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Microbial Analysis of Cooked Foods Sold in Sunday Bazaars of Karachi-Pakistan

1 Saara Muddasir Khan, 2 Omm-e- Hany and 3 Sikandar Khan Sherwani

1. Department of Biochemistry, Baqai Medical University, Karachi-Pakistan.
2. Institute of Environmental Sciences, University of Karachi, Karachi- Pakistan
3. Department of Microbiology, Federal Urdu University of Arts, Science and Technology, Karachi- Pakistan
Email: saara_ahmad@hotmail.com

Aims: To evaluate the cooked food sold in the Sunday bazaars of Karachi through MPN technique to find the presence of microbes and to render the food fit or unfit for human consumption.

Methods: This simple and observational study was done in the five major locations of the city Karachi and food selected was evaluated through the most probable techniques (MPN).

Validity Study: Total of twenty five samples were taken, five samples from each of the five different Sunday bazaars of Karachi. All the samples were evaluated from the MPN technique for microbial analysis.

Results: The MPN technique gives the consistent results of the presence of microbes in all the selected samples collected from the particular Sunday bazaars of Karachi. Analysis showed that all the dishes selected were positive for the presence of the microorganism rendering cent percent result showing the contamination of the selected cooked food dishes with the microorganisms.

Conclusions: The results from the study provide the indicator of the MPN reliability. It also suggests the criterion validity of the MPN technique for positive analysis of microorganisms in cooked food.

Keyword: Street Food, Microorganism, Most Probable Count Number (MPN)

1. Introduction

Cooked food sold in Sunday bazaars located in different areas of Karachi was selected. This type of food comes under the umbrella of street food^[1] as it is readily available, ready to cook, cost effective and available from the make shift stalls or wheel barrows^[2]. The food selected from the Sunday bazaars was on the same time of the day in the sterilized bags. This was then evaluated for the presence of the microorganisms through MPN technique^[3]. The reliability is concerned with the consistency and the precision of the measurements

done under the same environment. In the MPN technique the reliability has show no variation from one result to the other, resulting in the establishment of the indisputable quality of the procedure that rendered the positive results in all the samples selected^[4]. The samples included pakoray, samosa, cholay, burger and roll.

2. Materials and Methods:

2.1 Reliability of Sample: Most probable technique (MPN) was used for the analysis of the presence of the aerobic, coliform, fecal coliform

and fecal streptococcal coliform^[5]. The reliability of this technique represents the reproductivity and the positive results when repeated for many times under the same environment. The most probable number (MPN) technique is an important technique in estimating microbial populations in soils, waters, food and agricultural products^[6]. Many samples are heterogeneous, therefore precise cell numbers of an individual organism can be impractical to determine. The MPN technique is used for estimation microbial population sizes in such situations^[7]. The technique does not rely on quantitative evaluation of individual cells; instead it relies on detailed qualitative attributes of the microorganism being counted^[8]. The important aspect of MPN methodology is the ability to evaluate a microbial population size based on a process-related trait.

The MPN technique estimates microbial population sizes in a liquid state. The methodology for the MPN technique is dilution and incubation of the replicated cultures across several serial dilution steps. This technique depends on the pattern of positive and negative test results following inoculation of a suitable test medium (usually with a pH sensitive indicator dye) or inverted Durham's tube. The results are used to derive a population estimate^[9].

2.2 Sample: Five different samples were selected from five different Sunday bazaars located in five major parts of Karachi namely North Nazimabad, Gulshan-e-Iqbal, Gulistan-e-Johar, Malir and Defence housing authority. These cooked food samples comprise of samosa, pakoray, cholay, burger and roll. Altogether twenty five samples were collected and analyzed for the presence of the microorganisms. The same cooked food was selected from all the Sunday bazaars for evaluation. These food in particular were more readily available in all Sunday bazaars and due to their handiness, these dishes were more popular among people regarding cost effectiveness and less time for preparation and consumption^[10]. Also no storage particulars are needed in these

dishes, as mostly they are present in large dishes covered by thin gauze and served to the public^[11]. The social strata consuming such food is usually from all walks of life but most popular among the low strata of life.

2.3 Validity of A Sample: the validity depends upon the reliability of the sample. As most of the food selected when evaluated for the presence of the microbes shows the same results of positives no matter when and for how many times they are repeated. This all made the MPN method a valid procedure for the evaluation of the presence of the microorganisms^[12].

2.4 Statistical Relationship: The test results of all the food samples selected was positive resulting in zero variability^[13]. The combination of positives in all the food samples make the same mean value among the dishes nullifying any variability among the samples in respect to the positive outcome of the results^[14].

2.5 Reliability Study: The combination of positives is evident in all of the selected samples resulting in the reliability of the study. The reliability enables the test to give the same reproducible results no matter when repeated and for how many times it is repeated^[15].

2.6 Results: The total of 25 samples was collected from five different Sunday bazaars of Karachi and was analyzed using MPN method. The samples selected were samosa, burger, cholay, roll, pakoray. The samples were analyzed for total aerobic count, total coliform count, total faecal coliform count and total faecal streptococci and the results showed that all the samples were heavily contaminated with the entire above organisms irrespective of the place of the area of Sunday bazaars, showing that the people preparing it mostly belong to the same social strata and the same environmental conditions and the temperature results in the contamination of the food rendering it unfit for human consumption.

Table 1.1: Results of the bacteriological analysis of food sample received from all Sunday Bazaars.

| Food Sample | Total Coliform Count | | | Total Faecal Coliform Count | | | Total Faecal Streptococci | | | Remarks |
|-------------|--------------------------|------------------|-------------|-----------------------------|------------------|-------------|---------------------------|------------------|-------------|-----------------------|
| | Combination of positives | MPN count/100 ml | Final count | Combination of positives | MPN count/100 ml | Final count | Combination of positives | MPN count/100 ml | Final count | |
| SAMOS A | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| PAKORAY | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| ROLL | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| CHAT | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| BURGER | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |

Table 1.2: Results Total aerobic count of food from Sunday bazaar.

| Food Sample | Total Aerobic Count | | | Remarks |
|-------------|--------------------------|------------------|-------------|-----------------------|
| | Combination of positives | MPN count/100 ml | Final count | |
| SAMOSA | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| PAKORAY | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| ROLL | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| CHAT | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |
| BURGER | 3:3:3 | ≥2400 | ≥2400 | Unfit for consumption |

The results show the cent percent proportion agreement in the test results of the samples evaluated.

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