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RESEARCH ARTICLE

MICROBIAL FOOD SAFETY OF STREET FOODSAROUND THE VICINITY OF LSPU – SCCREGINA

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Abstract

Knowing the number of pathogenic microbes in the street foods such as Escherichia coli, coliform, and molds present in street foods around the vicinity of LSPU – SCC was the focused of the study. Determination of the quality of the street foods such as banana cue, kikiam, kwek – kwek, minane, and siomai of which has a high level of safety in the street food around the vicinity of LSPU – SCC were considered. This study utilized the Descriptive research design and the mean in testing and gathering of data. The results reveled that all the street foods tested were safe from E. coli with the mean of ocfu/g and all at lss than 10 cfu/g or 0 count which gathered Satisfactory remarks. However, the findings revealed that the banana cue, minane and siomai were safe from coliform while kwek and kikiam were not with a value of 2800 cfu/g. In addition, all the street foods tested were safe from molds and the total mean of all the microbes present were 987.47 cfu/g which means that the street foods were Unsatisfactory level with 100cfu/g and above count and revealed that only banana cue, minane, and siomai are safe for human consumption while large amount of microbes were found in kikiam, and kwek -kwek which means that they are not safe for human and may cause disease.

Introduction:-

Food is an important part of every one of us. Filipinos most especially during breaktime from work and schools, people in all walks of life are crowding around food stalls along the main streets and roads to eat street foods. Being in a Third World country, these food items are perfect because they are easily available, cheap, and tasty. Street foods are ready to eat foods and beverages prepared by vendors especially in the street and in other similar places. Hence, according to a 2019 study from the Food and Agriculture Organization (FAO), 2.5 billion people eat street foods every day. With the increase demand of hawkers for street foods and the rapid boost of the number of food stalls, the safety has become one of the major concerns of public health and the focus of government and scientist to raise public awareness. Studies showed that pathogenic bacteria such as E. coli, coliform and molds were the most common bacteria present in the street foods. The consumers health should always be considered in establishing these food stalls. Nowadays, the number of street foods around the vicinity of Laguna State Polytechnic University Santa Cruz Campus are increasing that makes the risk of serious food poisoning outbreaks remain a big threat much especially to the student's health. The aim of the study was to determine the presence of Escherichia coli, coliforms, and molds in street foods around the vicinity of LSPU – SCC.

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Statement of the Problem

The study specifically intended to answer the following questions: Know the street foods available around the vicinity of LSPU – SCC. Determine the amount of the following pathogenic microbes in the street foods such as banana cue, kikiam, kwek – kwek, minane and siomai. Determine if there is a high level of safety in the street foods around the vicinity of LSPU – SCC.

Review of Related Literature

The microbial food safety is reflected in the presence of Escherichia coli, coliforms, and molds in the street foods around the vicinity of LSPU – SCC. Department of Health defines street foods as the cause of the increasing number of food diseases such as diarrhea and hepatitis. Street foods are usually affected by unsanitary handling. According to United Kingdom Accreditation (2014), the presence of microbes in ready – to – eat foods are undesirable because it indicates poor hygienic conditions which have led to contamination or inadequate heat treatment. Moreover, the Indian Journal of Microbiology (2011), describes street foods vending as an important public health issue and great concern to everybody. This is due to the mushrooming of wayside food vendors who lack of adequate understanding on the basic food safety issues. In the 2017, Microbiological Standards and Guidelines of the United States, the presence of microbes should not be detected and such level of less than 3 per gram (not limit of the most probable number test) has been given as the satisfactory criteria for this organism. According to NSW Food Authority of 2020, there is a wide variety of ready-to-eat foods. Examples include but are not limited to, sandwiches, kebabs, sushi, takeaway foods, and bakery products. Ready to eat foods usually includes several ingredients which may or may not be cooked. Due to the variety of ready-to-eat foods, the interpretation of microbiological results obtained from testing must account for the method of processing and the individual components of food.

Spink (2012), a famous physician, in his book "Economically Motivated Adulteration: Another Dimension of the Expanding Umbrella of Food Defense" indicates a broader concept of food safety that public health should always be the concern. It is a science – based solutions for food safety and quality worldwide.

Food safety encompasses as actions aimed at ensuring all foods are safe as possible. Millions of people fall ill and many dies because of eating unsafe food (WHO, 2013).

The study focuses on the safety of street foods around the vicinity of LSPU – SCC. There are lots of street foods available around the vicinity of the school, but this study focused only on the most preferred among them. The Microbial Standard and Guidelines, United Kingdom Accreditation Service and NSW Authority are all giving importance to the quality of foods we have today. The food safety standards given by them helped this study to know if the foods are desirable to eat and will pass their standards.

According to Food and Drugs Association (2013), coliforms are organisms associated with bacteriology polluted water. Their presence in finished water is indicative of contamination and is not tolerated. Extensively studied, their presence may be associated with disease causing organisms.

Coliforms are not single species organisms. Coliform count is a hygienic indictor that includes unsanitary conditions or poor hygiene practices during or after food production. Testing for total coliform is not intended to detect fecal contamination, but rather to reflect general hygiene during food production or handling and the quality of the measure to minimize bacterial contamination. The presence of coliforms does not necessarily mean that pathogens are present. While the detection of pathogens in ready – to -eat foods indicate a risk of food borne illnesses. (Center of Food Safety, 2013).

Hagan, (2010), states that molds can grow anywhere, they have growing medium sufficient moisture and enough warmth. Same can even grow at refrigerated temperature, a little bit more slowly than they would if its warmer. They can also withstand much more salt and sugar than bacteria.

Escherichia coli is the abbreviated name of the bacterium in the family Enterobacteriaceae named Escherichia (Genus) coli (species). They can cause human illness by several different mechanisms. Illnesses caused by these microorganisms are characterized by severe cramping and diarrhea which initially water but becomes grossly bloody (Wikipedia 2012). Pathogenic microbes are ubiquitous, abundant in environment and are easily acquired by foods.

Consumers who are attracted by convenience and low, prices may overlook aspects of hygiene or sanitation. In this study, customers lack understanding of proper food handling practices and have a potential for foodborne disease (Allain, 2013).

In the study made by Chakravarty (2015), street foods are the cause of several types of food borne disease. The water used for drinking and cleaning purposes is often contaminated due to unhygienic storage and handling.

Food borne illnesses are occurring worldwide with greater frequency than before as a result; food safety is becoming an increasingly important public health issue. In the United States of America, 76 million cases of food borne diseases, resulting in 325,000 hospitalization and 5,000 deaths (Dugan, 2017).

In the study of Lopez (2019), the environment had a great factor in determining the food safety. Improper garbage facilities are leading to poor environmental condition.

Safety of street foods is questionable as in most cases they are prepared under unsanitary conditions by the vendors who are by large illiterate and have poor personal hygiene. The chances of contamination of these foods increase greatly due to extremely poor environment condition in which they are prepared and served. (Sheth, 2015).

A survey involving 1325 street foods in Iloilo, Philippines found that only one item caused diarrhea among the study participants. It may be that illnesses occur but are not reported to medical authorities. It has also been suggested that individuals develop immunities to food borne diseases, although detailed studies are needed to confirm immunity development (Tinker, 2013).

Moreover, in the study of Allotey, (2011), established by the World Food Program states that the average mold count for food samples were above maximum permissible limits of 100 cfu/g. the adverse effects of molds and mycotoxins have been recognized for centuries following ingestions of contaminated foods.

The studies made by Allotey, Allain, Chakavarty, Dugan Lopez, Sheth, and Tinker were a great support in this study. It served as a guide in determining the different pathogenic microbes that can contaminate foods and cause diseases to human.

Materials And Methods:-

This study utilized the descriptive method of research design to determine the microbial food safety of the street foods around the vicinity of LSPU – SCC. Hence this study is used to determine the presence of Escherichia coli, coliforms, and molds present in the street foods around the vicinity of LSPU – SCC. The study used banana cue, kikiam, kwek – kwek, minane and siomai as samples.

The methods of preparation in getting the microbes count of the street foods were preparation of sample containers, selecting a specific place, getting the food samples and lastly transporting samples on their specific laboratories for testing. The data obtained were treated statistically with use of mean to determine the number of microbes in the street foods and the standard scale of safety level the Food and Standard Scale (2013). Using the standard scale of 0 – 10 cfu/g with the description of Satisfactory; 11 – 100 cfu/g is marginal and 100 – above cfu/g is unsatisfactory.

Results And Discussion:-

In this study data were gathered from the food samples that were tested in the laboratory to acquire the microbial count of E. coli, coliforms, and molds in the street foods.

Table 1:- Standard Amount and Actual Value of E. coli in Street Foods.

Street Foods	Standard Amount	Actual Value	Safety Level
1.banana cue	<10 cfu/g	0	Satisfactory
2. kikiam	<10 cfu/g	0	Satisfactory
3. kwek - kwek	<10 cfu/g	0	Satisfactory
4. minane	<10 cfu/g	0	Satisfactory
5. siomai	<10 cfu/g	0	Satisfactory

Legend:
0 -10 cfu/g - Satisfactory
11 – 100 cfu/g - Marginal
100 – above cfu/g - Unsatisfactory

The table shows that there were lots of street foods that can be found and available around the vicinity of LSPU – SCC and it showed the actual value of E. coli in the street foods with the mean of 0 cfu/g. banana cue, kikiam, kwek – kwek, minane and siomai were all at less than 10 cfu/g or 0 count which means that all the street foods were tested were safe from E. coli ang gathered Satisfactory remarks.

Table 2:- Standard Amount and Actual Value of Coliforms in the Street Foods.

Street Foods	Standard Amount	Actual Value	Safety level
1.Banana cue	10 cfu/g	0	Satisfactory
2. kikiam	10 cfu/g	12000	Unsatisfactory
3. Kwek - kwek	10 cfu/g	2800	Unsatisfactory
4. Minane	10 cfu/g	0	Satisfactory
5. Siomai	10 cfu/g	0	Satisfactory

Legend
0 -10 cfu/g - Satisfactory
11 – 100 cfu/g - Marginal
100 – above cfu/g - Unsatisfactory

The table showsthe actual coliform count in the street foods. Banana cue, minane and siomai are at <10 cfu/g or 0 count and gathered a "Satisfactory" remarks while kikiam got an actual value of 12000 cfu/g and kwek – kwek got a value of 2800 cfu/g both verbally interpreted as Unsatisfactory remarks. The findings revealed that banana cue, minane and siomai are safe from coliform and kwek – kwek and kikiam were not safe to eat. The Center for Food Safety, 2013 states that the presence of coliforms does not necessarily mean that the pathogens are present

Table 3:- Standard Amount and Actual Value of Molds in the Street Foods.

Street Foods	Standard Amount	Actual Value	Safety Level
1. Banana cue	10 cfu/g	4	Satisfactory
2. kikiam	10 cfu/g	0	Satisfactory
3. Kwek - kwek	10 cfu/g	4	Satisfactory
4. Minane	10 cfu/g	0	Satisfactory
5.Siomai	10 cfu/g	8	Satisfactory

Legend:
0 -10 cfu/g - Satisfactory
11 – 100 cfu/g - Marginal
100 – above cfu/g - Unsatisfactory

The table shows the actual molds count in the street foods. Kikiam and minane got 0 count. Banana cue got 4 cfu/g count, kwek – kwek got 4 cfu/g and siomai got 8 cfu/g count. The study revealed that all the street foods under study were safe from molds.Hagan, 2010 states that molds can grow anywhere and can even grow at refrigerated temperature, a little bit slowly than they would if its warmer.The study of De Guzman (2017), the spread of these microorganisms are fast especially in open polluted places.

Table 4:-Actual Value of Microbes in the street foods around the vicinity of LSPU – SCC.

Street Foods	E. coli	Coliforms	Molds	Mean	Safety level
1.Banana cue.	0	0	4	1.33	Satisfactory
2. Kikiam	0	120000	0	4000	Unsatisfactory
3. Kwek - kwek	0	28000	4	933.33	Unsatisfactory
4. minane	0	0	0	0	Satisfactory
5. Siomai	0	0	8	2.67	Satisfactory

				Total Mean 987.47	**Unsatisfactory**

Legend:
0 -10 cfu/g - Satisfactory
11 – 100 cfu/g - Marginal
100 – above cfu/g - Unsatisfactory

The table shows the total mean of all the microbes present in the street foods around the vicinity of LSPU – SCC. Banana cue got a mean score of 1.33 cfu/g and had a safety level of Satisfactory. Kikiam got a mean score of 4000 cfu/g and a safety level of Unsatisfactory Kwek – kwek got 933.33 cfu/g and is Unsatisfactory safety level. Minane got o and is verbally interpreted as Satisfactory and siomai got 2.67 cfu/g and got unsatisfactory safety level. The total mean of all the microbes present in the street foods around the vicinity of LSPU – SCC is 987.47 cfu/g which means that the street foods were at the Unsatisfactory level (100 cfu/g and above count).

The findings revealed that only Banana cue, minane and siomai were safe for human consumption while the large amount of microbes are found in kikiam and kwek – kwek which means that they are not safe for human consumption and may cause disease. Th study made by Chakravarty (2015), found out that consumers who are attracted by conveniences and low prices may overlook aspects of hygiene or sanitation. In his study customers lack an understanding of proper food handling practices and have a potential for food borne disease

Conclusions:-

Banana cue, kikiam, kwek – kwek, minane and siomai were the most common available street foods around the vicinity of LSPU – SCC. The weighted mean of 987.47 cfu/g indicates that the microbes in the street foods around the vicinity of LSPU – SCC was rated Unsatisfactory; therefore it is not safe for human consumption. There is no high level of safety in the street foods around the vicinity of LSPU – SCC.

Recommendations:-

Based on the findings and conclusions of the study, the recommendations are1. Encourage the food vendors to maintain the proper hygiene and sanitation to have safe access to the street foods.2. Persuade the consumers to be more aware of the study for them to avoid food borne diseases. 3. The result of the study should be submitted to the sanitation unit in the Barangay where LSPU – SCC is located for them to study and inform the vendors on proper hygiene and sanitation practices. And finally educate students on the awareness of good sanitation practices and the handling and preparation of food. Safe steps in food handling, cooking, and storage are the essential steps to prevent food borne diseases. Follow the four steps of the Food Safe Families Campaign to keep food safe: Clean, Separate, Cook and Chill.

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