

Chef's Prospective Applications of Molecular Gastronomy in Cuisines of Uttarakhand

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Abstract

Molecular gastronomy is defined as the study and application of chemistry, physics, and other scientific principles on cooking. As part of a sub-discipline of food science that is characterized by avant-garde cooking techniques, molecular gastronomists study the chemical-physical processes that take place when you cook food. Some innovations that the movement has birthed include blood orange foam, transparent ravioli, cocktail ice spheres, hot ice cream, soy sauce crystals, and fried mayonnaise. Restaurants around the country have adopted the trend to transform flavors and presentations. Read on to learn the origins and concepts of this culinary craze.

Being the holiest shrines of Hindu, for more than thousand year's pilgrims visiting as Char-Dham Yatra in hope of salvation and purification of sin. The cuisine has regional influences because of its geographical locations, invasions and foreign settlers. The food and style of cooking are seasonal due to change in weather. The organic food and slow cooking suits tremendously of high-energy necessities of mountain and cold climate. The application of molecular gastronomy principle can bring the radical change in local food presentation and orchestra in cooking experience.

Keywords: Molecular, Gastronomy, Spheres, Foam, Local Food

equipments focusing on refined processing with best possible public health practices. The interdisciplinary approaches in research motivated the researchers to go beyond their area of specialization in achieving the better results (Professor Ravindra Kumar, V.C. IGNOU). The innovation, modern practices and scientists interest in cooking from field of physics and chemistry lead to radical change in molecular gastronomy. Chefs are moving out of their traditional kitchen and wishing to know the physiological changes what they have been cooking since centuries.

Molecular Gastronomy is a converge of two core discipline; principles of food science and professionalism of culinary arts. It includes scientific explorations of past and currents practices, proximal adjustment of ingredients in traditional recipes, rigorous and controlled testing of ingredients and in overall recipe; addition of scientific practices and methods to create orchestra in food presentation. The gastronomy has triggered scientific rigor in chef's world of edible creations. It has become an art of producing food via using new tools, techniques and methods in consultations with biologist, chemist and chefs in a well equipped experimental lab cum kitchen.

Literature Review

Gastronomy is a large knowledge which includes all activities that helps feeding mankind. It mainly focused on providing the best food to all consumers Brillat Savarin (1825) Rumford emphasis to improve the working knowledge of chefs including use of ingredients, tools, equipment along with cooking methods and techniques applied during cooking. According to him chefs must be trained for better understanding of food science and its application in cooking Rumford (1969). According to

Introduction

"I think it is a sad reflection on our civilization that while we can and do measure the temperature in the atmosphere of Venus we do not know what goes on inside our soufflés."

—Nicholas Kurti

Cooking has changed with advancement in culinary world. The manufacturing industries are developing the

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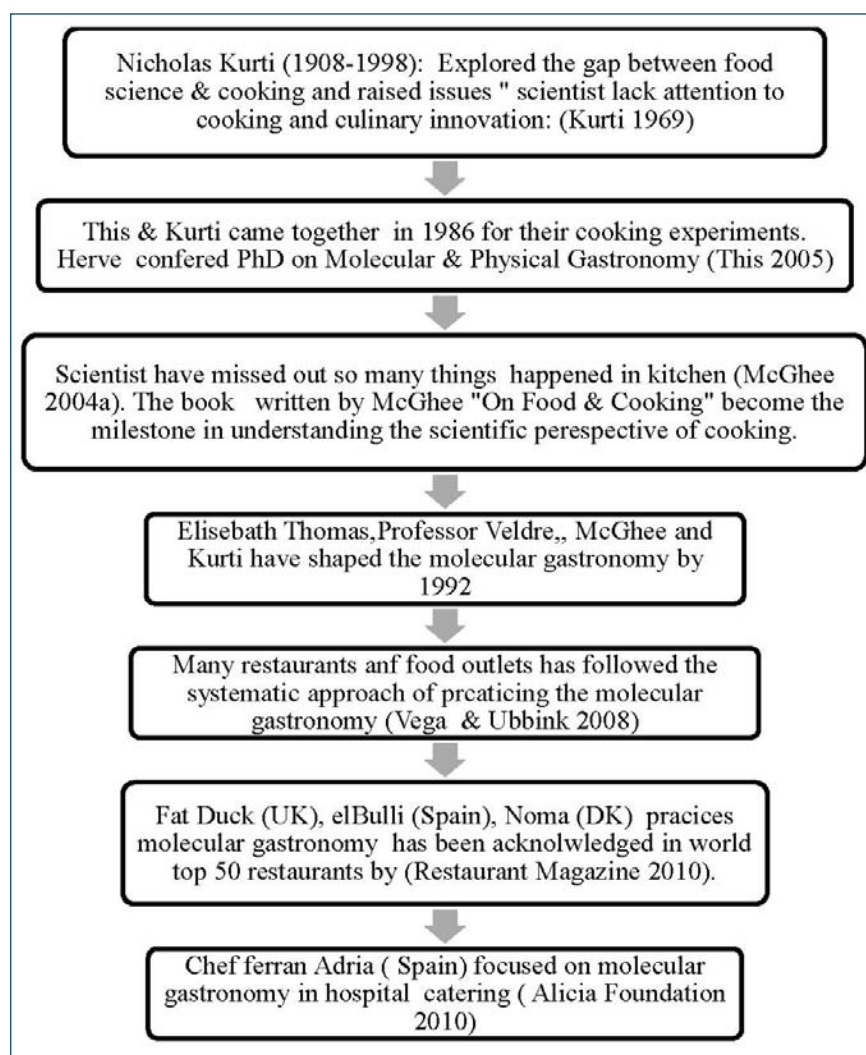
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Savarin everyone who are directly involved in cooking must have better understanding of science, technology and physiology to prepare better gastronomic products Brillat Savarin (1999).

Molecular Gastronomy can be a phenomenon of science in preparing any dish. The properties of physics and chemistry are recommended in compilation of a dish. It also provides more scope to develop new concepts and

variety of food presentations creating orchestra among food lovers. Emphasis on more focus toward cooking skills This (2006). According to Herev, there is great confusion about the term Molecular Gastronomy Herve (2006). Molecular gastronomy can be explained as unique meal experience with the help of scientific practices. It is the need of time that chefs should incorporate the methods, procedures and various agents to improve the sensory experiences of their food Bailey (2010).

Molecular Gastronomy Journey from 20th – 21st Century



Principal Approaches

The result of whipping egg white in a copper based apparatus gives better result as compared to stainless or glass based apparatus McGhee (2004), Prince & Linden (2001). Cooking at low temperature in sous-vide cooking specially for meats usually develop and improve better texture and results minimum loss McGhee (2004).

Chefs who are often associated with molecular gastronomy because of their embrace of science include Heston Blumenthal, Grant Achatz, Ferran Adrià, José Andrés, Sat Bains, Richard Blais, Marcel Vigneron, Sean Brock, Homaro Cantu, Michael Carlson, Wylie Dufresne, Pierre Gagnaire, Adam Melonas, Kevin Sousa, and Laurent Gras. Molecular gastronomy chefs use high-tech equipment and chemicals and combine different textures, ingredients, and tastes to create multi-sensory

dining experiences. Despite their seemingly outlandish techniques, molecular gastronomists prioritize quality and flavor. Popular molecular gastronomy techniques employed by modern chefs include frothing and foaming, dehydration, spherification, and sous vide.

Froths and Foams

There are a number of ways to create froths and foams, such as using a cream whippier or hand blender.



Dehydration

Molecular gastronomists use dehydration to preserve the crispiness and flavors of food, as well as create crunchy textures and flavored powders.

Spherification

Spherification makes juices, sauces, and soups look like little balls of caviar. This technique consists of mixing a liquid in sodium alginate, dropping it into a mixture of calcium salt and water, and then scooping the mixture out quickly enough so that it jellies on the outside and stays liquid on the inside.



Sous Vide

Sous vide is a popular technique that involves sealing food in an airtight plastic bag and cooking it in a water

bath for several hours on low heat. Sous vide allows food to retain its moisture and flavor.

Tools, Equipments and Utensils Used in Cooking

Confectioner 	Dehydrators 	Micro Scales 
Plastic Syringe 	Butane Burner 	Spherification Spoon 
Whippers 	Serve ware 	Mixology Tools  Flower Extracts

Molecular Gastronomy Delicacies

		
Cocktail Ice Sphere	Transparent Ravioli	Apricot Gel & Paper

		
Clear Canapés	Mango Sphere	Saffron Tagliatelle
		
Carrot Air	Mojito	

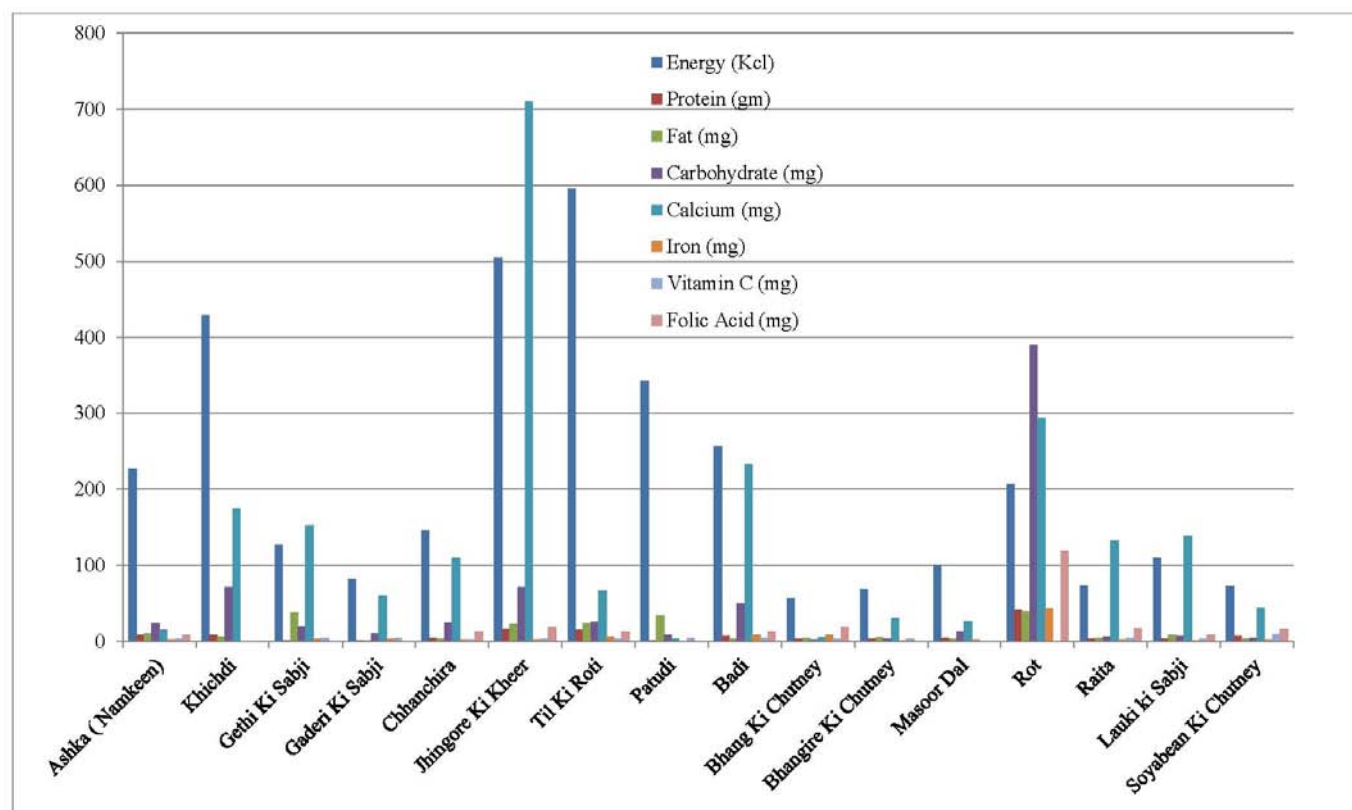
An Insight to Uttarakhand

Uttarakhand, long called adobe of the gods has a culturally colorful society. The religious, social and cultural urges of the people finds an expression in various fairs & festivals. The region has a very old and rich culture & shows a distinctive pattern with the elements from each of the ethnic groups and sub – group that reside in this place. It can be said that the cultures of Uttarakhand is a juncture where different cultures of the Kumauni - Garhwali meet Karush (2013).

Special features of Kumauni Cuisine

The regional dishes of Uttarakhand and their style of cooking changes according to season. The outcome of cooking leads by keeping the body calm and cold during summers while in winter the practices of dishes happens which provides heat in body to fight against tough winters. It has been observe the gravies prepared thicker in winters while in summers the curry are thin down by adding Chhas or grounded pulses. Mehta, Negi & Ojha, (2010). Other than meat variety of local pulses like Gahat, Bhatt, Urad, Lobia, Soybean are widely used in day to

day preparations. These dishes include Bhatt ke Duke, Aghast ke Dubke, Churkani, Urad ka Chaisa, tempered with red chili and Heeng are good source of protein, Mehta, Negi & Ojha, (2010). The millets and pulses grown in tough climate need a long stewing to impart all its flavor and taste. The best fuel for such cooking is wood and charcoal. The wooden logs are set on fire for slow and continuous cooking. Mehta, Negi & Ojha, (2010). Kodo, Sorghum, Proso Millet, Foxtail Millet, Finger Millet and Bamyard Millet are the major millets used in regional cuisine are rich source of nutrients like calcium, iron, and protein and magnesium. These are staple food of locals. Chandra & Nautiyal (3013). Locally grown Jammu, Gadreini, Jakhiya, Bhang seed, heeng, raie are major ingredients used as tempering in almost all savory dishes. Bungla, Tewari, Bhatt & Kishore (2012). Pahari Palak, Bichho Ghas, Chauli, Lingora, Kothiyar, Jhankara, Pania, Gandpapar, Bathua are major leafy vegetable used in cooking. Mehta, Negi & Ojha (2010). Almost all edible ingredients have certain medicinal benefits which help the local people to live healthy in tough winters and sudden changes in weathers. The pulses like Gahat are used in treatment for stomach stone and Semal Fruits are used to increase sperm count in males Shah (2014).



Sources: Raghuvanshi, Rita Singh, Uttarakhand Ke Paramparik Vayanjan, Rashtriya Krishi Prodyogik pariyojana, GB Pant University (2003)

Hypothesis of the Study

Kumauni Cuisine of Uttarakhand have tremendous features in terms of its availability, use of organic ingredients, nutrition, spiciness, public health practices, reasonable price and its popularity. The association between chefs and Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand need to be testified.

H₁: Chef's age has negative correlation with Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand.

H₂: Chef's qualification has negative correlation with Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand.

Objective of Study

To find tools, equipments and methods used by chefs in Molecular Gastronomy.

To study the special features of Kumauni Cuisine and prospective fusion with Molecular Gastronomy.

To study the interrelation between chef's qualification, chef's age and prospective application of Molecular Gastronomy in Kumauni Cuisines of Uttarakhand.

Research Methodology

To understand the acceptability of molecular gastronomy and Chef's prospective applications of molecular Gastronomy in Local Cuisine of Uttarakhand Semi-Structured questionnaire was designed to get free and frank responses from chefs working at various tourist destinations in Uttarakhand.

The variables were used from past studies. The questionnaire uses nominal as well as five point Likert scale from strongly disagree to strongly agree. The sample size planned for the study was for 75 chefs from Kumaun Region of Uttarakhand, who are familiar about molecular gastronomy. The received questionnaires were 61. The validity of data through Cronbach's Alfa was 0.79 which indicates good reliability of data. The primary data has been analyzed with the help of statistical techniques.

Data Analysis, Interpretation and Discussion

The primary data collected from 61 respondents has been used to derive inferences. The data was analyzed in SPSS 17. In order to test any hypothesis for finding the interrelationship between variables, the Correlation tool suppose to be one of the most practiced in research fields. First hypothesis try to find out the relationship

between age and prospective applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand. Since age and application are two variable for study, hence Bi-variate correlation analysis was done. Second hypothesis try to find out the relationship between qualification and prospective applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand. Since qualification and application are two variable for study, hence Bi-variate correlation analysis was done.

Table 1: Demographic Profile of Respondent (N=61)
Frequency

AGE		Frequency	Valid Percent	Cumulative Percent
LESS THAN 50		37	60.7	60.7
ABOVE 50		24	39.3	100.0
Total		61	100.0	

GENDER		Frequency	Valid Percent	Cumulative Percent
Valid	MALE	52	85.2	85.2
	FEMALE	9	14.8	100.0
	Total	61	100.0	

QUALIFICATION		Frequency	Valid Percent	Cumulative Percent
Valid	UG	43	70.5	70.5
	PG AND ABOVE	18	29.5	100.0
	Total	61	100.0	

INCOME		Frequency	Valid Percent	Cumulative Percent
Valid	Annual income Less Than 3 Lacs	35	57.4	57.4
	Annual income more than 3 lacs	26	42.6	100.0
	Total	61	100.0	

Table 2: Statistical Mean & Standard Deviation for Prospective Applications of Molecular Gastronomy in Kumauni Cuisine of Uttarakhand

		Local Cuisine of Uttarakhand are Flavorful and tasty	Use of organic food is higher	The meal is nutritious and well balance	Star Category Catering establishments are familiar with Molecular Gastronomy	Molecular Gastronomy applications can be applied in Kumauni Cuisine
N	Valid	61	61	61	61	61
Mean		3.9508	3.2459	3.7869	1.6230	3.2787
Std. Deviation		.80470	1.07480	.91496	.68712	1.19904

Table 3: Correlations between Chef's Age & Prospective Applications of Molecular Gastronomy in Kumauni Cuisine of Uttarakhand

			Age	Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand
Spearman's rho	AGE	Correlation Coefficient	1.000	-.215
		Sig. (2-tailed)	.	.096
		N	61	61
	Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand	Correlation Coefficient	-.215	1.000
		Sig. (2-tailed)	.096	.
		N	61	61

Table 4: Correlations between Chef's Qualification & Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand

			Qualification	Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand
Spearman's rho	QUALIFICATION	Correlation Coefficient	1.000	.056
		Sig. (2-tailed)	.	.669
		N	61	61
	Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand	Correlation Coefficient	.056	1.000
		Sig. (2-tailed)	.669	.
	N	61	61	

Findings

- The demographic profile of respondents as per Table 1 indicates that 60.7 % respondents are in the age of less than 50 years while 39.3 % are above 50 years. Majority of the respondents are male in comparison to female. 70.5 % respondents have acquired graduation and below while only 29.5 % have conferred with higher qualifications. The income segments indicate that 57.4 % of respondents have income less than 3 lacs while 42.6 % have more than six lacs annual income.
- The mean value as per Table 2 for Local Cuisine of Uttarakhand are Flavorful and tasty indicates 3.95 on five points Likert Scale indicates that respondents are in favor of the statement. For use of organic food have mean value 3.24 while food is nutritious and well balanced gained 3.75. The statement for Star Category Catering establishments are

familiar with Molecular Gastronomy indicates mean value for 1.62 suggests that molecular gastronomy is not popular in star category hotels. Respondents mean value for Molecular Gastronomy applications can be applied in Kumauni Cuisine is 3.27, suggest that there is wide scope for application of molecular gastronomy in Kumaun region of Uttarakhand.

- Table 3, indicates that there is negative correlations between Age and Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand. It concludes that with increase in age, chefs start losing interest about molecular gastronomy in Kumauni cuisine of Uttarakhand.
- According to Table 4, there is positive correlations between education and Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand. It concludes that chefs having more qualification have more interest about molecular gastronomy in Kumauni cuisine of Uttarakhand.

Table 5: Correlations between Chef's Qualification, Chef's age and Prospective Application of Molecular Gastronomy in Kumauni Cuisines of Uttarakhand

<i>Correlations between chef's qualification, chef's age and prospective application of Molecular Gastronomy in Kumauni Cuisines of Uttarakhand. [p<0.05]</i>	<i>Hypothesis Results</i>
H₁: Chef's age has negative correlation with Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand	H ₁ Accepted
H₂: Chef's qualification has negative correlation with Prospective Applications of molecular Gastronomy in Kumauni Cuisine of Uttarakhand	H ₂ rejected

Kumauni Cuisine Recommendations for Prospective Application of Molecular Gastronomy

Kumauni raita foam.		Bal mithai-Nitrogen poached Bal Mithai.	
Kappa Bhat can be served in jars with ghee powder.		Sana Nibu juice pearls using Spherification method.	
Bhang ki chutney can be served in jelly form.		- Buransh ka juice – buranch froth can be served with kumaoni sweet dishes. - Mustard oil can be served in powdered foam using Maltodextrin.	

Other Suggestive Dishes

*Smoked Badey with radish and
 Kumaoni raita foam
 sani muli and nimbu caviar shots
 Bhatt ka jaula with palak foam and pesa lun
 Gauhat ke dubkey with rice dolmas
 Sisunak pakoda with chutney jelly
 Madua roti topped with hung yoghurt, jaggery and bura
 Nitrogen poached Bal mithai with sugar pearls*

Conclusion

Molecular Gastronomy has been in practiced worldwide. Chefs are using the indigenous y cooking ingredients to

promote their cuisine with the application of physics, chemistry and other interdisciplinary subjects to make their food a life time experience. Kumauni Cuisine of Uttarakhand has tremendous features to attract all

food lovers. By including the concepts of Molecular Gastronomy we can promote the native delicacies to various palates. The application can be an effective marketing tool for destination developments.

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