Food safety

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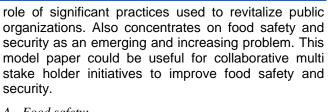
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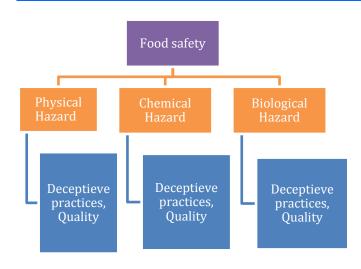
Abstract— This paper aims to review how current practices in food industry are causing illness, by investigating methods and usage of chemicals while production. A comprehensive literature review on food safety relating to human health created a theoretical foundation of the paper. Using the review centric research method, a model was developed and evaluated by reviewing the available literature. This is a timely topic as the role of food industry in business is ever increasing in a profitable manner. A new model is presented to explain the important aspects of food safety in some specific domains. The model highlights various health and safety domains that are benefited with food. This report depicts the domains -Temperature, Preservatives, Improper handling. The empirical data are limited to 40 different literature reviews with respect to the specific food safety business and health domains. Food industry and its business is vast. Therefore, the suggested model is particularly useful to understand the domain specific food safety and its prioritization, utilization and its outmost importance. The paper shows how food industry has evolved and its scope of business and how different tools and methods can be useful to bring the positive changes.

I. INTRODUCTION

There is growing literature concerning food safety in under developed countries Scholars, community organizations, and media alike are increasingly scrutinizing food, food systems, and food security. As these areas of interest grow in popularity, the discourse that surrounds them is also being examined to explore the ideological underpinnings and the power relations that surround food safety(Knezevic, Hunter, Watt, Williams, & Anderson, 2014). In China, the term food safety and security has become a buzzword that evokes concerns from individual consumers as well as food policy stakeholders. Understanding consumers awareness of the problem is crucial to formulating custom actions to facilitate health communication and eventually improve food safety and security (Xiang, Bo, & Emily, 2015) Although in recent years the Indian economy is growing at more than 7% per annum, its performance in food security is dismal. India is known for having the largest number of undernourished children and women with anemia. It is also home to the largest number of underweight children, in this scenario, it is

important to focus on the Sustainable Development Goal 2 targeted to end all types of hunger by 2030 (Reddy, 2016). Low food security is associated with negative developmental outcomes in infants and toddlers. Persistently low food security in early childhood is associated with long-term lower health status (Ip et al., 2015). However, most of the existing literature assesses the discourse of policy, power, and social institutions (or discourse 'from above'). Much work has been done to examine government policy, organizational policy, corporate policy, advertising, and other promotional discourse, as well as the way these various entities portray food, food systems, and terms like food security and food insecurity, which in turn shapes the public's understanding of them", (Knezevic et al., 2014)This study shows that people experiencing financial dissatisfaction may choose and consume food for its energy value. Because money and food are closely related. exchangeable resources, financially dissatisfied people may be motivated to replenish their need for financial resources by consuming caloric resources or food energy. Experiments provide support for this literature across various measures of caloric desire and actual eating behavior. The findings have notable implications for A brief introduction of Food safety and security and its independent variables are given above. Whereas marketing researchers have increasingly investigated the interplay of taste and health considerations in food consumption, this research demonstrates importance of investigating food considerations. Below are the variables which play an important role in food security, supply and marketing. Which are nutrition, agro biodiversity, stamp and farming Consumers often struggle to resist unhealthful food temptations. The ability to resist (food) temptations that provide immediate rewards is referred to as consumer self-control. Food insecurity, broadly defined as having limited access to adequate food, is associated with increased stress levels and reduced overall well-being. In addition, food insecurity has been shown to diminish dietary quality and affect nutritional intake and has been associated with chronic morbidity (e.g., type 2 diabetes, hypertension) and weight gain.(Nguyen, Shuval, Bertmann, & Yaroch, 2015) Low-self-control consumers are more likely to be overweight or obese and less likely to lose weight successfully.





II. RESEARCH METHOD

After reviewing a variety of peer reviewed articles available from Google scholar and UB library database a compressive literature has been developed in a single research paper which contributes all the research data of peer reviewed articles in one paper makes more comfortable to read in a single glance. This type of research is getting popular now a day's called as Review centric research. In this research paper data contains are analyzed experiments, recommendations and reports e.g.(Tallon, 2007). Our review centric research process follows the three phases of: (1) brainstorming; (2) narrowing down; (3) evaluation. Figure 1 depicts a synopsis of relationship between food safety and its variables in figure. This research paper is done in 3 major stages a) identification b) analyze c) effects for e.g. As per (Enenkel et al., 2015) p.10 says "Analyzing the coupling between socio-economic information, representing inter alia the impact of droughts, and environmental anomalies measured via satellite-derived information, representing drought risk, is important. Also if the current crisis is caused by violent conflict rather than climatic shocks, the impact of droughts on people's livelihoods can put the already vulnerable system under severe additional pressure, potentially fueling insurgent activities by identifying some key factors of nourishment food security can be located". As per (Chi, Masterson, Carle, Mancl, & Coldwell, 2014) p.863 says "Public health efforts to address food insecurity alone within vulnerable populations are unlikely to solve children's oral health disparities. Identifying potential mediators of food insecurity and caries (e.g., fast foods, sugar sweetened beverages, micronutrients) may allow us to develop specific nutrition focused social and behavioral interventions for vulnerable populations. Future approaches will involve improving the food environment, quality, and choice for low-income communities; educating socioeconomically vulnerable households on healthy meal and snack preparation; and helping individuals to reduce their frequency of carbohydrate intake". This article contributes to the literature by exploring, in a systematic fashion, the

A. Food safety:

The objective of this paper is to document and understand the perceptions of problems facing by food consumer's worldwide. The author Mazze, and Stern (1973) mentions that consumer is being ingesting many hazardous materials available in the market which are not safe and in most of the developing countries they are banned, but they are produced in the developing countries itself (Jensen et al., 1973) and (Jensen et al., 1973)says that food safety controls have a safety perceptions which are to be controlled and maintained properly to enhance the current systems (Jayasinghe-Mudalige & Henson, 2006). "National Food Safety Education Month — September 1998" 1998) mentions that average demand for the food safety concerns are raising Stephanie et al. (2004) discusses physicians are more likely increasing the number of cases refer to food borne illness(Stephanie et al., 2004) "Federal Food Safety Update" 1999) mentions FDA activities regarding food safety are going high("Federal Food Safety Update," 1999).Wen-Hwa (2015).says' Over the past few decades, foodborne diseases have posed a global challenge to public health. Food safety is important to general health, economic development, and social stability, as well as the image of a country and its government. (Wen-Hwa, 2015).

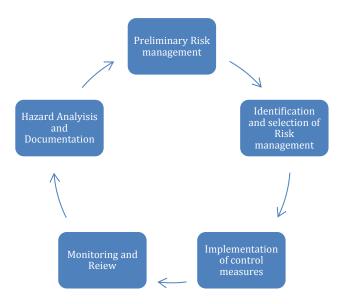


Figure2: Food safety and Risk analysis

B. Temperature:

When Food comes to scene temperature plays a significant role in either increasing the biological load present in it or decreasing it. Lutz (1914)mentions that temperature is the only factor that makes hatches to survive and very lethal(Lutz, 1914)while, Davis

(1907) says temperature decides diet for few animals on this planet to choose what to eat and what not to, they adapt new foods in winter(Davis, 1907), Edwards (1954) says he left few species in freezing temperature and found they were not capable of reproducing while at room temperatures they can reproduce(Edwards, 1954), Sachdev (1993) says India is a very diverse country has very good temperatures to support almost all species which help them in surviving (Sachdev, 1993), Bhat et al. (1994) mentions at freezing temperatures even with all sufficient proteins to survive microbes cannot survive whereas in normal temperatures with minimal protein content they can reproduce and hatch (Bhat et al., 1994), Ospovat (1979) says every living being undergo cycles same as microbes too, but in lethal temperatures they go inactive (Ospovat, 1979).

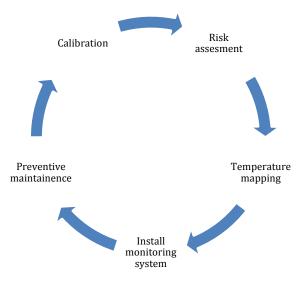


Figure3: Temperature control and its mapping

- 1) Turbidity: Water temperature is an imperative determinant in numerous oceanic natural procedures, while same in foods too. Particles dissolved in water will dominate the temperature.
- 2) Dissolved oxygen: DO is dissolved oxygen which stays in foods by default which can be separated by de-oxidizing. DO is also a considered factor while taking temperature into count.
- 3) Power of hydrogen: PH is power of hydrogen which dominates the acidulant or salinity of foods. The more hydrogen bonds the more PH. High Salinity or high acid PH is where food is free from contamination by microbes. This stops the raising temperature and inactivates them.
- 4) Pressure: PV=nRT is the ideal gas equation, pressure, temperature, volume and number of moles are factors. If DO and other gases are dissolved in food thus raises the PH and turbidity, eventually the number of moles will rise and also the temperature.

C. Hygiene:

Food hygiene is very essential to ensure that the food consumed is safe. Poor hygiene procedures and deceptive practices, improper handling will put the health at risk. Microbial load which is very harmful to health can contaminate and leads to food poisoning. Settle and Crane (1953) discusses hygiene rules we are following are obsolete has to be modified according to new usage policies to prevent contamination (Settle & Crane. 1953)."Food Preservation" 1960) discusses that preservatives are to be used to storage and preserve products not ass adding agents ("Food Preservation," 1960), 1961) says preservatives improve food hygiene and food safety upon adding to them (1961), Boyd (1963) says mushroom poisoning is a misnomer which can be treated by proper choosing and washing, to washed mushrooms using some preservatives will make the safe to consume (Boyd, 1963), "Violation of UN Code" 1989) says personal hygiene is must and medical facilities are to be supplied to prisoners in accordance rules ("Violation of UN Code," 1989).



Figure4: Overall hygiene and its adverse effects

- 1) Health beliefs and motivation: Motivation is the key factor in achieving hygiene. Hygiene is not completely a science geek word, its physical, mental and physiological term which needs lot of awareness sessions to create an idea.
- 2) Cultural variables: when health and workforce of individuals, comes to count their cultural difference is also taken into measure. Why this is important because, culture from place to place is significantly changes and people living there relocates they need the new communication patterns to help themselves. While, in the process their motivation towards health and other are neglected. Eventually hygiene and all other aspects are neglected. Moreover, different diverse people practice more than one hygiene rituals.
- 3) Developmental stage: In this stage individuals and organizations try to develop the hygiene to reduce the ill effects. While in the process as they try to be

improving and they are not perfect which has atleast a chance to contaminate the food.

4) Physical condition: In this stage individuals are motivated to keep themselves hygiene but due to their physical conditions they fail to do so. They may lack physical energy and dexterity to perform their actions.

D. Preservatives:

Additives are chemicals used to keep nourishment fresh. In spite of the fact that there are various diverse sorts of sustenance additives, antimicrobials, cancer prevention agents, and items that moderate the normal aging procedure are the absolute most basic. Notwithstanding their essential capacity, additives can represent various genuine wellbeing dangers. Cancer disease is a genuine symptom connected with the utilization of additives. Truth be told, the National Toxicology Program reports that propyl gallate - an additive usually used to settle certain beautifying agents and sustenance's containing fat - may bring about tumors in the mind, thyroid and pancreas. So also, In Chem - an association that gives peerreviewed data on chemicals and contaminants - takes note of that nitrosames, including nitrates and nitrites. can prompt the improvement of certain disease bringing on mixes as they connect with regular stomach acids. Nitrosamines are found in an assortment of sustenance's, including cured meat, brew and nonfat dried drain Anthony and Lebow (2015) discusses that fungi and other microbes cause bio deterioration which can be preventing by adding some preservatives (Anthony & Lebow, 2015), while Pollock et al. (1989) says that each and every preservative adding to the food need to be asses for food safety and there should be control limits (Pollock et al., 1989), I also agree with Garland (1961) that harmful preservatives excessive usage can cause ill effects (Garland, 1961).

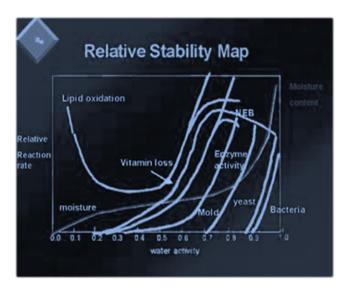


Figure5: Relative stability of temperature and moisture (source FAO)

1) Influence of certain chemicals (basic components of preservatives):

we call them as preservatives and their effects on human body measured by cytometry.

2) Red blood cells:

Boric acids and Hg salts doesn't show much effect but after three days it cannot survive. While, chloral hexedine and formaldehyde has negative effects on RBC.

3) White blood cells:

Boric acid and formaldehyde have negative effects while chloral hexedine and Hg salts have neutral results.

4) Casts:

Certain preservative has either negative effect or neutral effect, none of them is good for casts.

5) Epithelial cells:

Except borate+ sorbital+formate has good results and all remaining has either neutral or negative effects.

E. Improper handling:

Foodborne illness is a preventable public health challenge that causes an estimated 48 million illnesses and 3,000 deaths each year in the United States. It is an illness that comes from eating contaminated food. The onset of symptoms may occur within minutes to weeks and often presents itself as flu-like symptoms, as the ill person may experience symptoms such as nausea, vomiting, diarrhea, or fever. Because the symptoms are often flu-like, many people may not recognize that the illness is caused by harmful bacteria or other pathogens in food. Patricia, Virginia Val, and Lydia (2006) Discusses that older adults have very traditional practices which are not safe and lead to poisoning (Patricia et al., 2006) Fennema (1990) says that relative storage and all other formulations need to controlled for safe usage (Fennema, 1990), ("England And Wales," 1933) mentions that milk has very high storage problems which can be lowered by using preservatives, hygiene at work place and proper handling ("England And Wales," 1933), Mitakakis et al. (2004) discusses that extensive and intensive storage conditions are covering almost every variety of handling and storage practice (Mitakakis et al., 2004).

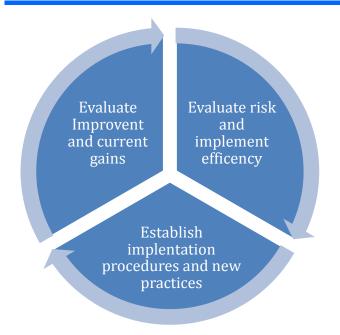


Figure6: Evaluating Improper handling practices and implanting new practices

1) Error theory:

Error theory is a cognitivist type of good agnosticism. The view moral proclamations can be recommendations, yet that every single moral suggestion are false (or can't be valid) — that we are for the most part in mistake when we put forth any ethical expression.

Presupposition failure:

Presupposition disappointment then again holds that the announcements are not expressly false, but rather are unquestionably not genuine because the announcements themselves make false presuppositions about profound quality (that ethical quality exists). Also, one may express that "the aliens on the moon have purple caps", which is coherently a suggestion however experiences a presupposition disappointment, by expecting that there are aliens on the moon, which is false. On a few records, this introduces the announcement from being false.

Observation error:

Observational blunder (or estimation mistake) is the distinction between a deliberate estimation of amount and its actual esteem. In insights, a blunder is not an "error". Inconstancy is an intrinsic piece of things being measured and of the estimation procedure.

2) Risk management:

Risk management has possessed an essential place on the motivation of specialists, scholastics and the businesses and has been on the ascent since it upgrades authoritative execution and makes cleanliness and sustenance security. Water temperature is a basic determinant in various maritime common strategies, while same in sustenance's as well. Particles disintegrated in water will rule the temperature. DO is broken up oxygen

which remains in nourishments as a matter of course which can be isolated by de-oxidizing. DO is additionally a considered figure while taking temperature as constant. PH is force of hydrogen which rules the acidulant or saltiness of sustenance's. The more hydrogen bonds the more PH. High Salinity or high corrosive PH is the place sustenance is free from tainting by organisms. This stops the raising temperature and inactivates them. PV=nRT is the perfect gas condition, weight, temperature, volume and number of moles are variables. If DO and different gasses are broken down in sustenance along these lines raises the PH and turbidity, in the long run the quantity of moles will rise furthermore the temperature. Inspiration is the key calculate accomplishing cleanliness. Cleanliness is not totally a science nerd word, its physical, mental and physiological term which needs parcel of mindfulness sessions to make a thought. whenever wellbeing and workforce of people, comes to check their social contrast is additionally taken into measure. Why this is vital because, culture from place to place is fundamentally changes and individuals living there moves they require the new correspondence examples to help themselves. While, in the process their inspiration towards wellbeing and other are ignored. In the long run cleanliness and every single other perspective are dismissed.

In addition, distinctive various individuals hone more than one cleanliness rituals. In this stage people and associations attempt to build up the cleanliness to decrease the evil impacts. While in the process as they attempt to enhance and they are not immaculate which has at least an opportunity to sully the nourishment. In this stage people are spurred to keep themselves cleanliness yet because of their physical conditions they neglect to do as such. They may need physical vitality and expertise to play out their activities.

Impact of specific chemicals (fundamental segments of additives) we call them as additives and their consequences for human body measured by cytometry. Red platelets: Boric acids and Hg salts doesn't indicate much impact however following three days it can't survive. While, chloral hexedine and formaldehyde effect sly affects RBC. White platelets: Boric corrosive and formaldehyde have negative impacts while chloral hexedine and Hg salts have impartial results. Throws: Certain additive has either negative impact or unbiased impact, none of them is useful for throws. Epithelial cells: Except borate+ sorbital+formate has great results and every outstanding ha either unbiased or negative impacts. : Error hypothesis is a cognitivist kind of good skepticism. The view moral announcements can be proposals, yet that each ethical recommendation are false (or can't be substantial) — that we are generally in slip-up when we set forth any moral expression. Presupposition frustration of course holds that the declarations are not explicitly false, but instead are

undeniably not certifiable because the declarations themselves make false presuppositions about significant quality (that moral quality exists). Likewise, one may express that "the outsiders on the moon have purple tops", which is soundly a proposal however encounters a presupposition frustration, by expecting that there are outsiders on the moon, which is false.

On a couple records, this presents the declaration from being false. Observational screw up (or estimation misstep) is the refinement between a consider estimation of sum and its real regard. In experiences, a screw up is not a "mistake". Irregularity is an inborn bit of things being measured and of the estimation system. Hazard administration has had a crucial place on the inspiration of experts, scholastics and the organizations and has been on the climb since it redesigns legitimate execution and makes cleanliness and sustenance security.

III. DISCUSS RESEARCH:

Water temperature is a basic determinant in various maritime common strategies, while same in sustenance's as well. DO is additionally a considered figure while taking temperature as constant. High Salinity or high corrosive PH is the place sustenance is free from tainting by organisms. If DO and different gasses are broken down in sustenance along these lines raises the PH and turbidity, in the long run the quantity of moles will rise furthermore the temperature. Inspiration is the key calculate accomplishing cleanliness.

Cleanliness is not totally a science nerd word, its physical, mental and physiological term which needs parcel of mindfulness sessions to make a thought. In this stage people and associations attempt to build up the cleanliness to decrease the evil impacts. In this stage people are spurred to keep themselves cleanliness yet because of their physical conditions they neglect to do as such. Red platelets: Boric acids and Hg salts doesn't indicate much impact however following three days it can't survive.

White platelets: Boric corrosive and formaldehyde have negative impacts while chloral hexedine and Hg salts have impartial results. Throws: Certain additive has either negative impact or unbiased impact, none of them is useful for throws. Epithelial cells: Except borate+ sorbital+formate has great results and every outstanding ha either unbiased or negative impacts. The view moral announcements can be proposals, yet that each ethical recommendation are false (or can't be substantial) — that we are generally in slip-up when we set forth any moral expression.

IV. RESULT AND DISCUSSION

The characterized nourishment security level is accomplished when an association has completely executed and adjusted HACCP and essential projects over most its units or properties. This is likewise the level where business administration systems are utilized for assets (faculty and apparatuses),

hierarchical arrangement, basic leadership, line-ofbusiness combination and hazard administration. You can't oversee something you can't gauge. These turns into the markers that answer the primary goal of a nourishment security program: Are we creating safe sustenance's? They have shown that there are five noteworthy hazard calculates that could prompt to foodborne ailment.

V. CONTRIBUTION AND NEW INSIGHT

A few illustrative structures are investigated and talked about to dissect the nourishment security on the individual grounds and modern view to improve the outcomes which are presently in principle. The discoveries of this study are proposed to be utilized to help a comprehension of the collaborations between standard creation hones and maintainable generation standards. to distinguish open doors for little and medium measured endeavors to wander into feasible activities at negligible cost. Moreover, the examination furnishes prove that consistence with natural measures can run as one with the meeting of different arrangements of creation models. to assist an understanding of the synergies between standard production practices and sustainable production principles to clarify whether halal food production is capturing aspects of sustainable development; and to identify opportunities for small and medium sized enterprises to venture into sustainable initiatives at minimal cost. Additionally, the investigation provides evidence that compliance with environmental standards can go hand in hand with the meeting of other sets of production standards.(Ali & Suleiman, 2016).

VI. CONCLUSION

There is growing literature concerning food safety in under developed countries Scholars, community organizations, and media alike are increasingly scrutinizing food, food systems, and food security. Below are the variables which play an important role in food security, supply and marketing. In China, the term food safety and security has become a buzzword that evokes concerns from individual consumers as well as food policy stakeholders. The analysis shows that past and current food security programmers' lead to increase domestic food production and assist in ensuring macro-level food self-sufficiency. Because money and food are closely related, exchangeable resources, financially dissatisfied people may be motivated to replenish their need for financial resources by consuming caloric resources or food energy. New techniques for solidifying, for example, high-weight solidifying, hydrotreating and utilization of radiator fluid and ice nucleation proteins, enhance solidifying process may needed. They may need physical vitality and expertise to play out their activities. By utilizing the variables above, inward sustenance procedures and choices will bring about more grounded outer nourishment security for customers and individuals.

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