. These researchers used a discrete choice experimental design in which people were shown different series of eight photos, consisting of combinations of variations on a meal, defined in the following way: dish (modern or traditional); vegetables (root mix or wok mix); meat (slices or whole pieces of tenderloin pork); sauce (either present or absent); and herbs (dishes either with or without a parsley garnish). The respondents had to select the meal that they preferred, the dish they would choose second, and their least favourite dish. Perhaps the most relevant variable in the context of the present article is the first one. The modern dish was selected significantly more often than the traditional dish. Additionally, a preference for the traditional version of the dish was positively correlated with age, with the elderly participants preferring this option more than the younger participants. These results seem to suggest that preferences for plating come from previous experience - and a possible comparison with the canonical or prototypical look of a certain dish. ("*Consumer Preferences For Visually Presented Meals*" *Reisfelt, Gabrielsen, Aaslyng, Bjerre, & Moller, 2009*).

Complexity of the dish depends on much more than merely just the variety of colour that happens to be present in a dish. It also depends on the size of the elements, the variation in colour, the number of products, the familiarity of the person with those products, and the mix of products or elements that are involved. Researchers examined the relationship between people's visual preferences and the perceived complexity of vegetables, fruits, and combined mixtures of fruits and vegetables. The researchers observed strong correlations between designed collative properties and perceived complexity. Inverted U-shaped relationships between visual preference and perceived complexity were documented for both the vegetable and fruit mixes. However, no such effect was observed for the combined fruit and vegetable plates, perhaps because from the start they were already seen as being quite complex. So, the take-home message here is not to allow the visual composition of the elements to become too simple nor too complex if you want a dish to be successful (or, at least, to be visually appealing). ("*Adolescent and adult visual preferences for pictures of fruit and vegetable mixes – effect of complexity*" ; *Mielby LH, Kildegaard H, Gabrielsen G, Edelenbos M, Thybo AK , 2014*) The artistic arrangement of the

elements in the dish was compared to a situation in which the very same ingredients were arranged as in a common tossed salad. In another condition, the 17 elements that went into making the salad were arranged side-by-side in a neat but non-artistic manner. The participants filled out pencil-and-paper questionnaires both before eating the food and after having finished the dish. The items in the questionnaire were designed to evaluate people's expectations and actual sensory and emotional experience of the dish. The Kandinsky-inspired artistic presentation resulted in the food being rated as more artistic (as expected). More importantly, though, the dish was significantly more liked than both of the other two presentations (a difference of around 36%). While the participants' perceptions of the basic tastes of bitterness, sweetness, saltiness and sourness were unaffected by the plating condition, the food arranged in the art-inspired condition was rated as more than 29% tastier over all. These results suggest that, assuming that there is nothing too unpalatable on the plate when they eventually come to taste it, the diner's hedonic and sensory perception will largely be determined by the expectations that the diner has. ("A taste of Kandinsky: assessing the influence of the artistic visual presentation of food on the dining experience"; Charles Michel, Carlos Velasco, Elia Gatti & Charles Spence, 2014)

According to Namkung et al. (2007), food presentation is a factor that constitutes food quality and impacts the appetite of the customer and their perception of food quality. Presentation is associated with how the food is being prepared and presented to the customers. ("Does Food Quality Really Matter in Restaurants? Its Impact On Customer Satisfaction and Behavioral Intentions" ; Young Namkung, SooCheong Jang, 2007)

So, it can be concluded that the presented dishes must be appealing and appetising.

As food decoration is the process that the diners have offered the selected food in a fashion that is visually appealing. The food presentation has significantly impacted on the way in which people consume their foods. In addition, the different colour, components, texture, shape and arrangements of foods must work together pleasantly and appropriately in order to form pleasing combination on plate.

Decoration of food focuses more with how the food is being prepared and presented to the people who are eating. Remarkably presenting a good-looking and well-decorated food can excite their perception of quality. Ideally, the decoration of the food is a key food attribute in modelling dining satisfaction. Decoration starts from the food layout at the counter, the style of service from the staff, the ambience in the outlet, the cutleries and plateware, variety of dish in a plate and portion size of food itself.

Indeed, the way the diners' interest is cultivated in high-end restaurants through highly complex food preparations and presentations, amongst other factors, is probably a key aspect of designing pleasurable food experiences. Indeed, this study is beneficial in assisting food vendor on how to attract customers and having a precise style of food presentation.



Although the deliciousness and healthiness of foods depend substantially on the skilled palates, sensitivity and responsibility of the individuals delivering them, the results of the various research studies that have been reviewed here clearly demonstrate that the plateware can contribute to the diners' health and overall multisensory eating experience.

Both the interactions between presentation and dishes, and how these elements combine with the rest of the restaurant environment are topics that are rapidly becoming better understood, and are certainly fascinating to study. Further investigation may try to understand how our attention is modulated depending on the food display, getting to know more about the eye's path through the dish, and how that influences the flavour journey the diner will travel could certainly open up new creative processes in the chef's mind. A better understanding of the relationship between the aesthetic of food displays and the main principles of harmony in art could also give light to exciting new approaches.

DISCUSSION

Food decoration can make or break the dining experience into a great success if done right. The visual display of food matters a lot to many chefs and food consumers, too. It is not only about decorating the food, but also making it taste more delicious psychologically for the eaters. Customers love it when the food is arranged and served correctly. It also showcases the standard and level of the restaurant. People in India especially judge the hygiene standards, quality, and taste of a dish without actually tasting it based solely on the way food is presented to them. Thus, food decoration is as essential to a dish as its taste and flavour.

IMPORTANCE OF FOOD DECORATION IN INDUSTRIAL ARENA

Food Presentation Impacts Customer Choices

The way a dish looks has a significant impact on how one perceives it as our home food is always tasty, but even so, people mostly find the food outside to be different and more delicious. That is so because they judge the food also before taste it, and this judgment, for the most part, is dependent upon our sight. The way food has been presented sets our mood and then prepares us for the dish the taste of which we then comprehend in a singular light.

Better presented food also makes customers feel that it was more value for money as the ingredients were high quality, and a lot of effort went into making the dish.

In a social experiment, people were given the same salad; the only difference was that one was simply tossed, and the other was presented well. According to the survey, most people found the well-garnished one to be tastier, and what is more, is that most of them were willing to pay more for it. That is the level of difference that well-presented food can make!

Essential For Food and Restaurant Marketing

In the age of social media where everything is clicked and uploaded, not maintaining aesthetics in food presentation may turn out to be a mistake in marketing of restaurant and social media is a potential opportunity for restaurant to stay relevant to the customers.

On the other hand, if the served food is visually pleasing, people will click and share it. This will market food and restaurant in an indirect and far-reaching way as potential customers are more likely to come to the restaurant on seeing the food on social media. With proper food presentation, restaurants can use their existing customers and channels to upsell the restaurant on social media platforms like Facebook and Instagram.

Food Presentation Communicates the Restaurant Quality

The well-presented food is visually judged to be that of superior quality of restaurant, on the other hand the poorly presented food reflects a mismanaged kitchen and even inferior food quality. Thus, it psychologically communicates the quality standard of the restaurant.

Elevates The Dish

Excellent food presentation comes through measured combinations between the dish and sauces, garnish, and the sides. All these combinations and ingredients not only add to but elevate the taste and quality of the meal. Every appetizer and every piece of garnish adds a different texture and flavour to the dish that later adds up to bring the dish out even more. Food presentation thus makes the recipe not only visually pleasing but tastier as well.

So, the way a plate looks and makes us feel sets the parameter of the method the food is going to feel as to why proper food decoration has become an utmost necessity in restaurants and other commercial arena. Food presentation is not just an art; there is a whole science involved in making the dish appear delicious.

Exclusive chefs at high-end restaurants and hotels take garnishing step seriously today. Wedding and event caterers also garnish their food to make it look beautiful, eye peeling to eat, and add a creative style and flavour to their occupation. Changing the colours, composition and design of the food helps to decorate it. Using the right kitchen tools, they can decorate centre pieces, sculptures, baskets, buffets and plates to compete in food contests. While in a distant future, technologies will play greater role in our decoration practices. Technologies such as in vitro meat, sous vide techniques, and the use of smart phones and tablets at the table are all trends that exist already and it might be more productive to provoke analysis, not of the technological

possibility of new techniques, but of the wider social, political and economic forces that play a decisive role in the spread of these practices between laboratories, restaurant kitchens, supermarkets and the home.

SUMMARY

Food presentation is the art of modifying, processing, arranging, or decorating food to enhance its aesthetic appeal. Creative food decoration and presentation create marvellous atmosphere. Creating lovely and fun plates with food will make everyone, adults and kids, eat and enjoy any meal. Creative and elegantly simple food design can transform eating any ordinary meal into an unforgettable experience. It is often the secret of culinary success. The food has to taste good of course, but a lot of mediocre cuisine is accepted because it's offered to the customer in an appealing manner. On the other hand, no matter how fantastic the food may taste, if it's served on a dirty plate, nobody would want to eat it.

Essential Food Presentation Tips To Keep In Mind

Here are some food decoration ideas one should be keeping in mind while presenting the food.

The Shape of the Plate

The shape of the plate to present the food should impact how the food is perceived. Certain forms are well suited to certain foods only. Angular plates, for example, give the food on it a smart, sleek, and modern look, and so are used to present more contemporary desserts or savoury food items. Round plates, on the other hand, make the food appear more wholesome and are generally regarded to go well with desserts.

The Size of the Plate

Plate size is another factor that is of prime importance in food presentation. The size of the plate must be well thought of, as too small a plate will make the food look cluttered while too huge a dish will make the quantity feel scarce. The plate size must also be supportive of the design. For example, if there are a lot of elements and one is planning to place them vertically, a smaller plate must be chosen but not too small, as some white spaces at the boundary would be needed.

Colour of the Plate

Different colours impact the psychology of people differently, and while some may be preferred for plating, some must never be considered like blue as it is a diet represent. White plates are preferred the most as they bring out the contrast of the colours and provide a neutral base, but if the contrast is right, black plates are considered contemporary and sturdy as well.

Food Plating Spots

On the plate, always follow the clock method to present food. Imagine the face of a clock when begin plating the ingredients. Certain types of ingredients are strictly supposed to go in certain spots. From the diner's point of view in a standard plating, the main ingredient like chicken or fish should be between 3 and 9 on the imagined clock. The starch like potatoes or fries must be between 9 and 12, and the vegetables should be between 12 and 3.

Proportioning

Proportioning of food is crucial if one wants to plate right. Correct proportioning of a dish is essential not only to its attractiveness but also plays an integral role in controlling the costs. The portion of each ingredient should be pre-decided and maintained while plating. The main ingredient should be positioned as the centre of attention and the other elements should complement it, rather than hide it.

Styling

The next food presentation technique is related to the way of putting a dish together or style a dish. The most important rule of this food decoration technique is balancing contrast and variety. Decorating the dish more than it is required too can end up ruining it or making it hideous.

Garnishing

The Garnishing process improves the texture and flavour of a dish. This food presentation technique also requires care and precision. The taste and feel of the garnish will add to the texture of the dish; hence it must be chosen carefully. It can be as simple as a colourful ingredient which if paired makes a more alluring dish to combinations of different fruits, sauces, and seeds which will add to the flavour, acidity, and texture of the dish. Also, easily identifiable organic garnishes should be used whenever possible to avoid the hassles of removing it before serving it to customers.

Using contrasting colours and adding height can make a plate look more interesting. By layering or stacking ingredients, it can give the dish more depth.

Using the plate as a canvas is key in mastering the art of plating. Sometimes decorators need to take a few steps back to look at the plate like a work of art. Food should be created with passion, thought and technique, but plated with a light hand, with direction from nature. Colours should reflect the seasons, with contrasting light and dark shades that evoke emotion. In the end, keep it simple and let the ingredients be the stars.

CONCLUSION

The main motive of doing this work is to encourage those in the food industry to think about eating as a multisensory experience and therefore allow professionals to better deliver positive results to diners and consumers. Rather than looking at food itself the focus is on the particular performance of fine dining, shrouded in the mystery and spectacle that comes along with the molecular gastronomy.

Today eating becomes about a lot more than what goes on in our mouths, sweeping away the static understanding of flavour as a quality of the food itself. It becomes an exciting provocation

for more transdisciplinary concern over the relationship with food that moves beyond traditional assumptions of bounded individuals and rational action to reconfigure the ways in which we think about taste and flavour in both social and embodied terms like changing the colour of a food or beverages can send a very powerful signal to the diner's brain about the likely taste and flavour they are about to experience.

The innovative methods employed by the various research teams offer useful knowledge to those interested in the study of the science and technology of food and are likely to provoke discussion around the ethical and philosophical factors at play in deliberate manipulation of food behaviours through sensory cues.

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