

A CASE STUDY

Changing food habits and cooking styles in metropolitan cities

AJEET KUMAR SINGH* AND NIDHI BHATIA GOGIA
Amity School of Hospitality, Amity University, NOIDA (U.P.) INDIA

ABSTRACT

The purpose of this paper is to explore and analyze the changing food habits, trends and cooking styles in metropolitan cities to understand consumer behavior, food selection pattern and to analyze the chemistry behind the food composition which directly or indirectly is leading or heading towards unhealthy life styles. These unhealthy cooking styles, food habits etc are ultimately affecting the health and psychological standards of people living in the metropolitan cities. The continuous food changing preferences and reflective evaluation of the food choice which depends on various parameters like occupational stress, and limited time has grooved the chance of study. The major emphasis of this paper lies in the food chemistry part which is not only spared by the consumers but even by the chefs of some star category hotels and restaurants. The study is not only limited to the changing pattern of customer preferences but also the negligence in understanding their ill effects. Chronicling the evolution food preparation and food making procedures which emphasizes the nutritional aspect and appeal of food which now a days is intertwined and jumbled up with a number of other complex food production practices changing the track of healthy food consumption pattern in the metropolitan cities. The constant urge of the chefs and few connoisseurs for experimenting new dishes and changing the food varsity as per the changing needs and consumption pattern of the metropolitan life style has evolved a new form of cooking all together leading to life style diseases like diabetes, blood pressure, hypertension, cancer and various others. The influential practices of certain specific cooking methods and the convergence of wine and other objectionable ingredients like monosodium glutamate etc. with some drastic chemical reactions outside and inside the human body is creating gastronomic intolerance. The more and more inclination of the newer generation towards the fast food eating habits is not fit for the healthier lifestyle as discussed and reported by various researchers. More over the ease in such food preparation and quicker consumption in today's metropolitan environment does not bar the changing consumption pattern from getting the process standardized.

Key Words : Food habits, Food chemistry, Gastronomy, Immune system, Healthier lifestyle, Changing food pattern and preference

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People living in metropolitan cities undergo differential stress and strain to sustain their life style and livelihood. These uncontrollable conditions have started making the immune system of the public really weak and fragile giving birth to various life style diseases like diabetes, high and low blood pressures and even the unpredicted ones like cancer etc.

The concern for this write up has brought out various facts which points fingers not only on the continuously changing eating habits but also the evolutionary nature of new cooking styles created by some chefs for the amazing taste and aroma but unfortunately overlooking the nutritional concerns. In recent years, there have been important attempts to explore the various perspectives of eating and

* Author for correspondence

Nidhi Bhatia Gogia, Amity School of Hospitality, Amity University, NOIDA (U.P.) INDIA

preparation of food and to ascertain if coherence exists between the findings from academic disciplines (Murcott, 1998). The role of cooking and its relationship to health is today debated but unclear. There is some evidence that cooking classes or training programmes which are multifaceted in their approach, in the short term achieve behavior change (Bostock, 1993; Demas, 1995; Kennedy and Ling, 1997; Caraher and Lang, 1995). Arguments for the importance of cooking skills range from their relationship to healthy eating (Department of Health, 1998), through their use for those on low incomes to achieve healthy diets (Leith, 1998) to their role as an essential life skill and fun in their own right (Royal Society for the encouragement of Arts, Manufacturers and Commerce (RSA), 1997) England. While these debates unfold, the absence of empirical data hinders the development of a coherent theory. Even the best recipes can sometimes go terribly wrong: - Shirley Corriher a well known biochemist says knowing a little chemistry could help the chefs and connoisseurs eradicate some of the problems. The concern for this write up has emerged due to the massive experimentations in gastronomy in a blind search by most of our well known chefs for developing some new flavors and even Signature dishes. Use of artificial, nonfood grade and attractive colours and preservatives in food products make them really eye appealing and inviting sometimes, but the same ingredients can be highly sensitive and reactive to various gastronomical conditions which differs from a human being to another human being on the basis of their anatomical and immune system. There is increasing evidence that food sensitivities are more common and have a wider and more varied impact on our health than previously realized. Although often equated with food allergies, food sensitivities also include food intolerances which, unlike allergies, are toxic reactions to foods that do not involve the immune system and are often more difficult to diagnose. Many of the symptoms of food sensitivities including vomiting, diarrhea, blood in the stool, eczema, skin rashes, wheezing and runny noses, are associated with an allergic reaction to specific foods. However, food sensitivities may also cause fatigue, gas, bloating, mood swings, nervousness, migraines and eating disorders (WHfoods, George Matitjan foundation. U.S).

The major concern which is missed out by the fraternity is the nutritional content and the calorie content leading to differential life style diseases and other associated problems. A food ingredient may react with the other ingredients which may be food, metal or any other ingredient which is added up during the course of cooking for example, when heat is applied to the green leafy vegetable in case of boiling the pigment which is chlorophyll present in the green leaf changes its colour to almost blackish, but when the same boiled leafy vegetable is dipped into the cooled water the colour becomes pronounced green again which is quite eye

appealing hence the process called blanching was coined. Similarly, when heat is applied to a shredded red cabbage the red pigment contained in it which is "anthocyanine" changes from an acid to alkaline and causing the color of the cabbage changed, but when, some vinegar (acetic acid) is added to the cabbage again, it turns the cabbage red again (Corriher). On the other hand, if Baking soda is added to the cabbage it will change its colour to blue which clearly signifies that the pigment when comes in contact to an acidic or alkaline medium, changes the colour of the cabbage. "Cooking is chemistry," said Corriher. "It's essentially chemical reactions." Various similar tests in the research and development kitchens have also confirmed the differential change in texture and chemical composition of food which may be by breaking up of the protein structure due to any cooking process similarly rancidity, winterization, hydrolysis of fatty acids, proving effects in bread and various other technical chemical process effecting the human gastronomy.

Focus discussion:

"Cooking is chemistry, backed by artistic sense of combining and presenting the food in an adorable manner, but primarily, "its chemical reactions which take place and change the food palatable and digestive (Darcy O'Neil). The first and the foremost step of cooking must be to analyze the chemical nature of food and then to try and find out the most probable combinations which might gastronomically be perfect or tolerable by the digestive system.

"Spices are added to our food to improve the taste. However, once they reach the digestive tract they may cause irritation to the stomach's mucosal lining. Spices increase the acid secretion and reduce the strength of the gastritis mucosal barrier." "Overindulgence of spicy food may cause various stomach ailments, like acid reflux, acute gastritis, ulcers insomnia, loss of appetite. The main reason behind these problems is the presence of high acidic content in spicy food. (Dr. S K Thakur, Gastroenterologist from Moolchand Medcity, New Delhi).

The daring activity performed by the chefs is to cook or make a unique combination of ingredients which in actual sense might be totally unpredicted, uncalculated, unanticipated. The food discovered, accidentally by hit and trial method might be palatable or digestible and even be tasty for some time but in the longer run might be injurious if the study of ingredients, their chemical composition and reactivity with other counterparts are not studied properly and accurately. A good chef must develop a clear cut idea of understanding the ingredients first by identifying the nature of the ingredients which is to be used in cooking. In India, like other countries, the understanding the nature of ingredients, their use and reactivity is practiced to some extent by the bakers and confectioners due to the prominent

usage of yeast, baking powder, ammonia, bread improvers, cream of tartar and various other ingredients whose chemical formula is known and which have a significant role in baking and confectionary making. Recipe balancing and other aspects are majorly seen in bakery and confectionary leaving a huge ground of research and development in other field of food production like Indian cuisine and even others. Basic thing which a chef must at least understand is the difference between acid, base and a neutral component, which react under various inert and open conditions and mediums in presence or absence of enzymes or catalyst developing varied changes. Common acids include lemon juice and coffee, while common bases include ammonia and bleach. Cooking in any form has the characteristic feature of changing the composition of the food product (Including physical and chemical).

Cooking is the foundation to our lifestyles and it is important to know which cooking method is best way to retain nutrition in food and which method eradicates or washes off the nutrients from the food. According to Mitzi Dulan, vegetables if chopped bigger in size and cooked with minimum quantity of water for exact duration and temperature as the procedure requires and preferably with a cover on will help in retaining the nutrients of the food. Ideally fruits and vegetables can be consumed raw, or a bit of gentle cooking of vegetables will improve its palatability. Cooking also destroys the bacteria or other microbes to much extent and increases digestibility unless and until the food is contaminated with high temperature resistant strains of microbes. Good cooking must not only enhance the flavor, texture, aroma and appearance of foods that are cooked but must preserve the nutrients as well. (Scallan E, Griffin PM, Angulo FJ, Tauxe RV, Hoekstra RM. Foodborne illness acquired in the United States—unspecified agents. *Emerging Infectious Diseases*, 2011).

From Oste (1991), heating (above 100°C or 212° F) decreases meat protein digestibility. Frying chickpeas, oven-heating winged beans, or roasting cereals at 200-280°C (392-536°F) reduces protein digestibility. The nutritive value of the protein in legumes such as soya beans, kidney beans i.e. rajmah, lentils and chick peas is also improved by cooking. Similarly, Egg whites and some fish, unless cooked, are not an effective source of the vitamins biotin and vitamin B-1. From Oste (1991), heating (above 100°C or 212 ° F) decreases meat protein digestibility. Frying chickpeas, oven-heating winged beans, or roasting cereals at 200-280°C (392-536°F) reduces protein digestibility. Heating of the refined flour during the baking process increases the amount of niacin which can be readily utilized by the body. Improper cooking contributes to increase in risk of heart disease and various chronic illnesses especially if the same pattern of cooking is utilized for the prolonged periods. Food cooked at high temperature like broiling, roasting, grilling or frying

ends up forming toxic compounds in food ultimately exposing free radicals which are unhealthy and harmful. Healthy eating isn't just about which foods you eat, but how they're prepared. Cooking food wrong can create toxic chemicals that make you sick. These chemicals are called advanced glycation end products, or AGEs. An average person accumulates excess AGEs just from eating common processed industrial foods and beverages. AGEs cause inflammation and contribute to heart disease, diabetes and other problems, including damage to the overall immune system. AGEs can simulate premature aging by damaging skin collagen, promoting arthritis and hardening arteries.

These harmful compounds are then absorbed into the body tissues and organs and they accumulate gradually with age and thus trigger a wave of oxidative stress, insulin resistance and finally inflammation or oedema. The largest vitamin loss during cooking is usually due to destruction of vitamin C, and to a lesser extent vitamin B-1 and the other water-soluble vitamins. The food is the study of chemical processes and interactions of all biological and non biological components of food. The biological substance includes such item as meat, poultry, lettuce, beer and milk as example. It is similar to biochemistry in its main component such as carbohydrates lipids and protein but it also includes area such as water, vitamin, minerals, enzymes food flavors and colour. Acrylamide is an industrial neuro-toxic chemical that has been found in carbohydrate rich diet and starch rich foods cooked at high temperatures. <http://www.raysahelian.com/>

The discipline also encompasses how products change under certain food processing techniques and ways either to enhance or to prevent them for happening, an example of enhancing a process would be to encourage fermentation of dairy products with microorganism that convert lactose to lactic acid, an example for preventing a process would be stopping the browning on the surface of freshly cut red delicious apples using lemon juices or other acidulated water. Food microbiology is the studies of the microorganisms which inhabit, create or contaminate food or major importance is the study of microorganisms causing food spoilage. However, good bacteria such as lactobacillus and probiotics are becoming increasingly important in food science. Yakult is one of the very prominently sold probiotic milk in India. In addition microorganisms are essential for the production of food such as cheese, yoghurt, other fermented foods, bread, beer and wine.

Research methodology :

This is a conceptual study about the current dining out trends which emphasizes on the changing taste and preferences of the customers in metropolitan cities. The secondary data has been used to accomplish this research paper. The survey explored whether people felt their food choices were in general restricted. Most respondents said

that they were not. Concerns about food going off, difficulties in storing the food and carrying from the shops were deemed more important than cooking skills, but this was gender related. When people were presented with a list of factors that might have a major impact on the types of food they could purchase, about half said that nothing limited their choice. Only one or two per cent of the total sample said that their choice was restricted by having limited cooking facilities. And nearly a tenth cited not knowing how to cook as a factor.

Conceptual analysis of various cooking styles on health:

One of the common methods of cooking which exists in almost all the cuisines involving moist heat is boiling. It's the basic method of cooking and makes the food highly nutritious and boiling aids in conserving the vitamins and minerals and minimizes nutrient loss. For perfect boiling of a food item less amount of water / milk or any other boiling medium must be used and the food item must be boiled quickly to prevent excessive evaporation. Alcohol boils at 172°F. Boiling temperatures decrease as you go up in altitude because the column of air on top of the liquid is shorter and exerting less pressure so it is easier for water vapor, in the form of steam, to escape. Longer cooking is not good especially of green leafy vegetables and meat products as it causes the plant's cell walls to shrink and release acid. So as it starts gushing out of the cells, and with acid in the water, it turns cooked green vegetables into a grayish liquid which is acidic in nature. In case of meat products the meat with abundance of protein gets denatured and hence, becomes stiff and chewy. Boiling is a very severe method of cooking and can even damage food by breaking down its structure and squeezing out the natural jus of the food component leaving the food item dry and chewy. Example can be taken of the lotus stem (kamalkakadi) from which the natural food jus gets extracted out and leaves it dry. Though by the boiling water gushes in the stem pores but leaves its nutrients seep off in the boiling water. Though pressure cooking will retain more nutrients than normal but it might change the texture or other aspects like acidification and /or toxin production due to hyper-reactions which might occur by combination of food items with the metal of the cooker after boiling. However, food steamed or boiled in a small amount of water in a tightly covered saucepan is likely to be nutritious. Items like fruits and vegetables which are to be boiled must never be soaked for long time before as there are some water soluble vitamins and nutrients which get lost inevitably. Steaming involves placing food in a perforated container at about 100 degrees centigrade. This method retains the aroma and flavour of food well and does not absorb any fat. But the lid must allow the steam to escape or condensation may act like a boiling process destroying some nutrients. Steaming is one of the best methods of cooking with no or very less

downside technically. One of the methods of applying dry heat to get desired browning through radiant or contact heat over the fire or even in the oven without any addition of fat is broiling. Grilling, roasting or barbecuing is a process of cooking by browning through contact heat under an oven grill, charcoal grill or electric grill keeping the food moist and succulent from inside. Food looks good, tastes delicious with a great texture. As the surface of foods heat above 310°F, amino acids and sugars react together, scores of new compounds form, and the surfaces start to brown, and the process called Millard reaction. (Nursten, Harry. The millard reaction: chemistry, biochemistry and implications, 2005). It develops a richness and depth of flavor, not to mention crunchy texture. Steaks get grill marks, roasts develop a bark, loaves of bread form crusts, slices of bread turn golden in the toaster, coffee beans turn dark when roasted, and fried potatoes darken. The sugars also begin to caramelize, contributing to the complexity. Though barbecuing over live charcoal is slightly different from oven grilling in that charred foods may contain cancer causing carcinogens. Before barbecuing the meat is salted and citrified for better taste but actually there exists a reason that is, if meat is salted prior to cooking, the salt will pull water to the surface (osmotic effect), where it will evaporate faster because it is exposed to direct heat. As the water evaporates, the salt will stay concentrated and pull more water to the surface, eventually drying out the meat. This is good roasts, bad for steaks and burgers. Now, If crispy skin is desired, salting is ok, but there are also better molecules for this, such as the sugar maltose, which is used on the skin of Peking Duck to make it crispy. Charcoal grill can be used occasionally without using a starter fluid hence, its best to use a gas grill for a cleaner and crisper burn. In roasting, fat content can be reduced by placing a drip pan underneath the food item but still charring must be reduced.

As it is well known fact that most of the foods are acidic which provides a natural protection against the growth of microorganisms in general and *Clostridium botulinum* producing botulinum toxin (which gives rise to botulism, a paralytic and fatal illness) in foods that are stored in the absence of air and have a pH greater than 4.8. The addition of alkaline reagents like baking soda will reduce the acidity and hence, diminish the natural protection against microorganisms. Because of this, care should be taken and baking soda should not be used in marinades, for instance, that will remain in contact with meat for more than a couple of hours. The use of alkaline reagents for foods that are cooked immediately, however, is unproblematic. (The kitchen as laboratory-reflections on the science of food cooking: - edited by César Vega, Job Ubbink and Erik van der Linden).

Vitamins get lost and proteins get denatured or ruptured, making the food difficult to digest in roasting. It would be better if leaner meat is chosen for less flame and

smoke. Preferring smaller chunks / pieces and cooking them at a lower temperature so as to minimize at lower temperature will reduce the carcinogens. It is always a better idea to marinate meat and meat products which actually is supposed to be grilled or roasted much before the actual cooking process starts as it decreases HCA (heterocyclic amines by 90% with basic marinating). Kansas State University, Doctor Fariba Emamgholizadeh, MD Found that in the marinated steaks, HCA levels were reduced an average of 71%. The doctor also found that using only the bases of the same marinades (without any herbs or spices) did not have the same protective effect.

Browned meats and cancer risk :

HCAs are produced by a chemical reaction between the particular molecules found in animal muscle when they are heated. High cooking temperatures and long cooking times are associated with higher HCA levels. Frying, broiling, and grilling produce more HCAs than lower temperature cooking methods like baking and oven roasting, while boiling and poaching produce the lowest amounts. A piece of well-done meat can have as many as ten times more HCAs than meat cooked rare. The most exciting thing which knowingly or unknowingly is practiced even in good hotels is keeping the marinated food for a longer time in the walk ins for the marinade to creep in and not just to creep in but also to keep the meat in the non danger zone to stop exponential progression of microbes. As a chef I have realized that to retain the nutrient level to the maximum extent it is always better to precook the meat in microwave and then grill it to reduce HCA'S (heterocyclic amines) and Flip frequently to avoid under cooked or over cooked stage and if possible scrape off the charred parts which may contain carcinogens. Even small modifications in cooking methodology affect HCA production. For example, when ground beef patties are pan-fried, even the frequency with which they are flipped significantly changes HCA production. Frequent flipping prevents the meat from reaching as high a temperature, thereby reducing the HCAs formed. Oven temperature makes a significant difference. The National Cancer Institute reports "a threefold increase in the content of HCAs when the cooking temperature was increased from ... 392° to 482°F" in oven-baked beef. (Jacob Schor, ND, FAB NO, 2010). HCAs have been detected in all kinds of meats—beef, lamb, pork, chicken, and fish—especially those that have been grilled, fried, or roasted. According to the National Cancer Institute, studies have linked high intake of well-done fried or barbequed meats with increased risks of colorectal, stomach, pancreatic, and breast cancers. Braising and stewing of a food item is done at less than boiling point and food is cooked in simmering liquid. It differs from stewing only less water is used. Food which is braised is only partially covered in hot, but not boiling liquid for a long time, perhaps 6 to 12

hours. Braising is usually done in large pots and the lid is usually not necessarily tight. This allows the food to tenderize without drying out as easily. The nutritional changes which occur in braising and stewing are similar to that of boiling. Leaching of water soluble vitamins and minerals into the cooking liquid can occur but these nutrients are reclaimed if juices are used in cooking. When rapid simmering follows this method at a slightly lower temperature any fat in the food can melt and escape. Frying involves cooking at high temperature, usually 350 to 360°F, by submerging in oil or fat. This method creates more heat than boiling. The high heat creates steam within the food which cooks it and creates pressure at the interface between the food and oil preventing the oil from penetrating if the temperature is properly set. if the temperature of the oil used as a medium of frying is not accurate/perfect then the food might get over drenched with oil or even the food item may be burnt leaving the interior of the food still raw. Deep fried foods are usually crisp on the exterior and moist in the interior. Cooking and browning of food in a large amount of fat medium so that food is evenly browned from all sides with temperatures ranging from 170 – 200 degrees centigrade is termed as deep frying. Deep frying of various food items lead to burnt edges of the food items if not evenly rounded destroying and rupturing the proteinacious structure found in the food. The best way to fry the food is to coat the pieces with a light batter which completely encases it so that the food inside the encasing is cooked by the latent heat and the food is as moist and ungreased as in boiling or poaching with all the flavour extracted from the batter. For frying use of polyunsaturated oil (like linolic or linolenic) can be used best recommended is till oil (sesame oil). One of the drawbacks of using polyunsaturated oils is that they are more likely to oxidize at high temperature. Hence, if consumed oxidized oil could promote free radical formation that is linked to cell damage and some cancers of benign or malignant form. One of the important facts associated with use of oils is that oil once used for frying must not be reused as it may develop some trans- fatty acid which can be easily correlated with a cardiovascular disease. Stir frying applies a principle of intense heat application to the food and timely withdrawal of heat from the food which seals the outside of food at a high temperature making the food crisp and crunchy on one side and the heat which was applied to the food helped in retaining the latent heat inside cooking the food and not leaving it raw. Oil used in cooking while stir-frying must be low in saturates like corn oil, sunflower oil, vegetable oil and olive oil and surely with a higher smoking point. Stir frying destroys about 15% of the B complex vitamins in meat but vegetables retain more vitamins this way than blanching or boiling. It's a method of cooking food in a small amount of fat over a high heat on a hot metal surface, usually in a frying pan or skillet, with the goal of rapid cooking and

browning. This method helps the food retain moisture and helps prevent it from absorbing oil. To be successful it is important the food is not too cold, the surface of the food must be dry, and the pan cannot be crowded. Sautéing onions and garlic reduces their bite and pungency, and converts some of the compounds to sugar giving them sweetness.

Microwave cooking is much quicker than conventional cooking. The microwaves preferentially heat the water in food so that the cooking process is essentially similar to that of steam cooking. With meat, the differences in vitamin B-1 and vitamin B-2 retention between microwave cooking and conventional grilling or roasting are small. With vegetables, the vitamin C in microwave-cooked food is similar to that achieved by cooking with steam or using a small amount of water in a tightly covered saucepan. Generally, microwave cooking retains nutrients as well as conventional methods. Curing involves the preservation of meat by the heavy application of some or all of the following: Salts, sugars, nitrates, nitrites, or smoke. Each works differently by altering meats chemistry, inhibiting some microbial growth and promoting others, altering enzymatic digestion, changing the color, and of course, flavouring the meat.

The food habitats in India have changed due to the western influence and the usage of the fast foods is also on the rise. Differences in individual behaviour and consumption do not of themselves constitute an inequity as they may be related to individual choices, rather than being structurally influenced (Whitehead, 1991). These foods are widely used in catering industries as well as at homes. There are varieties of instant/ready-to-eat foods available in the market to choose from and they have been a part of everyday life. Many consumers in metros lead time-pressured lifestyles and have less time available for formal meals, as a result of which demand remains high for products which can be eaten on the go. Research has reported on continued differential sharing of household roles and tasks (Murcott, 1998b), with women taking or being forced to take the greater responsibility for household tasks including that of cooking. Metropolitans are currently the largest consumers of processed food and are going to retain the title for long because of their ever increasing per capita income and lifestyle which is also changing very rapidly. Due to lack of time and extra strenuous environment the public in metropolitan cities prefer to eat at the fast food joints, kiosks or the restaurants as cooking is considered as a time and energy consuming affair and the money factor being almost the same.

Conclusion :

Thus, food cooked at various kiosks and outlets are preferred overlooking the nutritious effect of well cooked home food. Food manufacturers have grabbed it as a business opportunity and have also started manufacturing new

innovative food products and ready to eat food products to adjust and keep up with the speed of ever changing taste of the consumers. This has also increased the demand of better quality food packaging, food processing and this increase in demand has increased the number of manufacturing units in India. The demand of processed food products such as juice based drinking concentrates, bottled water, organic food, herbal tea, fortified drinks and low fat dairy products have increased very much in last five years. Canned foods, fast foods, frozen foods, instant products, dried foods, preserved foods, etc. has encouraged the introduction of a big range of ready to eat snacks, breakfast food etc which is directly affecting the food habits and health of general public in metropolitan city.

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