International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Microbial and Qualitative Analysis of Green chutney sample of street foods in selected areas of Pune

Shraddha Belambe[1], Ankita Uchake[2]

[1]Assistant professor, SNDT College of Home Science, Pune
[2]Student, SNDT College of Home Science, Pune

ABSTRCT

Street-vended foods are readily available sources of meals for many people around the world, but the microbial safety of such food is always doubtful. In developing countries, the major sources of food-borne illnesses are street-vended foods. The present research work was, therefore, untaken to find out the presence of total microbial count and coliform count from the Green Chutney samples collected from street vendors of different places in Pune City, Maharashtra.

Chutney is an integral part of Indian cuisine. It is served with everything from basmati rice to bread like naan, idly, chat items to curry dishes. Chutney refers to a broad category of Indian condiments or sauces that can be either sweet-tart or savory or spicy. We have studied the microbial profile of street food green chutney which is unprocessed, and it has raw materials like green chili, coriander leaves, curry leaves, mint leaves, ginger garlic pest coconut, and peanut.

We have studied the total microbial count and coliform count of chutney samples.

Among them, we found microbial growth in 60% of the samples but it is not beyond FSSAI standards. This study indicates that the street-vended food (green chutney) in Pune City is not highly contaminated and safe for consumption.

Introduction

Street foods is popular worldwide, especially in developing countries, due to their easy accessibility, affordability, and palatability. However, street foods have been identified as a significant source of foodborne illnesses due to the unhygienic conditions under which they are prepared and sold. Pune, a bustling city in Western India, is famous for its diverse street food culture, which attracts locals and tourists alike. However, the microbial quality of these street foods remains largely unknown, which poses a significant public health risk.

Foodborne disease outbreaks linked with RTE foods have been linked with different types of foodborne pathogens. The occurrence of foodborne illness is escalating worldwide. The original microbiological load on RTE food ingredients is vital, however, factors such as handling, processing, storage, and display may persuade the microbiological load of RTE foods at the point of sale. Ready-to-eat foods are often processed by hand and this direct contact may lead to an augmented incidence of contamination with potential food-borne pathogens.

The foods that we eat carry microbial associations whose composition depends upon which organisms gain access and how they grow, survive, and interact in the food over time. The microorganisms present

will originate from the natural micro-flora of the raw material and
those organisms introduced during harvesting, slaughter, processing, storage, and distribution. The numerical balance between the various types of microorganisms will be determined by the properties of the food, its storage environment, the properties of the organisms themselves.
and the effects of processing. The aim of the study is to check the microbiological quality of street foods. The present samples constitute raw ingredients like green chili, coriander leaves, curry leaves, mint leaves, ginger garlic pest coconut, and peanut, water which is used in making spicy-salty water for Panipuri, in sandwiches, also use with different cuisines by vendors in Pune. These samples were tested for different parameters such as Total microbial count, Total Coliform Count, pH, and salinity.

Food-Borne Infections and Intoxications
Foodborne illness can be caused because of unhygienic conditions and by not maintaining food safety. Also, because of the contamination and unsafe food.
Foodborne intoxication, more commonly known as food poisoning, is caused by eating food that contains toxins that are released by pathogens.

What are coliform bacteria?
Coliform bacteria are found in soil, surface water, plants, and in the intestines of warm-blooded animals and people. One type of coliform bacteria called Escherichia coli (E. coli) is a sign that fecal waste is in the water. Some types of E. coli in drinking water can make you sick.

Health problems can coliform bacteria to cause.
Most coliform bacteria are not harmful. However, some can make you sick. A person that has been exposed to these bacteria may have an upset stomach, vomiting, fever, or diarrhea. Children and the elderly are more at risk from these bacteria.
Factors Affecting the Growth of Microorganisms Intrinsic Parameters
The parameters present in substrates where the microorganisms are growing, which are internal parts of the substrate are called intrinsic parameters. These parameters are as follows: pH, Moisture content, Oxidation-reduction potential (Eh), Nutrient content (water, source of energy, source of nitrogen, vitamins and related growth factors, minerals), Antimicrobial constituent, and biological structures.
Extrinsic_Parameters extrinsic parameters of foods are those properties of the storage environment that affect both the foods and their microorganisms. Those of greatest importance to the welfare of food-borne organisms are Temperature, gaseous atmosphere and relative humidity.

Impact of food safety on microbial contamination-Microbial food-borne disease (FDB) is one of the major concerns in terms of public health because of the high risk of microbial contamination of foods by several types of biological hazards, causing personal distress, preventable deaths, and avoidable economic burdens. Every year, at least two billion people worldwide are affected by FBD, for this reason, these diseases are recognized as among the greatest public health problems in the contemporary world.
The incidence of foodborne diseases is because of the strict correlation with Public Health. In this respect, microbiological food contamination with pathogens, their persistence, replication and/or toxin production has become one of the major concerns to consumers, food industries and regulatory agencies all around the world. Food microbial contamination can occur at any stage of the food chain and could be avoided

by applying good manufacturing practices, Hazard Analysis Critical Control Point (HACCP) notions, raw material control, and maintenance of the cold chain at the industry and retail levels.

In this scenario it is important to highlight the necessity to implement new technologies and their application for fast and direct detection of the presence of microbial contamination and of course, for preventing food microbiological contamination in all the food chain steps which enhance the microbial food safety and quality. Moreover, a particular focus is requested on the continuous educational process and practices for contributing to the effect of good manipulation procedures and guaranteeing food safety, along the food chain, and the food quality to the final consumers.

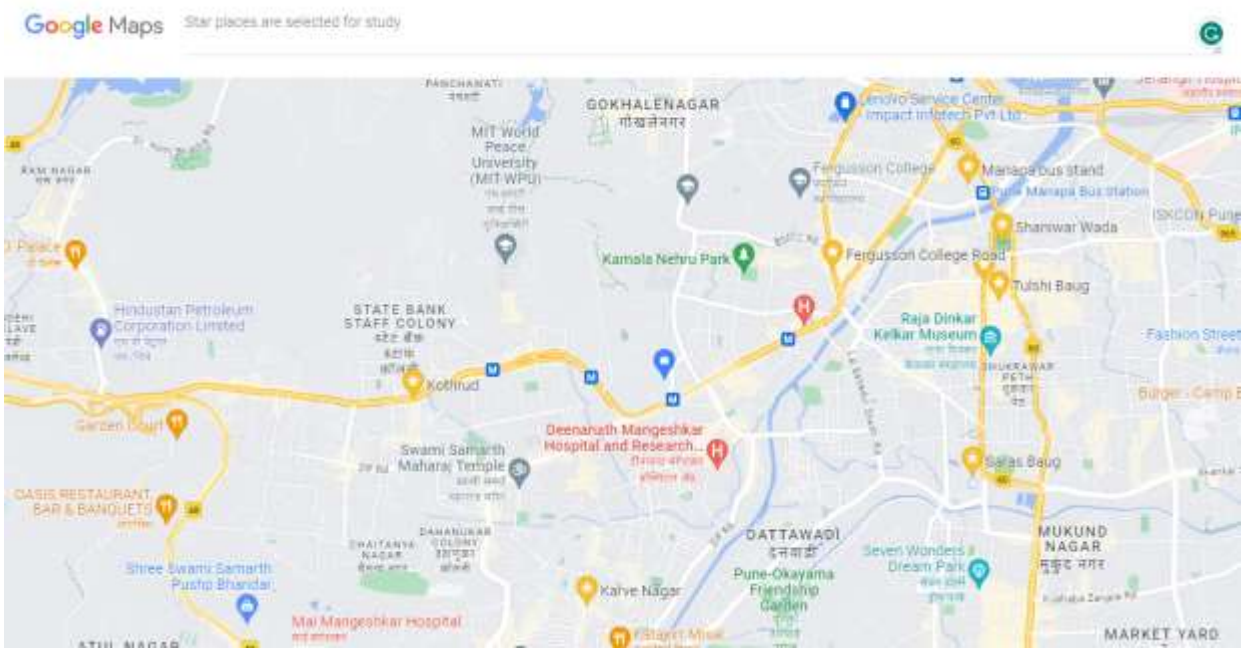
Objective

- To assess the presence and level of microbial contamination in street food samples.
- To evaluate the safety of street food and recommend corrective action where necessary.
- To create awareness among consumers about the need for safe food handling practices.

Methodology

Study area.

5 different places of Pune city which are Karve Nagar, Shaniwar Wada, Sarasbag, MANAPA, Tulshibag.



Study duration.

This study was carried out over a period of 3 months from February 2023 to April 2023.

Sample collection.

About 30 green chutney samples were randomly collected from street vendors in the top 5 local areas of Pune City. These samples were collected aseptically in different Ziplock poly bags to prevent their contact with any other source that can contaminate the samples.

TOTAL PLATE COUNT

To detect the total viable bacterial growth and coliform count of the green chutney (street food) samples. Microbial analysis of the green chutney sample performed. For bacterial analysis, To enumerate the “total”

or viable bacterial growth of the green chutney samples Plate Count Agar (PCA) has been used and for enumeration of coliforms in green chutney Violet Red Bile Agar (VRBA) has been used.
The total plate count technique gives the number of viable organisms present in a particular sample. We followed a pour plate method according to the FSSAI manual.
For bacterial analysis of green chutneys, we used PCA and VRBA agar media.

REQUIREMENTS -
(I) Glassware - (1) 10 ml Sterile pipettes – 1, 1 ml Sterile pipettes – 1, Sterile Petri plates -4 **,** Sterile test tubes -5 **(II) Media -** plate count Agar - 50 ml, Violet red bile agar -50 ml **(III) Sample -** Chutney sample - 1g, Sterile distilled water - 30 ml

PROCEDURE
Sample preparation - Weigh 1 gm of sample and adds 9 ml of D/W.
Dilutions & Dilution table -
1. Add 9 ml D/W in all the dilution tubes.
2. In the first tube add 1 gm homogenate sample.
3. Take 1 ml of serial solution from the first test tube & add to the second tube & mix it well.
4. Follow the same procedure for all the dilution tubes**.**

Table No. 1

Sr. No.	Dilutions	Amount of D/W (in ml)	Amount of sample solution (in ml)	Total volume (In ml)
1	10^{-1}	9	1	10
2	10^{-2}	9	1	10
3	10^{-3}	9	1	10
4	10^{-4}	9	1	10

Pour plate method for enumeration of total microbial count -
1. Label all Petri plates with the sample number, dilution and date.
2. Pipette 0.1ml of the food homogenate and of such dilutions which have been selected for plating into a petri dish in duplicate. Pour 10 to 12ml molten PCA into each petri dish (cooled to 42-45^{o} c).
3. Within 15 min from the time of preparation of original dilution. Mix the media and dilutions by swirling gently clockwise, anticlockwise, to and from trice and taking that the content does not touch the lid. allow setting.
4. Incubate the prepared dishes, inverted at 35^{o} c for 24 hours.

Pour plate method for enumeration of coliform count -
1. Pipette 0.1ml of the food homogenate (prepared sample) and of each dilution into the appropriately marked duplicate Petri dishes.
2. Pour 10-12 ml molten VRBA into each petri-dish and swirl the plates to mix. Allow to solidify.
3. Overlay with 3 to 5 ml VRBA and allow to solidify.
4. Incubate the dishes, inverted at 35^{o} C for 18 to 24 hours.

Result and Discussion

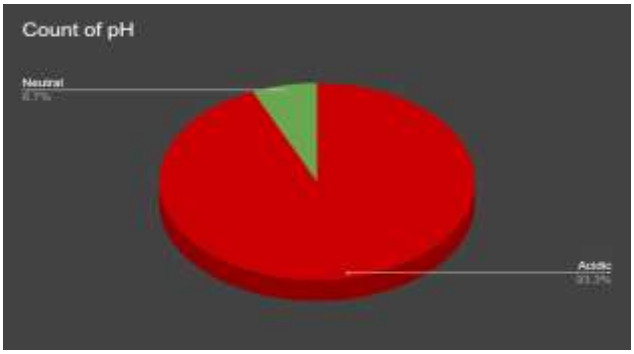
Physical properties of samples

The following results show the physical properties of the collected street food green chutney. chart 1 summarizes the pH level and Chart 2 salinity level of green chutney. These parameters are considered crucial to the growth of microbial count.

pH

Bacteria need optimum pH for their rapid growth. In this analysis of 30 green chutney samples, 93.3 % are acidic and 6.7 % are neutral in pH.

Figure 1. pH of samples



Salinity in percent

The following table summarizes the salinity percent of collected samples of green chutney. We have collected 30 samples of which 8 samples come under the range of 0 - 5 % salinity. 2 samples have 5 % salinity. 15 chutney samples lie under the range of 5 - 10% salinity. And 5 samples lie under 10-15% salinity.

Figure 2. Salinity of samples in %

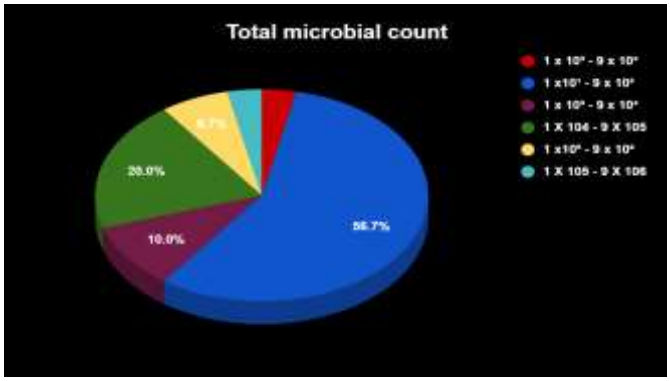
Microbial analysis of green chutney sample (n = 30)

Total microbial count of street green chutney sample

From a total of 30 green chutney samples collected from street vendors. we found contamination in 18(60%) samples. But according to FSSAI microbial standards, the standard aerobic plate count is 1 X

10^6/g. In this analysis, we found out that the CFU/g count is not beyond the standard. That is why we can consider the street's green chutney as not harmful in considering foodborne illness.

Figure 3. Microbial count in samples in %



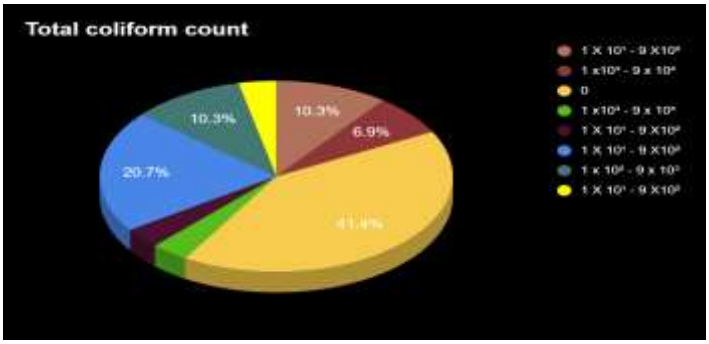
Total microbial count

Figure 4. Microbial count in samples original plates

Total coliform count

In 30 green chutney samples collected from street vendors, we found contamination is not detected in 12 (41.4%) samples. We found contamination (20.7 %) in 6 samples, and (10.3%) in 3, (6.9%) in 2 samples, (3.4%) in the remaining 3 samples each. According to FSSAI microbial standards limit for colony forming unit is 1 x10^4/g for Enterobacteriaceae. In this analysis, we found out that the CFU/g count is not beyond the standard. That is why we can consider the street's green chutney as not harmful as considering food born illness.

Figure 5. Coliform count in samples in %



Total coliform count

Figure 6. Coliform count in sample plates

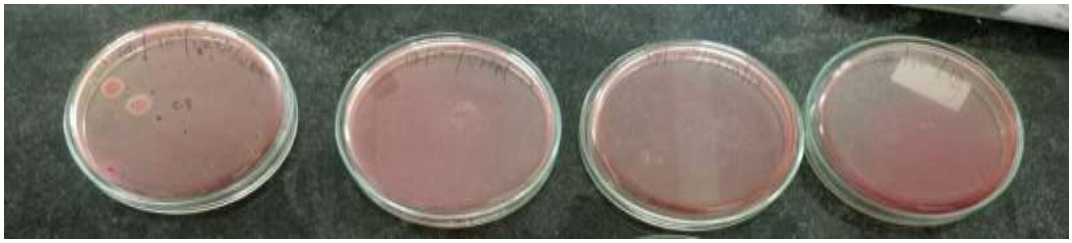


Table no 2. Table of Total microbial count and total coliform counts (n=30)

Sr.no.	Sample no.	Total microbial count	Total coliform count
1	S1.	4×10^4	9×10^1
2	S2.	9×10^4	-
3	S3.	1×10^3	1×10^4
4	S4.	7×10^2	5×10^2
5	S5.	1×10^5	-
6	S6.	1×10^4	-
7	S7.	6×10^5	-
8	S8.	5×10^4	-
9	S9.	4×10^4	2×10^4
10	S10.	TNTC	-
11	S11.	2×10^6	9×10^2
12	S12.	1×10^4	2×10^3
13	S13.	9×10^5	1×10^2
14	S14.	1×10^5	-
15	S15.	4×10^3	3×10^1
16	S16.	2×10^3	9×10^2
17	S17.	3×10^3	-
18	S18.	3×10^2	6×10^1
19	S19.	5×10^4	7×10^1
20	S20.	1×10^2	1×10^1
21	S21.	1×10^5	4×10^2
22	S22.	2×10^4	-
23	S23.	4×10^3	-
24	S24.	1×10^4	-
25	S25.	6×10^3	-
26	S26.	TNTC	1×10^3
27	S27.	1×10^5	5×10^3
28	S28.	1×10^3	-
29	S29.	9×10^4	1×10^3
30	S30.	3×10^4	7×10^2

Discussion

At the present time, street food vending has become a major community health issue and matter of concern for all of us. A lot of food-borne disease outbreaks are occurring every year worldwide. The reasons behind this include a lack of appropriate knowledge and supervision on street food vending, preparation of food under insanitary conditions and displaying food openly which also lead to further contamination by dust, insects, rodents, and hands of intending consumers.

The present research work was, therefore, undertaken to test for different parameters such as the Total microbial count, coliform count, pH, and salinity from the Green Chutney samples collected from street vendors of different places in Pune City, Maharashtra

we found microbial growth in 18(60%) samples. according to FSSAI microbial standards for fruit and vegetable products, the standard aerobic plate count is 1 X 10^6/g. In this analysis, found out that the CFU/g count is not beyond the FSSAI standard. And for the coliform count, CFU /g count is not beyond the FSSAI standard limits.

In the physical properties of the sample, we observed most chutney samples were acidic in nature which may be the reason for the low microbial count. This can be the point for further study.

Conclusion

We have studied the microbial profile of street food green chutney which is unprocessed, and it has raw materials like green chilli, coriander leaves, curry leaves, mint leaves, ginger garlic pest coconut, and peanut. After this study conclusion can be made that microbial count is not beyond the FSSAI limits in green chutney samples in certain areas of Pune city.

This study indicates that the street-vended Green chutney in certain ares of Pune city is not highly contaminated with pathogenic bacteria like coliforms.

References

1. Ferrari, A. M., OLIVEIRA, J. D. S. C., & SÃO JOSÉ, J. F. B. D. (2021). Street food in Espírito Santo, Brazil: a study about good handling practices and food microbial quality. Food Science and Technology, 41, 549-556.
2. Dagalea, F. M. S., Lim, K. M. C., Vicencio, M. C. G., Ballicud, J. J. C., Burac, M. R. B., Vibar, J. J. B., & Villadolid, V. B. E. (2021). Are street foods safe: Detection of escherichia coli in street foods sauces. South Asian Journal of Research in Microbiology, 9(3), 41-45.
3. Naratama, M. R., & Santoso, I. (2020). Non-fecal and fecal coliform tests of ready-to-eat food and drinks using fluorogenic and chromogenic media. In Journal of Physics: Conference Series (Vol. 1442, No. 1, p. 012064). IOP Publishing.
4. Adu-Gyamfi, A., & Nketsia-Tabiri, J. (2007). Microbiological studies of macaroni and vegetable salads in Waakye, a local street food. Ghana Journal of science, 47, 3-9.
5. Uddin, M. A. (2018). Microbiological analysis of ready to eat foods collected from different places of Dhaka city, Bangladesh. Stamford Journal of Microbiology, 8(1), 30-33.
6. Dharshini,p.v. (2018). microbial safety of street foods in selected locales of Coimbatore, Tamil Nadu. Asian Journal of miltidiment (vol.7, issue 2) 152 - 159.
7. chin, v. t. s. (2017). microbiological quality of street food and knowledge and practice of street food handlers in kuala lumpur (Doctoral dissertation, International Medical University).

8. Omorodion, N. J., & Ogunekum, A. (2022). Microbial and physicochemical screening of ready to eat street foods. Asian Journal of Basic Science & Research, 4(1), 24-35.
9. Oliveira, J. D. S. C., & de São José, J. F. B. (2019). Food handling practices and microbial quality in street food. Journal of Food and Nutrition Research, 7(4), 319-324.
10. Neha Chauhan et al., in 2015 studied the Microbial profiling of street foods in different locations in Dehradun city