

# CHEERS TO CRYO MARGARITA!

CRYO  
MARGARITA



SPHERES THAT BURST  
IN YOUR MOUTH TO  
OFFER INTENSE POPS OF  
FLAVOUR. CUNNINGLY  
CREATED FOOD THAT  
LOOKS LIKE IT IS ONE  
THING BUT IS ACTUALLY  
SOMETHING ENTIRELY  
DIFFERENT. DISHES  
WHERE YOU TASTE  
MULTIPLE FLAVOURS IN  
A PLANNED SEQUENCE.  
ONES THAT INCORPORATE  
AROMAS AND SOUNDS OR  
TEXTURES. IT'S CLEVER  
CUISINE. IT IS MOLECULAR  
COOKING THAT  
INCORPORATES SCIENCE  
AND TECHNOLOGICAL  
TOOLS FOR EVER NEWER  
AND MORE EXCITING  
EXPERIENCES.  
**PRIYA PATHIYAN** EXPLORES  
HOW...

CHEMISTRY AND FOOD SCIENCE HAVE JOINED HANDS TO DISH OUT SOME FANTASTICALLY DRAMATIC CREATIONS, THANKS TO SOME BRILLIANT MINDS AT WORK IN PROFESSIONAL KITCHENS

RASPBERRY CAVIAR  
WITH STRAWBERRY  
FOAM AND CARAMEL

**C**

ooking has been about science right from the first time a human cracked an egg and decided to crisp it up in a bit of animal fat. Maybe even before that. It's been a continuous journey of experimentation down the decades. And today, restaurants across the world are raising the bar to evolve ever more interesting versions of classic preparations or create entirely new ones. Experts are applying the science of how different ingredients react at molecular levels and using these reactions to be the foundation for presenting food in a very visual, sometimes interactive, and often surprising format.

Think of the newly ginger-haired Heston Blumenthal, no stranger to the average Indian who has watched a few seasons of *Masterchef Australia*, who wields his molecular magic wand at The Fat Duck in London. His famous *Sounds of the Sea* dish, created in 2007, was all about his multi-sensory philosophy. He created a

course of dried kelp, hijiki seaweed, baby eels, razor clams, cockles, mussels and sea urchins, displaying in a way that was reminiscent of the sea shore, with an ocean 'spume' and edible sand. He served this on a glass-topped box that was filled with real sand. To add to the experience, there was an iPod in a conch shell attached to headphones that played the sound of seagulls and the waves crashing on a beach. These tableside theatrics are not only an impressive indication of culinary skills but also necessary for a restaurant and its chef to be taken seriously in gourmet circles and talked (or tweeted) about.

Many Indian chefs are clued in to this phenomenon. Of the three restaurants that Abhijit Saha, Founding Director & Chef of Avant Garde Hospitality owns, two keep modern culinary techniques centre-stage. His award-winning signature Indian restaurant is Saha in Singapore and Caperberry in Bengaluru, where he hosted and impressed *MasterChef Australia's* celebrity judges Gary Mehigan and George Calombaris in 2012. When we ask him to pick one creation that incorporates molecular cooking that he is personally proud of, he finds that difficult, as the tasting menu at Caperberry changes every two months and there are ▶

PHOTO: DREAMSTIME

CHURROS MODERN - WITH A MOLECULAR TOUCH



THE DESI DEMYSTIFICATION

SARABJIT KAUR, MASTERS STUDENT IN FOOD INNOVATION & PRODUCT DESIGN AT THE AGROPARISTECH, FRANCE, EXPLAINS...

In Indian cuisine we have a lot of interesting physiochemical phenomena going on. For instance, the swelling of a roti or the spongy texture of khaman dhokla. We study these phenomena under Molecular Gastronomy.

There's also the study of Culinary Precisions, which are age-old practices used in cooking. For instance, the fact that resting the dough before making rotis keeps them soft for a long time. Molecular Cooking is the use of scientific principles in cooking. For example, making a Kulfi with liquid Nitrogen or serving lassi in an ice sphere. That will be similar to pani-puri but the pani will be replaced by lassi and the puri will be a hollow ice sphere.

Note by Note (NBN) cooking is using compounds like protein powder for creating food. In NBN, we use only chemical compounds as ingredients. For flavours as well we use chemical compounds. For example, using protein powder for making Chicken tikka. So, Indian dishes and flavours can be used for NBN cooking.



PHOTO CHEF ABHIJIT SAHA, CAPERBERRY AND SAHA DREAMSTIME (BELOW)

► so many dishes that he has innovated with. It's all about the right ingredients and techniques, experimenting

MOLECULAR COOKING OFTEN RELIES ON LED-BLINKING WATER BATHS, SYRINGES, PH METRES AND SHELVES OF FOOD CHEMICALS LIKE XANTHAN

and perfecting each creation. "And our patrons have loved the results. Be it a deconstruction of Salad Caprese, the imitation

Carpaccio or the live New Age Tiramisu. Also, the duck in different versions," he says. Some of his dishes with Indian flavours that are also enhanced by molecular cooking techniques are the Gol Guppa Spherification, Sous vide cooked lamb roulade with Kakori Kebab Spices and live maple wood smoke and Spiced Cryo Espuma which have been quite a hit.

Similarly, Gaggan Anand, who went through the paces with Ferran Adria at the erstwhile El Bulli, recently impressed Mumbai's luxe lunch bunch with his dhokla foam and chocolate pani puri. His eponymously named restaurant Gaggan in Bangkok, Thailand, was proclaimed the 17th best restaurant in the world earlier this year.

Gresham Fernandes, Group Executive Chef, Fine Dine Division at Impresario Entertainment & Hospitality, and the man behind Delhi's Smoke House Room's genius, spent three months at Noma last year to understand the Nordic cuisine and molecular techniques. "At that point, we had forayed into degustation menus and 20-course meals at Smoke House Room. We had travelled a lot - Spain, France, the UK - just eating at restaurants, thinking what we wanted to do in our own country. Working at Noma ►



CHEF GRESHAM FERNANDES

HOW IT ALL CAME ABOUT...



1969

HUNGARIAN-BORN, OXFORD-BASED PHYSICIST NICHOLAS KURTI GIVES A LECTURE AT THE ROYAL INSTITUTE CALLED 'THE PHYSICIST IN THE KITCHEN'



1988

KURTI MEETS FRENCH PHYSICAL CHEMIST HERVÉ THIS AND THEY CONDUCT SEVERAL EXPERIMENTS TOGETHER AND FIRST REFER TO THIS MODERNIST COOKING AS 'MOLECULAR AND PHYSICAL GASTRONOMY'



1992

A SET OF WORKSHOPS CALLED 'SCIENCE AND GASTRONOMY' ARE HELD IN ERICE, ITALY, BRINGING TOGETHER SCIENTISTS AND PROFESSIONAL COOKS FOR DISCUSSIONS ABOUT THE SCIENCE BEHIND TRADITIONAL COOKING PREPARATIONS



1994

HERVÉ THIS PROPOSES THE THEORY OF NOTE BY NOTE CUISINE AND PIERRE GAGNAIRE COLLABORATES WITH HIM

► for three months, I got a different perspective on how people cook there with very few ingredients, how to keep it fresh and the ideas churning,” he says.

For him, it's all about using the techniques to create something that can't otherwise be done. “For instance, if you want to try and freeze a gin and tonic, it can only be done using liquid nitrogen,” he says. And it's imperative that molecular cooking isn't used just because it's there, but because it serves a purpose, he emphasises, explaining, “Foams have always been around. They're basically just an incorporation of air into anything. Cappuccinos in the 1920s had foam. But that was created to keep the coffee hot as it was cold in Italy. Similarly, the way filter coffee is poured at a height from cup to cup in South India makes it creamy. It's there for a reason, not just to impress.”

## SOME KEY MOLECULAR TECHNIQUES INCLUDE HOT ICE, JELLY NOODLES, AROMA LEAF, FOAMS, LIQUID NITROGEN AND DEEP FRYING IN WATER

So, what according to him, is the essence of modern cooking, we ask. Fernandes grins, “Basically, all the top chefs are just kids in their heads. The food is always about a surprise, about tapping into nostalgia, just an opening of your mind. Like, if you've grown up in Mumbai, you'll remember Simba wafers, which you ►



PHOTO: MASALA LIBRARY BY JIGGS KALRA



ABOVE JALEBI CAVIAR WITH SAFFRON GLAZE AND PISTACHIO RABDI

INSET ZORAWAR KALRA OF MASALA LIBRARY BY JIGGS KALRA

FAR LEFT THE TRADITIONAL MISHTI DOI GETS TRANSFORMED INTO LOLLIPOPS

LEFT MOLECULAR COOKING TECHNIQUES TURN KHANDVI INTO SPHERES

## ON A NEW NOTE



PHYSICAL CHEMIST HERVÉ THIS, WHO WORKS AT THE INTERNATIONAL CENTRE FOR

MOLECULAR GASTRONOMY AGROPARISTECH-INRA IN PARIS, IS CONSIDERED THE GODFATHER OF MOLECULAR COOKING. HE'S THE MAN WHO WAS INVITED TO LECTURE ON LIQUID NITROGEN WHEN HE WAS 12 AND THE ONE WHOSE SCIENTIFIC EXPERIMENTS AND RESULTANT KNOWLEDGE HAVE INSPIRED AND IMPACTED CHEFS ACROSS THE WORLD, FROM HESTON BLUMENTHAL TO PIERRE GAGNAIRE! EXCERPTS FROM OUR INTERVIEW WITH THE MAN WHO FAMOUSLY UNBOILED AN EGG...

**If all cooking is about science, then how is molecular cooking different?**

In my view, cooking has nothing to do with science, and science has nothing to do with cooking! Indeed, cooking is technique + art. Science is looking for the mechanisms of phenomena, and science does not make anything except producing 'explanations', models, theories. When you use the result of science, it's for education or for technology. And technology makes the link with technique (cooking). Molecular gastronomy is defined as 'the science that looks for the mechanism of phenomena occurring during cooking'. This is different from 'molecular cooking' which is nothing to do with science. Its definition is 'cooking with modern utensils'.

**Do you believe that a home cook can and should try molecular cooking or should it be left to the professionals?**

Molecular cooking was introduced for anyone! I don't

care about professionals (in a way), but I use them to show the way. This is part of my strategy. But remember that I am working for the public. We deserve modern tools for cooking, not Middle Age pans!

**In your opinion, who are the current chefs doing the most innovative work in molecular cooking?**

Ah! You have to know that molecular cooking is a very old stuff, as I proposed it in 1980. Today, I am in New York in order to show the new thing, called Note by Note Cooking. And Pierre Gagnaire is the first in the world who could do this!

**What exactly is Note by Note cooking?**

It began in 1994, when I dreamt of the day when recipes gave advice like 'add to your bouillon two drops of a 0.001 percent solution of benzylmercaptan in pure alcohol'. The ingredients used in Note by Note cuisine include water, ethanol, sucrose, amino acids and lipids. For example, in wine made by Note by Note cuisine, the following might be added: water, anthocyanins (for colour), sugars, ethanol, amino acids (for flavour), glycerol, phenols, quinones, and organic acids. Pierre Gagnaire and I developed Note by Note dishes for between six months and a year and presented the first Note by Note meal in Hong Kong in 2008. Two years ago, I published La Cuisine Note à Note and now, every year, I, along with the chefs and students at Le Cordon Bleu prepare a note by note dinner. In the Note by Note sphere, the idea now is to understand the 'bioactivity' (think of flavour release as an example) of about 1,500 different kinds of gels that I discovered.

**Do you think Indian cuisine lends itself well to molecular cooking?**

Yes, Indian cuisine can certainly be modernised.

► only get at the circus these days. So your Waiter could just come up wearing a red clown nose and give you wafers with vinegar and salt... It doesn't have to be 200 ingredients to be good. It has to be simple but done with a perspective and presented a certain manner. And unlike in the past where people just did things for effect and used three different techniques on a plate, everything is simple and flavourful today. I look at it as Instagram. You can take a picture and spoil it by using too many different settings or you can have a good picture and even use it without a filter. And yet, the visuals are very important.

## NOTE BY NOTE CUISINE USES WATER, ETHANOL, SUCROSE, AMINO ACIDS AND LIPIDS

They can make or break a dish. It's always good to have beauty on the plate. That's what everyone wants. A chef can cook good food, but the question always is 'how do you elevate it?' Molecular cooking gives you more ways to play with it."

Fun is something that Zorawar Kalra understands well. As the son of celebrity chef Jiggs Kalra, and Founder & MD of Massive Restaurants, he could have stuck to the tried-and-tested formulae of success – plush Indian restaurants with familiar Indian food. Instead, he has chosen to do it differently, with flair. The man behind Delhi's recently opened Farzi Café and Mumbai's Masala Library by Jiggs Kalra that has been getting rave reviews since 2013, tells us how he conceptualised the unique ►



MOLECULAR COCKTAILS ARE A HIT AMONG FANCY FOOD LOVERS. TECHNIQUES LIKE DRY ICE AND LIQUID NITROGEN CREATE A DRAMATIC EFFECT

PHOTO BRICKHOUSE CAFE AND BAR, MUMBAI/DREAMTIME (RIGHT)



SPHERICAL VANILLA YOGURT WITH STRAWBERRY COULIS



MOLECULAR BREAKFAST- EGG, ASPARAGUS AND BACON

## THE DESI DEMYSTIFICATION



ABHIJIT SAHA, THE MAN BEHIND THE MENUS AT CAPERBERRY, BENGALURU, AND SAHA, SINGAPORE,

IS ONE OF INDIA'S FOREMOST EXPERTS IN MOLECULAR COOKING. HE EXPLAINS THE SCIENCE OF IT AND THE MOST COMMONLY USED TECHNIQUES...

Chefs are now collaborating with chemists, food scientists and industrial designers to transform food that look and taste different. Some key techniques include deconstruction, hot ice, jelly noodles, encapsulations, aroma leaf, foams, sous vide, liquid nitrogen and deep-frying in water. Another aspect of molecular gastronomy is combining foods with similar volatile aroma molecule compositions, which determine their flavour. If one ingredient has high levels of amines or aldehydes then it should be combined with other ingredients that contain high levels of amines or aldehydes. At the Fat Duck, Heston Blumenthal (even though he does not subscribe to the term 'molecular gastronomy' to describe his cooking) combines caviar with chocolate and oysters with passion-fruit jelly. Unusually shocking combinations seem to work wonderfully due to the presence of common amines.

**CRYO COOKING** This new-age method of cooking uses liquid nitrogen to cool food very quickly at a staggering minus 196 degrees centigrade. This process aids in creating interesting textures and mouth feel, and sensational style of food presentation. At Caperberry, we use liquid nitrogen to prepare some of our signature creations including Cryo Margarita,

Granita of sangria, Frozen duck liver parfait powder, Frozen chocolate ganache powder and Cryo espuma.

**SOUS VIDE COOKING** Described by Harold McGee (who wrote the chef's bible, *On Food and Cooking: The Science and Lore of the Kitchen*) as 'one of the most important culinary innovations of modern times', sous vide is a French term that literally translates to 'under vacuum'. It is a slow cooking method, where food is cooked in an airtight bag, immersed in a water bath heated to a precise temperature. Especially useful for cooking seafood and meats, this unique technique prevents the leaching out of juices, helping to retain tenderness and flavour, all the while cooking the food to perfection. At Caperberry, we use this technique for all our meats, some seafood, fish and vegetables.

**SPHERIFICATION & FAUX CAVIAR** Spherification is a modernist technique pioneered by the celebrated Ferran Adria of El Bulli fame. It is a process by which liquids are shaped into spheres without external casing, using Xanthan (a thickening agent) and Gluco (Calcium Lactate Gluconate) in a water bath and sodium alginate (a seaweed extract used to increase viscosity). The liquid is encased within itself. Sizes of the spheres can vary, but when spherifications are made in tiny sizes they are referred to as imitation or faux caviar, because of their resemblance in appearance and texture to caviar. Both spherifications and caviars create startling explosions of flavour in the mouth. At Caperberry spherification is used to prepare spoon cocktails, skinless raviolis, fruit caviars and much more.

► menus. “The thought came to me almost eight years ago when I had visited El Bulli in Spain. After experiencing it, I kept wondering why we could not do something similar with Indian cuisine. It seemed too cutting edge and radical for that time, but now the infrastructure is available, enabling us to make bhel-puri with liquid nitrogen, where you get

## CRYO COOKING IS A NEW AGE METHOD THAT USES LIQUID NITROGEN TO COOL FOOD QUICKLY AT A STAGGERING MINUS 196 DEGREES CENTIGRADE

exactly the same flavour of the dish, but in a scientific, surprising way. The idea behind Farzi Café was to bring Indian cuisine back ‘in vogue’. Young people love eating out, but they don’t go for Indian meals, which intrigued me for the longest time, and then I realised that there is a lack of hipness associated



CRYO ESPUMA OR FOAM

with our cuisine, even though the pleasure of having a good Indian meal actually supersedes anything else. As an Indian and an avid lover of the robustness Indian food offers, we take immense pride

in our cuisine and believe that it is up to us to make the effort to elevate Indian food, reintroduce it to the world in its modern avatar, retaining its traditional roots.”

Kalra believes that dining is a sensory experience. According to him, “Though the taste of a dish is of extreme importance, while eating, it is essential to use all the five senses to enjoy a holistic culinary experience, which not only does justice to the food served but also engages the consumer at various levels with an avant garde experience.” The very clinically named Phirni Oxide at Farzi Café is certainly dramatic and engaging, being poured in front of you at the table with liquid nitrogen, and then broken into a hundred pieces! Meanwhile in Mumbai, the thandai sphere served as an amuse bouche at Masala Library, encapsulates all the flavours of the traditional thandai into a small bubble, which bursts as soon as you put it into with your mouth, releasing all the flavours of the dish! They also do a signature cocktail, which uses the foaming technique to create a star anise foam. This offers a glimpse into the potential use of modern techniques, not just for cooking food but also to develop unique beverages.

At an industrial-themed Mumbai bar, all the bartenders are trained to make ‘molecular cocktails’, which the patrons are really finding interesting. The most popular is the Dutch Kettle, made with orange, basil and dry ice, which has people reaching for their cell phones to click and post pictures on social media sites. Whiskey drinkers like The Smoked Godfather, which is infused with a smoky burnt

COCONUT JELLY & MANGO GEL MADE TO RESEMBLE AN EGG USING MOLECULAR GASTRONOMIC TECHNIQUES, GARNISHED WITH PASSIONFRUIT PEARLS OR CAVIAR



wood flavour. “Molecular Gastronomy is becoming popular worldwide. I first saw these techniques in London and decided to see if we could recreate some of them. The response has been overwhelming!” enthuses Bunty Arora, owner of the Brickhouse Café and Bar.

The trend seems to be catching on with more and more restaurants in India starting to experiment with molecular cooking. Kalra says, “This is surely the beginning

and there is a lot more that we have to showcase using modern culinary techniques and presentations. However, it is important for us to be aware that too much too soon may not work today. I believe there is still a long way to go before you would witness a pure molecular gastronomy concept in India appealing to the five senses of the diners.”

According to Fernandes, while there are people like Kalra who are doing it and doing it well, it’s hard to create

an Indian menu that uses a lot of these techniques. “Indian food is not built that way and molecular cooking takes away from it. It’s not that we cannot do it, but it’s a thin line,” he avers. When we press him for more clarity, he explains, “In India, there are too many variations (some people will eat only vegetarian, some won’t eat pork, others won’t eat beef, some will be fasting on certain days, etc) and it’s difficult to customise that much and at such short notice.

For instance, Noma has just 30 dishes. People book tables in advance, they come on time, they don’t ask for too much customisation except in case of dietary restrictions or allergies. That makes it easier to plan as all of these processes are time-consuming and you have to create your menu much in advance. Also, when people visit a restaurant of that calibre there, they look at the chef as a musician. They go for the music. They respect it.” ●

PHOTO CHEF ABHJIT SAHA, CAPERBERRY AND SAHA, DREAMSTIME (ABOVE)

## YOU CAN DO IT TOO!

IF YOU LOVE SCIENCE AND DREAM OF DISHING UP DELECTABLE FOOD, MOLECULAR CUISINE CAN EMERGE FROM YOUR KITCHEN TOO!

MolecularRecipes.com, a leading online source for molecular gastronomy recipes and techniques which has even been invited by the Harvard School of Engineering and Applied Sciences to present to their Science & Cooking class, strongly believes that molecular cooking should not be the turf of top chefs alone. Their Quantum Chef explains, “I would see these amazing dishes created on television. I would taste these culinary masterpieces at restaurants. But that wasn’t enough. I had to try it myself. My love of science, physics, design and food drove me to explore and experiment with Molecular Gastronomy at home. Using make-shift equipment and ingredients, I would hunt for online and in specialty stores, I was able to create my own dishes. Of course, there was a lot of trial and error, but with experience and practice I was able to master the techniques and achieve some beautiful results.”

With all this talk of chemicals, is it safe to create and to eat, you wonder. “When people hear the words Molecular Gastronomy or molecular cuisine for the first time they often mistakenly view it as unhealthy, synthetic, chemical, dehumanising and unnatural. This is not surprising given that Molecular Gastronomy often relies on fuming flasks of liquid nitrogen, LED-blinking water baths, syringes, tabletop distilleries, PH meters and shelves of food chemicals with names like carrageenan, maltodextrin and xanthan. The truth is that the ‘chemicals’ used in molecular gastronomy are all of biological origin. Even though they have been purified and some of them processed, the raw material origin is usually marine, plant, animal or microbial.

These additives have been approved by EU standards and are used in very, very small amounts. The science lab equipment used just helps modern gastronomy cooks to do simple things like maintaining the temperature of the cooking water constant (water bath), cooling food at extremely low temperatures fast (liquid nitrogen) or extract flavour from food (evaporator). There is still some debate out there about the healthiness of molecular gastronomy but I personally believe there are far bigger health issues in the everyday food we consume. In the end, you are not going to be eating liquid pea spheres every day anyway,” explains the Quantum Chef.