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Harmful Chemical Components in Streetfoods

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ABSTRACT: How safe is that mouth-watering biryani sold in Dalhousie or the delicious cutlets at the roadside eateries? A sample test done by the Municipal Corporation reveals an alarming result. It says most street food contains hazardous chemical ingredients. Municipal Corporation food and adulteration department officials said 255 food samples have been tested in the last one year. Poisonous chemical ingredients were found in 51 of them, which is more than 20% of all samples tested. These chemical substances are being used by vendors to give a colour coat on vegetables and other street food to make them look more attractive to the customers.
For example, tests on cutlets sold in places like Dalhousie and Esplanade revealed that they contain high quantity of metanil yellow, a dangerous chemical substance. This chemical can even cause cancer if consumed for a long period of time, say experts.

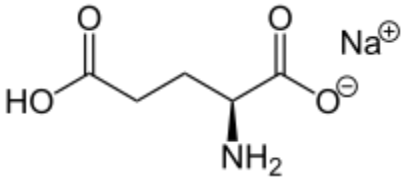
KEYWORDS: streetfood, chemical, poisonous, metanil, cancer, colors, municipal, roadside, water

I.INTRODUCTION

Monosodium glutamate (MSG), also known as sodium glutamate, is the sodium salt of glutamic acid. MSG is found naturally in some foods including tomatoes and cheese in this glutamic acid form.[2][3][4] MSG is used in cooking as a flavor enhancer with an umami taste that intensifies the meaty, savory flavor of food, as naturally occurring glutamate does in foods such as stews and meat soups.[5][6]

MSG was first prepared in 1908 by Japanese biochemist Kikunae Ikeda, who was trying to isolate and duplicate the savory taste of kombu, an edible seaweed used as a broth (dashi) for Japanese cuisine. MSG balances, blends, and rounds the perception of other tastes.[7][8] MSG, along with disodium ribonucleotides, is commonly used and found in stock (bouillon) cubes, soups, ramen, gravy, stews, condiments, savory snacks, etc.[1]

The U.S. Food and Drug Administration has given MSG its generally recognized as safe (GRAS) designation.[9] It is a popular belief that MSG can cause headaches and other feelings of discomfort, known as "Chinese restaurant syndrome". Several blinded studies show no such effects when MSG [2]is combined with food in normal concentrations, and are inconclusive when MSG is added to broth in large concentrations.[9][10][11] The European Union classifies it as a food additive permitted in certain foods and subject to quantitative limits. MSG has the HS code 29224220 and the E number E621.[12]



Street food vending has become an important public health issue and a great concern to everybody. This is due to widespread food borne diseases, due to the mushrooming of wayside food vendors who lack an adequate understanding of the basic food safety issues. Major sources contributing to microbial contamination are the place of preparation, utensils for cooking and serving, raw materials, time and temperature abuse of cooked foods and the personal hygiene of vendors. Various studies have identified the sources of food safety issues involved in street foods to be microorganism[3] belonging to the genus Bacillus, Staphylococcus, Clostridium, Vibrio, Campylobacter, Listeria, Salmonella. Application of sound risk analysis policies is being advocated to provide a scientific base to the host of risk management option which India[4] may need to explore to ensure public health and safety. With the grip of sudden and unprecedented urban growth, non-traditional food trends have gained a big momentum in the world, especially in developing countries. Among them, Street foods play an important role while mushrooming worldwide rapidly. These are defined as ready-to-eat foods and beverages prepared and/or sold by vendors and hawkers especially in street and other similar public places. (FAO)[5]

Street foods are appreciated just because of their unique flavors, convenience, business opportunities for developing entrepreneurs and contribution to the economies of developing countries. And also, surprisingly, Street foods accounts for a variable and significant part of daily diet and nutritional requirements through a wide range of ingredients and products, at low cost for millions of urban workers and inhabitants in those developing countries. According to a research done in Indonesia, it was possible to obtain almost half the recommended daily allowance of protein, iron, vitamin A and vitamin C from a street food meal by spending US$ 0.25.[6]

With all of these pros, there is a huge discussion on the major public health risks related to street foods due to several reasons. Lack of general food safety knowledge of many street food vendors and inadequate public awareness of possible hazards of these foods and lack of basic infrastructure and facilities have led to these major health risks.[7]

Here, we present a food safety hazard analysis in terms of possible biological and chemical hazards that may contaminate street foods via several sources and processing steps.

Vending Location:

In most of the cases, the preparation locations and conditions are reported as unsuitable for the preparation of foods. Street foods are frequently processed near road side stalls where they are not clean and not well lit while exposing to many sources of contamination. Foods prepared earlier can be remained on the preparation surfaces, promoting cross contamination. Since the foods are not covered well, food borne pathogens may harbor due to the exposure to flies, dusts and insects etc. During the food handling by vendors, a bunch of pathogens like Escherichia coli, Salmonella, Shigella, Campylobacter and S. aureus can be eventually transferred to these foods as food borne hazards to consumers. These pathogens are transferred from vendor's skin, nose, hands or even from faeces due to lack of proper hygienic practices. On the other hand, due to the lack of facilities for liquid drainage and disposal of garbage and discarded or deteriorated foods, these vending locations may become a habitat for rodents, insects and media for growth of microorganisms who may eventually become hazardous for these foods.[8]

Quality of Raw Materials - Water & Others

One of the major problems in the food services in developing countries is that the quality and the safety of raw materials are substandard for business reasons and therefore it has become a critical point, especially in street foods. Safety and quality of the portable water used in street foods are very important as the water contamination can persist through preparation and cooking. Most of the cases, when there is a lack of clean potable water supply for these vending stalls, the vendors tend to re-use the water, especially for cleaning purposes. However, there is a major risk of contamination of well-known enteropathogens such as E. coli, Salmonella spp. and Campylobacter spp., when unsafe water is being used for cleaning equipment, utensils, hands and used as an ingredient and washing of foods.[9]

Besides water, the possible safety hazards of other raw materials are also important. As an example, the raw meat, poultry and vegetables can be commonly contaminated with potential food borne pathogens like B. cereus, C. perfringens, C. jejuni, E. coli, L. monocytogenes, Salmonella and S. aureus . Presence of mycotoxins is another major burden for the raw materials used in street foods. Studies found that these aflatoxins, ochratoxins and patulin producing fungi (mainly Aspergillus and Penicillium spp.) were found in various street food items in many developing countries.[10]

In addition to these contaminants, there is a major concern in non food-grade chemical additives such as coloring agents, flavor enhancers, preservatives and contaminants like pesticide residues and the use of adulterants. For example, a study conducted in India has found that the banned toxic synthetic colorants such as Metanil Yellow, Orange II and Rhodamine B which is having hepatotoxic, neurotoxic and carcinogenic effects, have been detected in several street food vending stalls. In fact, the sellers may frequently use these additives to enhance the unique taste and the appearance of their products.[11]

Obviously, most of the street foods contain high amounts of Trans Fatty acids and Carbohydrates which is directly related to the non communicable diseases.[12]

II.DISCUSSION

Utensils and Equipment :

Studies show that higher levels of arsenic, cadmium, copper, lead and mercury probably come from leaching from the utensils which are not properly designed and cleaned. Also the aluminum pots used in cooking may leach aluminum ions into the food, especially acidic foods, that may cause serious adverse effects on the brain and kidney. The other case is that, due to the poor designs and the poor maintenance of cleaning utensils, the food preparation surfaces and surrounding can not be properly cleaned and that may promote the occurrence of hazards and cross contaminations.[13]

Also the serving utensils used in street foods may contain pathogens like Micrococcus spp. and Staphylococcus spp. which may have originated from the vendors hands when they touched the food preparation areas, dishcloths or the water during dish washing or hand washing.[14]

Processing Contaminants :

Polycyclic aromatic hydrocarbons (PAH) and Acrylamide formation is another major food safety burden in street food preparation. Generally PAH is formed due to the incomplete combustion of organic matters such as foods and wastes. Similarly, when grilling or smoking and overcooking or protein rich foods like BBQ, these PAH is formed. Also Acrylamide is formed when frying starch rich foods like French fries and potato chips. The presence of these two toxic compounds at higher levels may promote the risk of cancers and some PAH also having dioxin like properties. The major reasons for the formation of PAH and Acrylamide in street foods are, their characteristic long cooking time, high temperature cooking and also the reuse of cooking oils.[15]

Storage :

Here, the major concern is the storage temperature. In most of the cases, street foods are stored at ambient temperatures for a long period, before the consumption. This situation may cause food poisoning outbreaks. Leaving cooked foods for hours and even for overnight at ambient temperature, definitely creates a favorable condition for the growth of foodborne pathogens like Escherichia coli, Staphylococcus aureus, Bacillus cereus and Clostridium perfringens. Some vendors reheat the foods at the time of purchase by a customer. But, if so, the time-temperature exposure during reheating needs to be sufficiently high or long enough to inactivate large quantities of pathogens that could develop during the long storage period. But unfortunately, that's not properly done in most of the street food stalls.[16]

Control Measures……

The efforts made should focus on,

01. Educating the food vendors, based on food safety,

02. Provide sufficient facilities and improve the environmental conditions under which the street food trade is carried out,

03. Public awareness based food safety and risk of consuming substandard foods.[33]

Still there are no sufficient regulations and standards related to the safety and the quality of street foods. Therefore appropriate regulations must be implemented and incorporated into existing food regulations.[17]

However, many of us are sceptical about whether it's safe to eat. As long as certain hygiene conditions are met, there's no reason that street food isn't safe for consumption. Because, some developing countries like Thailand, promote their street foods and process them at sufficient hygienic conditions and quality, targeting the tourism industry. Some of them use advanced utensils and processing machines in their stalls as well.[18]

So, the street food concept has a big potential in money making on a national level, **only if it is carried out under safe conditions**.

III.RESULTS

World Health Organization estimates that 600 million people worldwide suffer from consumption of contaminated food, of which 420,000 die. This includes approximately 125,000 children in the under-5 years' age-group (WHO,

2015). Five-year data (2011-2016) from the National Centre for Disease Control (NCDC) has shown that food-borne outbreaks along with acute diarrheal diseases account for almost half of all reported outbreaks under the Integrated Disease Surveillance Programme (IDSP) (NCDC, 2017).[19]

Common Foodborne Pathogens

The most common bacteria responsible for food-borne diseases include Escherichia coli, Salmonella, and Campylobacter, which can cause serious complications, including death. Most of the symptoms are gastrointestinal, such as diarrhea and vomiting, but other symptoms like fever can also occur. [32] Vibrio cholerae causes cholera, which spreads through contaminated water or food. The major symptom is acute watery diarrhea, often termed as "rice water stool" because of its resemblance to rice water. This leads to severe dehydration and death if not treated promptly.[20]

There are a number of parasites that are spread through contaminated food and water. These include Echinococcus spp., Ascaris, Cryptosporidium, Entamoeba histolytica, and Giardia. Most of these infections cause gastric problems.[21]

What Happens if These Pathogens Infect You

These pathogens can cause serious food poisoning, which can manifest itself in the form of severe stomach aches, profuse diarrhea with vomiting, fever, cramps, and even passing blood in the stool. People with a weakened immune system are particularly susceptible. Even healthy people are not spared.[22]

Scientific studies have shown that many infectious diseases, including some diarrheal diseases, exhibit a seasonal variation (Altizer et al., 2006). The immunity tends to be weakened especially in damp and humid weather conditions, making people more susceptible to infections (Paynter et al., 2015). Therefore, it is very important to be extra careful about what we eat.

Eating at the Roadside: Which Foods Could Cause Gastric Problems

The best option is to avoid street food altogether. However, if you cannot resist eating at the roadside, you should be very careful. Various types of snacks containing mashed potatoes might be kept in the open for a long time, [31] which can encourage bacterial growth. One of the most common snacks in this category is samosas. Other snacks like pakoras can also cause gastric problems, particularly if they are not made from fresh ingredients. Other favorites like chole bhature are susceptible to fungal contamination, particularly in humid conditions.[23]

Most types of street foods are generally prepared in the open. There is a chance of contamination of the food with dirty water. It is very common to see street-food stalls located near open drains. So there is a high chance of contamination with drain water containing fecal matter, in which diarrhea-causing coliform bacteria can be present. [30] Moreover, the water used for preparing street food favorites like golgappas is likely to be contaminated, and there is a chance of contracting water-borne diseases like cholera and typhoid in this way. Also, street vendors selling fruit juice should not be consumed as they are generally prepared outside and served later on, thereby leading to contamination by infectious pathogens. Other utensils like serving-glasses are usually not clean.[24]

What About Drinking Water

It should be noted that the drinking water supplied by street-food vendors can be heavily contaminated with microbes. Moreover, drinking water can also be contaminated with chemicals, which leach into the underground water deposits. Therefore, water from roadside food vendors should not be consumed at all.[29]

How Can We Help

Arbro Pharmaceuticals Pvt. Ltd. has NABL accredited and FSSAI approved laboratories with state-of-the-art instruments as well as highly trained technicians. Components of food samples, including microbes present in street-food, are regularly tested with utmost precision. [25]

IV.CONCLUSIONS

Street food vending is an important component of socioeconomic activities in developing countries. Its significance is appreciated by the volume of trade involved, provision of readymade meals and employment for the teeming populace along the chain of the business. The benefits and contribution of street food trade to the economy of developing countries elicited recommendations from researchers on ways to mitigate the hazards in its consumption and safeguard the health of consumers.[26]

It was recognized that policies and regulations for safe street food trade are very weak and poorly enforced in most developing countries and even non-existent in some countries. Therefore, strengthening of the policies and proper enforcement would undoubtedly ensure significant reduction in the hazards of street food consumption.[27]

These would involve active participation of all stakeholders in street food trade such as governments, street food vendors, consumers' associations, civil society groups and development partners. Raising the awareness on the treat of unwholesome practices in street food trading through dissemination of information in mass media and audience participatory programs was further recommended.[28]

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