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...
Cooking 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
In Indian cuisine we have a lot of interesting physicochemical 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.

How many dishes that he has innovated with. It’s all about the right ingredients and techniques, experimenting 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 Gappa Spherification, Sous vide cooked lamb roulade with Rakori 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 elite 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 traveled a lot - Spain, France, the UK - just eating at restaurants, thinking what we wanted to do in our own country. Working at Noma...”

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

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

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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

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 in 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.}

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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 formula 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 concept of success – plush Indian restaurants with familiar tried-and-tested formulae he could have stuck to the

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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-freezing 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.

SOUIS 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 while cooking the food to perfection. At Caperberry, we use this technique for all our meats, some seafood, fish and vegetables.

SPHERIFICATION & FAUX CAVIAR Spheration is a modernist technique pioneered by the celebrated Ferran Adrià of El Bulli fame. It is a process by which liquids are shaped into spheres without external casing, using Xanthan (a thickening agent) and Glucon (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 spheronisations 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 spheronisations and caviars create startling explosions of flavour in the mouth. At Caperberry, spheronisation is used to prepare spoon cocktails, skinless raviolis, fruit caviars and much more.

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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 still a long way to go 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 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 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 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 more and more restaurants in India want 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 we 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 menus. “The thought came to me almost eight years ago when I had visited 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 holi-puri with liquid nitrogen, where you get

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.”

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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.”

DO YOU WANT TO KNOW MORE ABOUT MOLeCUlar Gastronomy in your kitchen? 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 at 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 lighting water baths, syringes, tabletop distilleries, PH meters and shelves of food chemicals with names like carageenan, 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 molecular 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 nitrogen everyday anyway,” explains the Quantum Chef.