# ESTIMATION OF BIOPHYSICAL CHARACTERISTICS OF STREET FOODS AND THE ESTIMATION OF MICROBIAL LOAD IN SELECTED FOOD SAMPLES POPULAR IN ELURU TOWN, W.G. DISTRICT, A.P.

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Abstract:

Street food is ready to eat food or drink sold by hawker, or vendor in a street or other public places such as a market or fair. Some of the foods are regional, but many have spread beyond their region of origin. Indian street food is as diverse as Indian cuisine. Almost all sections of people are on the roads for street food while shoppings and outings. But the place where we eat and what we eat matters a lot. Risks exist anywhere along the food supply chain. However the vast majority of negative outcomes occur during the handling, preparation, storage, vending and disposal of waste. This study has examined the biophysical characters and microbial contamination of 6selected street foods available in different corners of the city, Eluru, West Godavari Dist, AP, where different food samples were collected and analysed for its safety. It was found that the foods collected from Sanivarapeta, II town and Ramkoti were highly contaminated, due to unhygienic handling and environment around, and the water used for cleaning and preparation.

Key Words : Street foods, Vending, colony count, Panipuri, Chat, Punugulu, Bajji,

INTRODUCTION:

Street food is ready-to-eat food or drink sold by a hawker, or vendor, in a street or other public places, such as a market or fair (FAO,1997). It is often sold from a portable food booth, food cart, or food truck and meant for immediate consumption. Some street foods are regional, but many have spread beyond their region of origin. Most Street foods are an extremely heterogeneous food category, encompassing meals, drinks, and snacks. They also show great variation in terms of ingredients, methods of retail, processing and consumption and are sold on the street from "pushcarts or baskets or balance poles, or from Nigeria stalls or shops having fewer than four permanent walls" (FAO, 2007). street foods are of both finger food and fast food, and are cheaper than restaurant meals. Street food vending is found all around the world, but varies greatly between regions and cultures.

Apart from region specific menu in India, there is one particular menu that is not only mouth watering but available in almost the entire country. It is the menu of "Indian street food". Hot and spicy, sweet and yummy, all bundled in one and this is the speciality of Indian street food. Indian street food is as diverse as Indian cuisine. The street food is very popular among Indians. Almost all the strata of Indian society hit the roads for street food during shopping's and outings. But it is very important to watch what you eat and where you eat. The place and the conditions where you eat matters. Opportunity to develop business skills with low capital investment; least expensive and most accessible means of obtaining a nutritionally balanced meal outside the home for many low income people ( WHO, 2002; Dipeolu et al., 2007).

Street food is known for  its advantage of local ingredients use in their preparation, employment opportunities and  the customer will be well aware of the ingredients used in the preparation. But at the same time there is threat of contamination, un hygiene and lack of social status. Despite from economic and nutritional benefits, these foods found to be the potential source  to cause  food born  diseases, as these foods  are contaminated from different sources(Tambekar et al., 2008). They are always associated with travellers diarrhoea and food born diseases. Risks exist anywhere along the food supply  chain. However the vast majority of negative outcomes occur during the handling, preparation, storage, vending and disposal of waste. This study  has examined the biophysical characters and microbial contamination of 6 street foods available in different corners of the city, Eluru, West Godavari Dist,AP,

## METHODOLOGY:

Eluru is a city and district headquarters of  West Godavari district in the Indian state of Andhra Pradesh. It is one of the 14 municipal corporations in the state and the mandal headquaters of Eluru, in the Eluru revenue division.

The craze for street food in Eluru is very high  due to low socio economic population , and where there is no much entertainment and amusement street food has become more popular and is  available in most of the places in Eluru. For this study 5 foods were  selected from 6 main places i.e., Gavaravaram, , Ameenapet, Shantinagar, II town, Ramkoti, Sanivarapupeta. The reason to select these areas is based on most crowded stalls at these centres and the conditions prevail surrounding these stalls.

Coding of Sample:

| Area of collection | Panipur | Chat | Noodle | Bajji | Punugulu |
|---|---|---|---|---|---|
| GAVARAVARAM | GPP | GC | GN | GB | GP |
| AMEENAPET | APP | AC | AN | AB | AP |
| SHANTHI NAGAR | SNPP | SNC | SNN | SNB | SNP |
| II TOWN | TPP | TC | TN | TB | TP |
| RAM KOTI | RPP | RC | RN | RB | RP |
| SANIVARAPUPETA | SPP | SC | SN | SB | SP |

From the  table it is indicated that the samples were collected from Gavaravaram area and coded for panipuri as GPP-1,Chat as GC-1,Noodles as GN-1,Bajji as GB-1,Punugulu as GP-1.The letter G is the indication of area where sample was collected

Like way  the samples collected from Ameenapet area  coded for panipuri as APP-2,Chat as AC-2,Noodles as AN-2,Bajji as AB-2,Punugulu as AP-2.The letter A is the indication of area where sample  collected

In the same way samples collected from Santhinagar area and coded for  panipuri as SPP-3,Chat as SC-3,Noodles as SN-3,Bajji as SB-3,Punugulu as SP-3.The letter S is the indication of area where samples collected.

The samples collected from II Town  area and coded for panipuri as TPP-4,Chat as TC-4,Noodles as TN-4,Bajji as TB-4,Punugulu as TP-4.The letter T is the indication of area from where sample  collected

The samples collected from Ramkoti area and coded for panipuri as RPP-5,Chat as RC-5,Noodles as RN-5,Bajji as RB-5,Punugulu as RP-5.The letter R is the indication of area where sample collected

Samples were  also collected from Sanivarapupeta area and coded for panipuri as SPP-6,Chat as SC-6,Noodles as SN-6,Bajji as SB-6,Punugulu as SP-6.The letter S is the indication of area where sample collected

BIOPHYSICAL TESTS:

Samples were collected from the above areas, are subjected to physical tests like ph and temperature.

$P^H$:

To evaluate the $P^H$ of the food sample, ph strip was placed on the food sample and observed the colour change. Marked the ph value based on the colour indicated on the ph scale.

Temperature:

Placed the thermometer on the food sample. Observed and noted the readings.

Preperation of the sample

Samples are serially diluted by taking 6 test tubes each containing 9ml of distilled water and one test tube with 10ml of distilled water.

Mark the 6 test tubes from $10^{-1}$ to $10^{-6}$ and plug the test tubes with cotton.

Take 1gm of sample and sample to 10ml distilled water test tube and mix well.

Remove the cotton plug and take 1ml of sample from 10ml test tube and add it to $10^{-1}$ dilution and mix well.

Take 1ml of sample from $10^{-1}$ dilution and add it to $10^{-2}$ dilution and mix well.

Repeat this procedure upto $10^{-6}$ dilutions.

Take $10^{-2}$ dilution for fungal growth and $10^{-5}$ dilution for bacterial growth.

Media preparation:

i.Nutrient agar media:

Dispense 4.87 gms of nutrient agar media with 125 ml of distilled water in a conical flask.

Add 3-4 spatula's of agar agar media for solidification.

Then stir the contents properly.

Then autoclave the nutrient agar media at $12^0c$ of 15lbs pressure for 15 minutes.

Then pour 25ml of media in each petriplate and allow it to solidify.

ii.Potato Dextrose Agar media:

Dispense 3.5 gms of potato dextrose agar media with 125ml of distilled water in a conical flask.

Add 3-4 spatula's of agar agar media for solidification.

Then stir the contents properly.

Then autoclave potato dextrose agar media at 15lbs pressure for 15mins at $121^0c$.

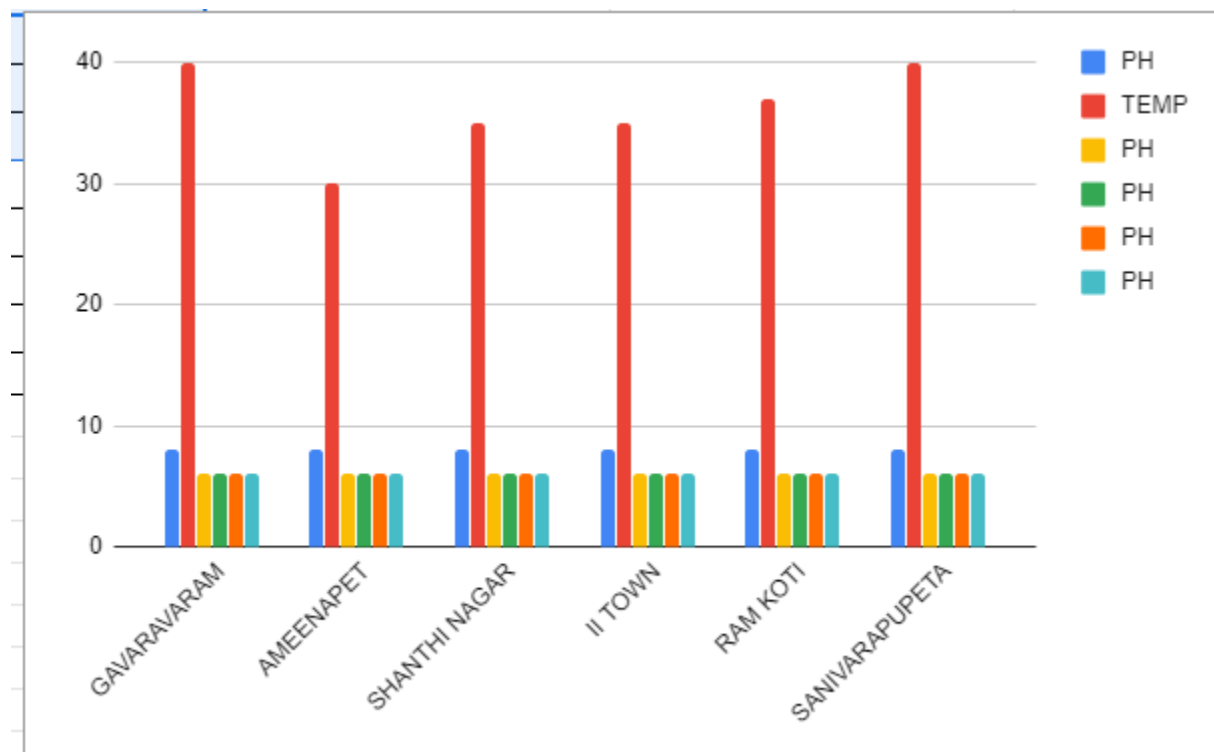Then pour 25ml of media in each petriplate and allow it to solidify.

Samples were Inoculatetd at the $10^{-2}$ dilution in PDA media and $10^{-5}$ dilution in nutrient agar media by spread plate method

Observed the colony growth after 24hrs for bacterial culture and 48hrs for fungal culture.

RESULTS:

BIOPHYSICAL TESTS:

| SAMPLE / AREA | CHAT | | NOODLES | | PUNUGULU | | BAJJI | | PANI PURI | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $P^H$ | TEMP | $P^H$ | TEMP | $P^H$ | TEMP | $P^H$ | TEMP | $P^H$ | TEMP |
| GAVARAVARAM | 8 | $40\,^{O}C$ | 6 | $60\,^{O}C$ | 6 | $42\,^{O}C$ | 6 | $35\,^{O}C$ | 6 | $20\,^{O}C$ |
| AMEENAPET | 8 | $30\,^{O}C$ | 6 | $60\,^{O}C$ | 6 | $35\,^{O}C$ | 6 | $30\,^{O}C$ | 6 | $21\,^{O}C$ |
| SHANTHI NAGAR | 8 | $35\,^{O}C$ | 6 | $55\,^{O}C$ | 6 | $30\,^{O}C$ | 6 | $30\,^{O}C$ | 6 | $23\,^{O}C$ |
| II TOWN | 8 | $35\,^{O}C$ | 6 | $55\,^{O}C$ | 6 | $40\,^{O}C$ | 6 | $35\,^{O}C$ | 6 | $25\,^{O}C$ |
| RAM KOTI | 8 | $37\,^{O}C$ | 6 | $50\,^{O}C$ | 6 | $45\,^{O}C$ | 6 | $35\,^{O}C$ | 6 | $20\,^{O}C$ |
| SANIVARAPUPETA | 8 | $40\,^{O}C$ | 6 | $60\,^{O}C$ | 6 | $37\,^{O}C$ | 6 | $35\,^{O}C$ | 6 | $22\,^{O}C$ |



The above table indicates that the temperature of the samples from different areas varied from $30^{0}c$-$40^{0}c$ in case of chat, $50^{0}c$-$60^{0}c$ in case of noodles,$30^{0}c$-$45^{0}c$ for punugulu,$30^{0}c$-$35^{0}c$ for bajji and $20^{0}c$-$25^{0}c$ for panipuri respectively.

BACTERIAL COUNT

| AREA | CHAT | NOODLES | PUNUGULU | BAJJI | PANI POORI |
|------|------|---------|----------|-------|------------|
| GAVARAVARAM | 118 | 54 | 108 | 97 | 122 |
| AMEENAPET | 92 | 52 | 74 | 88 | 135 |
| SHANTI NAGAR | 68 | 35 | 39 | 62 | 59 |
| II TOWN | 164 | 43 | 63 | 92 | 87 |
| RAMKOTI | 76 | 84 | 186 | 35 | 62 |
| SANIVARAPUPETA | 72 | 90 | 110 | 85 | 78 |
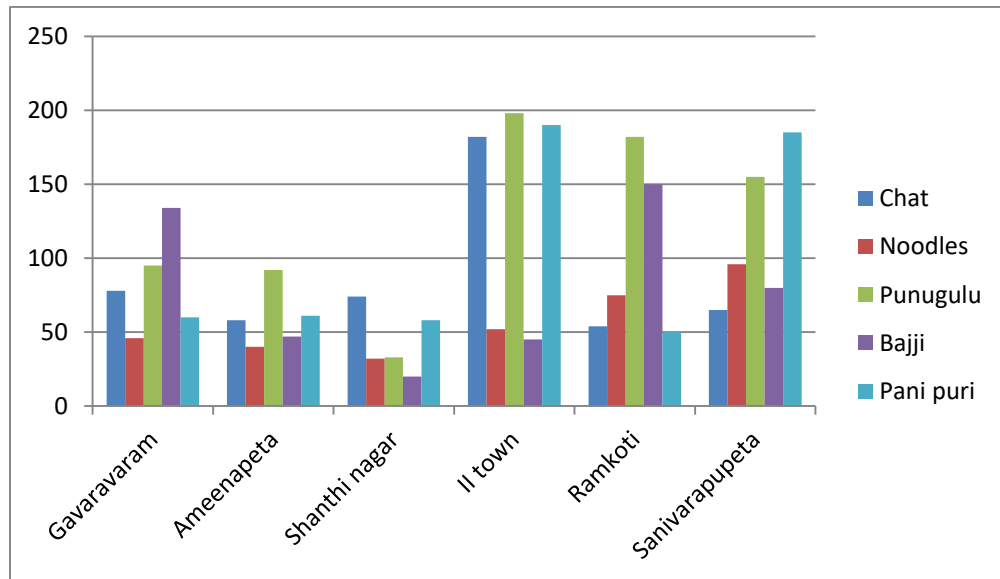


From the above table it is observed that the colony count ranged from 72-164 in case of chat from various areas, For noodles the range was 35-186, For punugulu the range was 39-186, For bajji the range was 35-97 and for panipuri it was indicated that 59-135 in number.

FUNGAL COUNT

| AREA | CHAT | NOODLES | PUNUGULU | BAJJI | PANIPOORI |
|---|---|---|---|---|---|
| GAVARAVARAM | 78 | 46 | 95 | 134 | 60 |
| AMEENAPETA | 58 | 40 | 92 | 47 | 61 |
| SHANTI NAGAR | 74 | 32 | 33 | 40 | 58 |
| II TOWN | 182 | 52 | 198 | 45 | 190 |
| RAMKOTI | 54 | 75 | 182 | 150 | 50 |
| SANIVARAPUPETA | 65 | 96 | 155 | 86 | 185 |
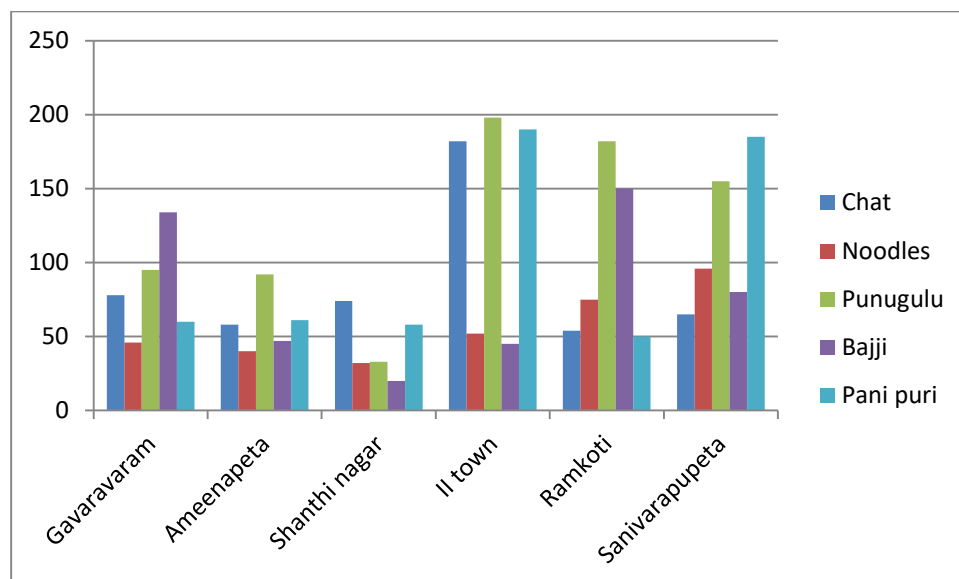


From the above table it is observed that the colony count ranged from 54-182 in case of chat,for noodles the range was 32-96,for punugulu the range was 33-198,for bajji the range was 40-150,for panipuri the range was 50-185 in number.

DISCUSSION:

The holding temperature of any food sample may range from $15.5\text{-}34.5^0$C. At this temperature the microbial count will be less. The temperatures above $5^0$c and below $63^0$C was is not safe for consumption. The food should be cold below $5^0$c and hot above $63^0$c for consumption (Diriba Muleta et al,2001). There may be chances of temperature in post preparation conditions.

Where as $p^H$ values of the foods remain same for all areas like chat from all areas is 8, where as the rest of the sample $p^H$ remained 6 only.

The PH of most food products vary from 3.5-7.0, the bacteria best grow around at neutral PH(6.5-7.0) and the Yeast grown comfortably above 8.5 (Belb et al 2013). The bacterial growth found in these samples can be due to PH and temperature changes and long exposure to environment and due to mixing of left overs of the previous day.

Among the samples collected from the selected areas II Town has shown highest count(164) in the chat sample where as Santhinagar chat sample indicated lowest count(68).

In case of noodles the sample collected from sanivarapupeta has highest count(90) where as sample from santhinagar shown lowest count(35).

In case of punugulu the bacterial count ranged from 39-186 in which the highest range was observed in the sample collected from ramkoti(186), where as lowest was observed in santhinagar(39).

The samples of  bajji have shown the count ranging from 35-97 where in highest was observed in the sample collected from gavaravaram(97), where as the lowest count was observed in ramkoti(35)

In panipuri the colony count ranged from 59-135 where highest was observed in ameenapet(135) where as lowest was observed in santhinagar(59)

From this study it can be concluded that from the samples collected, the samples from santhinagar shows lowest count with respect to all the samples and found to be safer than the samples collected from other areas. Among the samples from santhinagar chat has 68,bajji has 62 where as panipuri has 59 rest like noodles and punugulu has lowest count like 35 &39 respectively.

Among the samples collected from II Town has shown highest count(182) in the chat sample where asramkoti chat sample indicated lowest count(54)

In case noodles the sample collected from sanivarapupeta has highest count(96) where as sample collected from santhinagar shown lowest count(32).

Punugulu  sample collected from II Town has highest count(198) where as sample collected from santhinagar shown lowest count(33). Bajji the sample collected from ramkoti has highest count(150) where as sample collected from santhinagar shown lowest count(40).

Panipuri the sample collected from II Town has highest count(190) where as sample collected from ramkoti shown lowest count(50).

Samples of II town, Ramkoti and sanivarapet are found to be highly contaminated with microorganisms compared to the samples collected from other parts i.e., Gavaravaram, Ameenapet and santhinagar. This may be due to improper handling of food, longer exposure to open environment and the water they use for washing the utensils as well as preparation.

CONCLUSION:

Fom this  study  it is  found that the number of colonies observed (both fungal and bacterial count) in the areas i.e II Town, Ramkoti, Sanivarapeta which were  have  higher number of microbial  count  compared to the other counter parts. Therefore to ensure customer safety in these areas hygienic surroundings, less handling of  food after preparation, good water use for washing of the plates and preparation, less exposure  to the external environment to be maintained. Utensils used for preparation and holding should also be taken care.

SUGGESTIONS:

        Vendors should be educated on the importance of hygiene in food handling .

 Surroundings covering of food and water they use for purpose of washing.

➢ Young people who are fond of street foods to be cautious in selecting the areas where the practices are hygienic and at right temperature.

➢  We say that there is further scope to take up study in future to enumerate and isolate specific microorganisms prevailing.

➢ Take up a project in  the areas of educating hygienic practices of food handlers.

➢ We suggest the Local Government to convert this business into a organized sector. food vendors can be alloted specific areas and with hygienic surroundings with good water facilities to safeguard the consumers at large.

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