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The Hygiene and the Quantity of Coliforms in Steamed Chicken Rice sold in Nong Khaem district, Taling Chan district, Bang Kruai district, Bang Rak district, and Bang Khen district

Bhurin Julual[1], Eugene Patrick Ywin[2], Dhanakrit Adulytheerakij[3], Pattarachai Wangsuwan[4]

Suankularb Wittayalai School

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Abstract: **Nowadays, chicken rice is one of the famous dishes in Thailand and is the most popular food in Thailand. Chicken Rice Shop can be normally found everywhere in the community. The researcher has a special fondness for chicken rice, therefore, chicken rice was chosen as an experimental example of this research. Farmed chickens can sometimes contain a large amount of contaminants, so the researchers conducted a comparative experiment between the chicken rice in the store and the restaurants to see if the cleanliness of food and products differed. Henceforth, this led the researchers to many questions and concerns about the hygiene of such foodstuffs. From the above problem, the researcher saw the importance of the problem. Therefore, the objective was to survey and analyze the number of coliform bacteria in 24 chicken rice shops from 5 major districts Nong Khaem district, Taling Chan district, Bang Kruai district, Bang Rak district, and Bang Khen district. In Bangkok, it is divided into indoor chicken rice and chicken rice outdoor restaurants. Coliform bacteria were used to identify coliform bacteria in chicken rice. The test results show that there were similar results between in-store chicken rice and chicken rice outdoor restaurants, and 67% of the chicken rice in the 5 major districts of Bangkok failed to meet the standards of cleanliness. From the research it can be concluded that the type of restaurant is not a determinant of food hygiene. It is considered an excess number of bacteria and should not be taken orally.**

Keywords: **Coliform bacteria, Restaurant, Street food.**

1. INTRODUCTION

Being one of our daily needs, food is something that humans must intake but some of them could be contaminated by various microbes causing effects to the human body. Food safety can be generally simplified as various ways to reduce the risk of infection in food, whether it'd be the handling, preparation, or restoration of food. The lack of food safety is the main reason for food being contaminated by microbes. Once unsafe food, the food that is uncooked, handled badly etc. , has been consumed, that individual is at the risk of numerous illnesses. [1][2][3]

According to the mentioned passage about contamination of microbes in food, Nowadays, harmful bacteria has been detected in our daily life food and especially in street foods. Street food is numerously popular in Thailand which leading to the unintentionally consumption of contamination of Coliform bacteria, *E. coli* and *S. au*reus in food that can be fatal to the point of causing illnesses, leaving foods without any protection resulting in the raising number of bacteria in food

referring to the article "Situation of Microorganism Contamination in Ready to Eat Food: The Case Study at Khon Kaen and Udon Thani Provinces". Moreover, price value is also an essential factor in Thailand, most people prefer cheaper and more value foods before the expensive one affecting street food buying of consumers. According to the related paper "Food Quality, Price Value, Satisfaction, Health Value, and Food Attitude Affecting Street Food Buying Decision of Consumers in Bangkok". Additionally, street food is also very famous among foreigners tourists in Thailand. Thai food is one of the best types of food in the world; therefore it is not surprising that even foreigners love Thai food. Nevertheless, in terms of the safety protocol of street food consumption causing bacteria admission into the body. Thus, we have to find a way to reduce the number of bacteria in street food in case of illness reduction. Referring from the research paper "Attitudes and Satisfaction of International Tourists in Bangkok Metropolis Toward Street Food".

When discussing an Asian food particularly in Thailand, usually steamed chicken rice would be on top of the list most of the time. The main reason why steamed chicken rice gained so much popularity over this year is its simplicity and taste. Due to this reputation, steamed chicken rice is often sold in numerous restaurants all over the country. Moreover, steamed chicken rice is also considerably common among street foods especially in fresh markets and along the road. As a result, there are some lingering concerns about the hygiene of the food targeting the aspect of food contamination. According to a certain source, a plate of steamed chicken rice from a certain Thai school was examined and the result of the findings was that there are various microbes present in the food; TPC, *S. aureus, B. cereus and E. coli*.[4]

The ever growing popularity of steamed chicken rice in Thailand has led to them being recognised everywhere and often being the first choice of many people. As the demand of the said dish rises, the speed of the production also increases to satisfy the demand. Consequently, the awareness of food safety may drop causing the food to be contaminated by various microbes. Therefore, the researcher would like to take the matter into further inspection to detect the microbes in the steamed chicken rice from a selected source; restaurants and outdoor booths. [5][6][7][8]

Purpose of the study

1. To detect coliform contaminated in steamed rice chicken
2. To compare the number of coliform between restaurant food & outdoor food

2. STUDY METHODS

This is a cross sectional study of the Coliform bacteria contamination in steamed chicken rice that is sold in Bangkok metropolitan using "Random sampling method"to distinguish street food and restaurant food.

Sampling

Samples used in this study research, researchers using "Random Sampling Method" in case of finding samples for the research. Samples are being gathered from 2 major sources which are "outdoor restaurants" and "indoor restaurants" in Taling Chan district, Nong Khaem district, Bang Kruai district, Bang Khen district and Sathorn district by using steamed chicken rice as a sample for the paper. Samples are all kept in a constant temperature 2-8 Celsius degrees before lab testing.

Table 1: shows the number of samples of students who ate Steamed Chicken Rice during indoor restaurants and outdoor restaurants.

No.	Sample	Source	Number of Sample
1.	Steamed Chicken Rice	indoor restaurant	12
2.	Steamed Chicken Rice	outdoor restaurants	12
Total			24

Instrument and Tools

In this Coliform bacteria detection, researchers use a Coliform bacteria test kit from "Department of Medical Sciences Ministry of Public Health" to primarily verify that the Coliform bacteria contamination in food exceeds the standard or not. In case of food poisoning reduction.[9]

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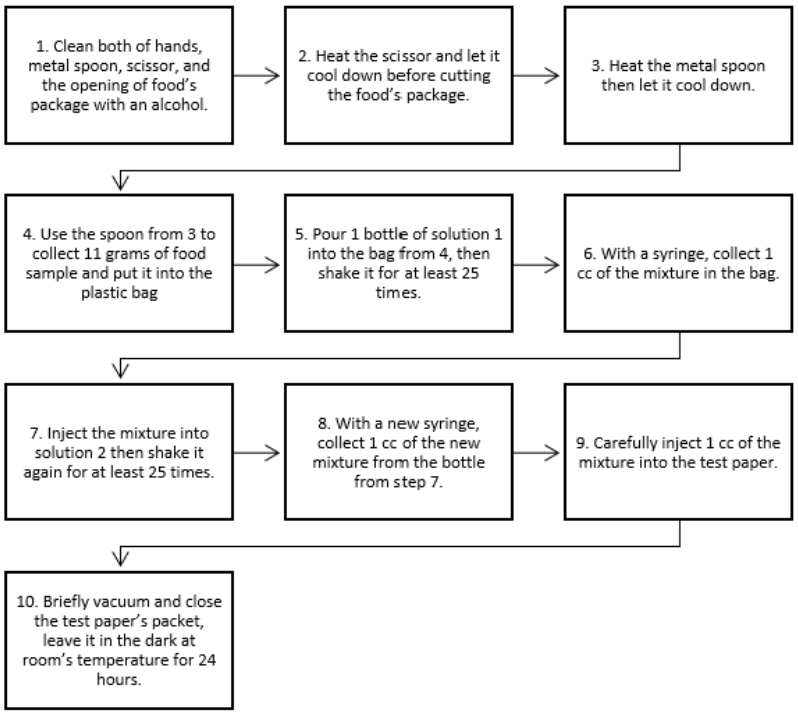
Equipment

Table 2: Number of devices used in the experiment

No.	Equipment	Number
1.	Test paper	24
2.	Syringe	48
3.	Plastic bag	24
4.	Solution 1 and Solution 2	24
5.	Cotton and Alcohol	1
6.	Steriliser	1
7.	Weighing scale	1
8.	Scissor	1
9.	Metal spoon	1
10.	Lighter/ Alcohol burner	1

Test Procedure

Table 3: Experimental stages



1. Clean both hands, metal spoon, scissor, and the opening of food's package thoroughly with alcohol.
2. Heat the scissor and let it cool down before cutting the food's package.
3. Heat the metal spoon then let it cool down.
4. Use the spoon from 3 to collect 11 grams of food sample and put it into the plastic bag

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5. Pour 1 bottle of solution 1 into the bag from 4, then shake it for at least 25 times.
6. With a syringe, collect 1 cc of the mixture in the bag.
7. Inject the mixture into solution 2 then shake it again for at least 25 times.
8. With a new syringe, collect 1 cc of the new mixture from the bottle from 7.
9. Carefully inject 1 cc of the mixture into the test paper.
10. Briefly vacuum and close the test paper's packet, leave it in the dark at room's temperature for 24 hours.

3. RESULT INTERPRETATION

Counting red dots on the testing papers and interpreting the outcomes of our specimen into tables. From the number of red points in the sample, if it has more than 4 points, it does not pass the benchmark. On the other hand, if it has less than 4 points, it passes the benchmark.

Table 4: Result Interpretation

Types of Food	Number of Red Dots	Criteria	Number of Coliforms / 1 Gram of Food
Ready to eat meal Outdoor Restaurant	0 - 4	Passed	Number of Red Dots X 100
	≥ 5	Failed	

4. RESULT

The resulting number of coliforms within 24 samples, 12 from restaurants and 12 from outdoor restaurants, the researchers found that 16 of the samples exceeded the amount of microbes that was considered safe. Meanwhile, 8 of the samples were categorised as safe products. Consequently, the findings indicated that food from 12 restaurants has only 4 restaurants that were considered safe which accounts for 33.33%. Similarly, 8 outdoor restaurants failed to pass the standards which accounted for 66.67% of all outdoor restaurants food. (Table 5)

Table 5: Coliform bacteria detection results in steamed chicken rice (n=24)

Steamed Chicken Rice Samples	Source	Red Dots	"Coliform Quantity/gram of foods (Red Dots x 100)"
Sample 1	Indoor Restaurant	7	700
Sample 2	Indoor Restaurant	28	2800
Sample 3	Indoor Restaurant	13	1300
Sample 4	Outdoor Restaurant	3	300
Sample 5	Outdoor Restaurant	11	1100
Sample 6	Outdoor Restaurant	35	3500
Sample 7	Indoor Restaurant	70	7000
Sample 8	Indoor Restaurant	12	1200
Sample 9	Indoor Restaurant	18	1800
Sample 10	Outdoor Restaurant	3	300

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Sample 11	Outdoor Restaurant	0	0
Sample 12	Outdoor Restaurant	20	2000
Sample 13	Indoor Restaurant	3	300
Sample 14	Indoor Restaurant	4	400
Sample 15	Indoor Restaurant	9	900
Sample 16	Outdoor Restaurant	6	600
Sample 17	Outdoor Restaurant	8	800
Sample 18	Outdoor Restaurant	9	900
Sample 19	Indoor Restaurant	4	400
Sample 20	Indoor Restaurant	3	300
Sample 21	Indoor Restaurant	7	700
Sample 22	Outdoor Restaurant	26	2600
Sample 23	Outdoor Restaurant	29	2900
Sample 24	Outdoor Restaurant	2	200
Total		330	33000

The table shows and illustrates the resulting red dots from the coliform bacteria detection test on 24 distinct steamed chicken rice. In detail, there are significantly higher amounts of steamed chicken rice with more than 4 red dots presented within 16 stores compared to only 8 stores with less than or equal to 4 red dots. (Table 6)

Table 6: Coliform bacteria detection results in steamed chicken rice, according to purchased restaurants (n=24)

Restaurant Categories	Red Dots 0-4 n (%)	Red Dots >4 n (%)	Number of Samples n (%)
Indoor Restaurant	4 (33.33)	8 (66.67)	12 (100)
Outdoor Restaurant	4 (33.33)	8 (66.67)	12 (100)
Total	8 (33.33)	16 (66.67)	24 (100)

5. DISCUSSION

Coliform bacteria presence in steamed chicken rice can be classified as an indicator bacteria. In detail, coliform bacteria that is situated on the food signifies that the environment is ideal for intestines-type pathogens to manifest and indicate that the food may not be thoroughly disinfected. While indoor restaurants are exposed to a higher degree in an environment, increasing the chance of being infected by microbes, it is not always the case since some of the samples from the restaurant are more contaminated. A similar result can be found in the opposite case, some indoor restaurants are much cleaner than those that are restaurants. [10][11] According to the experimental results, 24 samples of steamed chicken rice were collected from restaurants and indoor restaurant. Then, researchers found that the number of Coliform bacteria in steamed chicken rice samples was in the range of 0 - 20,000/gram, 8 samples, representing 33.33%. The Coliform bacteria amount which passed the benchmark was 0-400/gram, or there were 0-4 red dots in 16 samples, representing 66.67%. On the other hand, the Coliform bacteria amount which did not pass the benchmark was at least 500/grams, or there were 5 or more red dots. Genres of restaurants that purchased steamed chicken rice for the Coliform bacteria detection in this research. Coliform

bacteria content that passed the benchmark and the other which did not pass the benchmark were found in the same category of restaurants. Hence, types of restaurants are irrelevant to the amount of chloroform. The results from the findings show that it is consistent with the article that the proportion of randomly collected steamed chicken rice around Bangkok that had an overcrowded amount of bacteria was 67.65%; in addition, there were 34 samples that were collected. Due to the fact that 67.65% of stream chicken rice in Bangkok has more bacteria than the threshold of safety, people need to be aware and be more careful in eating the stream chicken rice. [12][13] According to the papers on the risk of Coliform bacterial contamination in chicken rice in Muang district, Ratchaburi which have been researched since December 2012. Found that the Coliform bacteria which did not pass the benchmark in steamed chicken rice represented 67%. The possible factors that could lead to the contamination are the purity of container equipment, and the food provider's hands. Lastly, frequently used hand towels.

[14] Reference from the research of halal food in the area Songkhla and Satun Provinces in 2549. The product consisted of chicken rice. We found Coliform bacteria in 13 samples, representing 7.7%, which is the number of bacteria in a standard form that causes bacteria to contaminate nutrients. In fact, we noticed that the Coliform bacteria comes from contamination in cooking utensils such as cutting boards and a refrigerator for storing meat.

[15]. From the survey of chicken rice in the canteen of Loei Rajabhat University During August-October 2011, one sample of chicken rice was collected. The result was that it failed to meet the criteria because of the number of coliforms. There is more than the threshold of safety which constitutes >1100mpn/g, whereas the required amount is <500mpn/g.

From the research, the researchers found out that there hadn't been a development of steam chicken rice. All of the specimens failed the requirement. As a consequence, it can lead to a lot of drawbacks, such as disease, etc.

6. CONCLUSION

Owing to the fact that the number of coliform varies throughout the samples disregarding the source of the sample. Therefore, the researchers came to the conclusion that the environment is nothing but only one of the factors. To determine the safety of the food, there are many more factors that contribute to the contamination rate.

Limitations

In this experiment, the food that was acquired by the researchers was bought at a distinct time due to the shop opening time and the distance from the shop and to the experimental lab. The coliform test does not have the capability to determine the specific type of coliform bacteria; only their presence can be checked.

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Conflict of interest

The researchers state that there is no conflict of interest.

REFERENCES

[1] World Health Organization. Food safety [internet]. 2020 [Accessed May 10, 2022]. Available from : https://www. who.int/news-room/fact -she ets/detail/food-safety

[2] Apirak Bumyut. Assessment of food safety conditions at foodservice premises using Thai survey form and field fecal indicator testing in Pakpoon municipality of Nakhon Si Thammarat, Thailand. SciELO-Brazil. [internet]. 2022 [Accessed May 10, 2022]. Available from : https://www.scielo.br/j/cta/a/rQSfnqdWq5wtSLHJPkhHTFJ/ ?format =pdf&lang=en

[3] Ratchadaporn Suwannarat. The Survey of Contamination Listeria monocytogenes, Salmonellae and E.coli O157:H7 in Raw Meat Selling In Fresh Market In Bangkok and Circumference. Department of Medical Sciences [internet]. 2016 [Accessed May 10, 2022]. Available from : http://bqsf.dmsc.moph.go.th/bqsfWeb/wp-content/uploads/2017/ Publish/Research/%E0%B8%9B%E0%B8%B5%202559/3-2559%20Survey%20of%20Listeria%20monocytogenes. pdf

[4] Srinakharinwirot University. Microbiological Hazards and Critical Control Points of the School Lunch Production of Khao Man Kai [internet]. 2022 [Accessed May 10, 2022]. Available from : http://ejournals.swu.ac.th/index.p hp/ssj/article/view/6923

[5] Umporn Jaempol. Microbiological Hazards and Critical Control Points of the School Lunch Production of Khao Man Kai. ThaiScience [internet]. 2015 [Accessed May 10, 2022]. Available from : https://www.thaiscience.info/journals/Article/SSCJ /10977744.pdf

[6] Dariwan Setthitham. The situation of Microorganism Contamination in Ready to Eat Food: The Case Study at Khon Kaen and Udon Thani Provinces. Khon Kaen University [internet]. 2013 [Accessed May 10, 2022]. Available from : https://he01.tci-thaijo.org/index.php/kkujphr/article/view/118222/90730

[7] Phinicha Kitkasemphongsa. Food Quality, Price Value, Satisfaction, Health Value, and Food Attitude Affecting Street Food Buying Decision of Consumers in Bangkok. Bangkok University Research [internet]. 2016 [Accessed May 10, 2022]. Available from : http://dspace.bu.ac.th/jspui/bitstream/123456789/3796/1/pinicha_kitk.pdf

[8] Thitipat Pakprot. Opinions of Foreign Tourists towards Street Food Consumption: A case study of Pranakorn District, Bangkok. Dhurakij Pundit University [internet]. 2020 [Accessed May 10, 2022]. Available from : http://libdoc.dpu.ac.th/thesis/Tiparat.San.pdf

[9] Bureau of Quality and Safety of Food. Coliform Test Kit [internet]. 2017 [Accessed May 10, 2022]. Available from : http://bqsf.dmsc.moph.go.th/bqsfWeb/wp-content/uploads/2017/06/test-kit/7-coliform%20in%20food.pdf

[10] H.B.D. Halkman. Coliform Bacteria. ScienceDirect [internet]. 2019 [Accessed May 10, 2022]. Available from : https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/coliform-bacteria

[11] Leland W. Coliform Bacteria. ASM American Society for Microbiology [internet]. 1939 [Accessed May 10, 2022]. Available from : https://journals.asm.org/doi/pdf/10.1128/br.3.1.1-48.1939

[12] Food Sanitation Division Health Department. Food Safety Situation [internet]. 2020 [Accessed May 10, 2022]. Available from : http://foodsanitation.bangkok.go.th/assets/uploads/year_report_food/document/20210331_95168.pdf

[13] Bureau of technical advisors Risk of bacterial contamination in chicken rice in Muang district, Ratchaburi [internet]. 2020 [Accessed May 10, 2022]. Available from : http://advisor.anamai.moph.go.th/images/Journal_health/HEALTH_Vol36No3_06.pdf

[14] Chaveewan Maliwan. Microbial Quality of Ready to Eat Halal Foods in Songkhla and Satun Provinces. Institute of food [internet]. 2012 [Accessed May 10, 2022]. Available from : http ://158.108.94.117/Public/PUB0575.pdf

[15] Bunliang Suphim.Ubon.Microbiological Quality of Ready-to-Eat Foods in Loei Rajabhat University Canteen. Ratchathani University [internet]. 2017 [Accessed May 10, 2022]. Available from : https://www.ubu.ac.th/web/files_up/08f2017090610180224.pdf