An investigation on the quality of commercial packaged drinking water available in Punjab in terms of bacterial existence

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ABSTRACT

Bacterial assessment of five brands of packaged drinking water samples procured from different locations of Punjab, were investigated to evaluate their human consumption quality. The packaged drinking water bottles were bought from diverse locations. The samples were used for the bacterial isolation by serial dilution methods and the microscopic; biochemical characteristic features of the bacterial isolates including bacterial fermentation reactions of sugar of the collected bacterial isolates were investigated. Results of these investigations demonstrated various extents of bacterial load. The contamination of this packaged drinking water may causes numerous enteric infections in the consumers and strict recommendations were emphasized for improving their quality with least tolerable bacterial load.

Keywords

Packaged Drinking water, quality, Bacterial load, Quality of drinking water, Contamination, Enteric infections


Background:

Water is considered to be the most essential requirement for the survival of all organisms and functionality of the each and living cell in the world. Water is essentially required for the body in order to function various systems of the body like digestion, circulation, respiration, translocation, absorption, excretion of metabolic waste products, secretion of various hormones, secretion of numerous enzymes and other biochemical functions of the body. For betterment of the quality human life, more water consumption is essentially taking place. Hence there will be always demand for the quality water at least for human consumption globally. But unfortunately, it will be big revelation that the water that is being consumed by the whole human society across the world became polluted. In fact, the Nature has an immense circulative and purifying mechanism that water will get ahead of the sky from the earth and returns back to earth, from the earth to rivers to the sea, and from the sea, it returns to the sky. Several resources are in the form of effluents will acts as pollutants of water and those are major cause of epidemics among the social communities by acting as nutrient source of microbial community. These will always demand the proper pretreatment, purification and supply of drinkable water. If there is no satisfactory regulatory measures to control the microbial community before supplying of water, the man may affected with these enteric community and susceptible to numerous enteric diseases that may turn into epidemic outbreak. Therefore it is most vital to ensure the distribution of drinking water to the public in safe and clean condition. By keeping the significance of water in view of its need to perform various body functions, the studies
are more obligatory to turn aside the hazard of water born disease occurrence. Bacteriological examinations will be recommended as the most essential analysis for potentially hazardous water borne pathogens.

**INTRODUCTION**

Bottled water has become one of a major source of drinking water in the present time. The popularity of drinking water packaged in bottles is circumstantially increasing as maximum population think of it as a better alternative for water provided by the municipal service providers. Bottled water is also one of the primary raw materials for various other food products and beverages, the quality and health safety of bottled water is therefore crucial to maintain and implement. Bottled water is never completely free from microorganisms and clean drinking water is one of the basic human needs. The assumptions of the people that bottled drinking water is one of the safest drinking water would be wrong and they are highly unaware of the health and safety limitations. Presence of pathogenic microorganisms in bottled drinking water is a major threat to human beings. Over the past few years the rate of consumption has drastically increased in a very fast rate. Bottled water also has a time limit and it is clearly noted on the bottle itself. The plastic water bottles from the brands that cost higher does not literally mean that they are likely to be more clean or safe than the cheaper ones or the ones in the normal cost range, this study lead to findings that proved this statement. In this study 7 water samples which were bottled locally were analyzed for the presence of pathogenic bacteria out of which 5 samples showed bacterial growth. Storage of bottled water is also one of the factors responsible for the growth of microorganisms; several factors are also present which helps in microbial growth. However, drinking water supplying authority may take all essential steps to pass the qualitative laboratory investigations; we must realize that vulnerability might take place from pollutants those can contact with water resources all the way through other methods.

The previous investigations designated that there will be existence of some enteric pathogens such as *Escherichia coli*, *Shigella* and *Salmonella* in packaged drinking water. The majority of case reports emphasized on Typhoid fever may be spread through packaged drinking water among the public. The well characterized enteric pathogens are mostly occur in packed water comprise various strains of Enteropathogenic *Escherichia coli*, *Leptospira*, *Salmonella*, *Shigella*, *Mycobacteria*, *Vibrio*, Human enteric viruses, Cysts of *Entamoeba histolytica*, *Giardia lamblia*, *Francisella* along with other pathogenic protozoan parasites as well as various pathogenic worms with their larvae. Water of good quality has a low total bacterial count fewer than 100 cfu per milliliters. *Salmonella* strains have been frequently detected in drinking water sources and this have been correlated with outbreaks of Salmonellosis. Since safe drinking water is essential for good health, drinking water must be free of pathogens. This study is aimed at establishing the bacterial quality of six brands of bottled water produced and distributed in Nigeria by establishing the level of their bacterial load, the species distribution and potential public health significance.

**REVIEW OF LITERATURE:**

In more than half of the population of various developing countries, people are facing major problems regarding waterborne diseases. It is becoming one of the most important global issues affecting the welfare of human health (Deshmuk et al. 2016). These research methods ensure that the quality of drinking water cannot be set to a maintained standard which is fit for human health (Howe et al. 2002). In accordance to the quality standards of bottled drinking water, there is an establishment of microbiological standard requirement for it which is rooted to the detection of...
coliforms. The presence of E. coli in bottled drinking water states that the water is not safe for drinking. Thus, the absence of E. coli proves that the bottled drinking water is of a safe and hygienic standard (Robin, L.P. and Feng, P.C., 2013). On a research carried out on bottled drinking water it was found that there were minimal presence of coliforms (faecal coliforms and enterococci). Therefore, stating that bottled water were free from total coliforms (Obiri et al. 2003).

Approaching through a microbiological viewpoint, the health considered factors of drinking water is highly dependent from its manufacture to final intake to ensure that any microbial contamination must be barred (Chauhan et al. 2017). It has been observed that certain outbreaks of water borne diseases have caused due to the consumption of contaminated bottled water which has been taken from water sources with poor quality (Rosenberg, F.A., 2003). The rate of bacterial growth was found to be significantly less in cold environmental conditions compared to environment with moderate temperature state. Regulations on storage of bottled drinking water once opened and consumed, could be stated after the research related to the statement above (Raj, S.D., 2005). There are significant development of bacterial bodies observed in noncarbonated bottled drinking water after the process of filling and storage at moderate temperature conditions (Loy et al. 2005). The examination for analysis of bacterial bodies present in bottled drinking water needs to be executed using an enrichment media that revives the inactive bacteria and provides condition for them to multiply (Warburton, D.W., 2000). Gram-negative bacteria that are also a facultative anaerobic organism were found during the CFU analysis (Falcone-Dias et al. 2012). Bottled drinking water has become a major source of drinking water and many people are dependent on that as it is properly sanitized and considered to be free from impurities and best for human consumption. In a study the pH of various bottled drinking water ranged from 4.11 to 7.58 (Sasikaran et al. 2012). Bottle water samples were observed by various culture procedures and the presence of pathogenic water borne microbes were detected (Tagoe et al. 2011). Heterotrophic plate counting is a common test used by public health laboratories to enumerate bacterial growth in water. HPC (Heterotrophic plate count) procedure was used to enumerate the total bacterial count. Water samples were analyzed for the presence of bacterial growth using R2A agar which was sold by Neogen Corporation (Acumedia, Michigan, US) (Liu et al. 2017). In the procedure of enumerating HPC bacteria, a 0.1mL eppendorf pipette transferred the water samples into the agar plates. Spreading was carried out using L-shaped disposable spreaders, the samples were diluted and each had three stocks which after serial dilutions were conducted. The plates were turned upside down and its incubation was executed at a temperature of 37°C (Liu et al. 2017). Suntex Colony Counter was used for counting the number bacteria in HPC plates. 30 to 300 cfu were counted to make sure there is complete accuracy in the estimation (Liu et al. 2017). Membrane filters are also used to treat the water samples and check the presence of microbes (Oyedeji et al. 2010). The spread plate technique is the most commonly performed experimental method for analyzing total plate count, various other techniques like TCC (Total Coliform Count), FCC (Fecal Coliform Count) and FSC (Fecal Streptococcal Count) are also used (Pant et al. 2016). After the isolation of bacteria from the samples further identification and morphological analysis was carried using procedures like Gram’s staining and biochemical test consisting of oxidase test, catalase test, methyl-red Voges-Proskauer test, citrate utilization test, urease test, indole test, motility test, etc. The method of usage of selective media facilitates in the differentiation of various microbes and further assists in the study of characterization and morphology (Pant et al. 2016).
The evaluation of total viable count was done to examine to standard of the bottle drinking water brands situated locally (Joseph et al. 2018).

**MATERIALS AND METHODS:**

**Preparation of media (LB broth + Agar powder)**

2.5g of LB broth of HIMEDIA was weighed and dissolved in filtered distilled water in a conical flask, 2g agar powder, bacteriological of HIMEDIA was added in the same flask and mixed thoroughly with the help of a glass rod, the final volume was made upto100ml. The media was then kept for autoclaving.

**Sampling**

Seven local drinking bottled water were taken (SpringWell, Kinley, AquaFina, Aqua Real, Himalayan, Bisleri, Kingfisher). Seven test tubes were taken and autoclaved along with distilled water. 9ml of autoclaved distilled water was mixed with 1ml of the water sample, this was carried out for all the seven samples i.e. serial dilution was carried out for each sample, the samples were diluted to $10^4$ concentration.

**Preparation of LB plates and inoculation**

The above mentioned media (LB broth + agar powder) was poured into the petriplates in the laminar air flow to ensure safe and sterile conditions, the plates were allowed to solidify. With the help of an inoculating loop the serially diluted samples were streaked on the plates. The plates were inverted and sealed with parafilm to ensure minimal chances of contamination and the plates were kept in the incubator for 48 hours at 37°C. Growth of microbial colonies were observed on the petriplates.

**Subculturing**

LB broth weighing 1.5g was dissolved in filtered distilled water in a 100 ml conical flask to gain a volume of 50ml. With the help of an inoculating loop of 37°C the flask containing the culture was left in the shaking incubator for 24 hours. The turbidity level determines the extent of growth of the bacterial culture.

**Gram Staining**

A loop-full of the broth culture was placed on the slide using a sterile inoculating loop and spread appropriately in order to allow it to air dry, followed by the process of heat fixing which was done by passing the slide through the flame two to three times with the smear side up. The process of heat fixing is used to exterminate the bacteria in the smear, adheres the smear firmly on the slide to allow easy uptake of the stain. After the process of heat fixing all the slides were placed the staining tray. The smears were let stand for the time period of 1 minute after flooding them with crystal violet. The slides were rinsed with water and then the smears were let stand for the time period of 1 minute after flooding gently with Gram’s iodine. The slide was tilted slightly and rinsed gently with water. The smear emerges as a purple circle on the slide. Gram’s decolorizer was applied to the smear and rinsed immediately with water. Again the smear was let stand for a time period of 1 minute after gently flooding it with counter stain safranin and then rinsed with water. Finally, the slides were viewed under the light microscope after blot drying them.

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Anti-biotic resistance
The most widely used antibiotic susceptibility test known as The Kirby-Bauer test, also termed as the disk-diffusion method determines what choice of antibiotics should be used when treating an infection. The dependency of this method is on the inhibition of bacterial growth which is measured under moderate conditions. A culture medium is inoculated uniformly and aseptically, where the test organism is contained and then placed into filter paper discs impregnated with a specific concentration of a particular antibiotic, for this test. The growth of the organism initiates on the agar plate while the antibiotic “works” to inhibit the growth. The growth is observed around the disc containing the antibiotic if the organism is susceptible to a specific antibiotic. Thus, if a “zone of inhibition” is observed around the disk on the plates it determines the susceptibility of the test organism to the antibiotic disks (Ampicillin, Penicillin and Methycillin).

Biochemical tests
**IMViC tests:** In biochemical test, IMViC tests were performed for further characterization of bacteria present in the water samples taken.

**Indole test:** For Indole test either the tryptophan broth was inoculated with the broth culture taken in different test tubes which was further incubated at a temperature of 37°C for a time period of 24 to 28 hours provided with aerobic condition and added 0.5 ml of Kovac’s reagent.

**MR-VP test:** For the MR-VP test-tubes were inoculated with MR-VP broth and the sample cultures containing the micro-organisms to tested which has been kept under incubation for up to 48 hours and then about 5 drops of methyl red indicator was added to the test-tubes. In another test samples Barrit’s reagent was added for the Voges-Proskauer’s test. Any visible change in the color of the test-tubes determines the result of the test.

**Citrate utilization test:** Citrate utilization test was also carried out to check the presence of bacteria which can utilize citrate as their carbon and energy source. The test is carried out by inoculating the sample bacterial cultures on the Simmons citrate agar slants and kept for incubation at the temperature of 37°C for the time period of 24 hours. If the color is detected to be blue then the test is positive.

**RESULTS AND DISCUSSION:**

**Bacterial Load:**
The serial dilution and CFU assay analysis revealed that Kinley and Bislery proved to be less bacterial load from microbial contamination based on the test results performed on them. Growth of bacteria on inoculation in LB plates depicted the presence of microbes in the water samples as mentioned in table-1

**Gram Staining and Biochemical Assay:**
Microorganisms were isolated and biochemical test and molecular studies were conducted along with staining techniques for identification. Gram positive microorganisms were observed when viewed under the microscope. The presence of microbes which are gram positive in nature was observed under the microscope. The antibiotic resistances of these bacteria were also checked. On further characterization these bacteria were found to belong to the genus *Bacillus* predominantly as shown in the figure.1. Biochemical characterization of bacteria isolated from the bottled samples was shown in the figure.1.

**Antibiotic Resistance:**

The antibiotic resistances of these bacteria were checked. The growth is very minimal, there is no major pathogenic drug resistant bacterial contamination found in any of the samples as shown in the figure.2. However, caution and further studies is very much necessary regarding this issue. The microbial analysis (bacteria) exposed that the occurrence of bacteria in the seven bottled samples of drinking water. The occurrence of these bacteria in drinking water samples might be due to the improper sealing process of the bottles such as loose caps, cracks, broken caps, openings, weak seals that may be reason during packaging as well as transportation. The existence of the bacteria in “pure and mineral” water should be more concern about the consumerseven though these organisms are not pathogenic. It is evident about the quality of the packaged drinking water we consume often might show affect our health, consequently to retain our health even after the consumption of bottled water, the manufacturers of bottled water be supposed to take care of the processing methods of bottled water. These kind of improper processing methods those adopted by the manufacturers to save time, energy and money might show effects on public health and causes illness from consumption of these contaminated water. Bacterial quality of all seven types of bottled water samples were examined and observed that mildly intolerable levels of bacterial load with sample-7 showing a higher bacterial load than the others i.e. $6 \times 10^{1}$ CFU/ml. Effective antimicrobial treatment be supposed to carry out on four samples among seven samples. The producers of bottling and packing of water should be changed and the seal of their bottles to be extra tamper proof. The manufactures must practice the usage of use spot caps for proper sealing of the bottles as well as should have a dust proof cover and to be designed the bottle construction in such a way that one sucks the water rather than opening the cap that allow contamination such as *Staphylococcus aureus* and other bacteria when any one user try to open the seal to drink from the bottle. The currently using capping procedures are open too opportunistic invasion of *Staphylococcus* species and other normal microbial flora of palm whenever they are opened for use. The contamination chances obtained by the *Bacillus* species and *Enterobacter* species can be reduced by the development of hygiene in the water processing factories by adopting efficient purification and cleaning strategies, by avoiding long storage of water and by proper disinfection methods. The elevated bacterial load in the bottled water from samples 1, 3, 4, 5 may be due to the structural breakage. Bacteriological tastings must be carried out on all packaged bottled water before packaging and distribution to the sales outlets. There should be appropriate awareness and education of the public on the medical importance and consequences of consuming contaminated water. The government should implement strict appliances for the provision of pure drinking water coordinated with sanitation departments for monitoring of water firms. The occurrence of *Enterobacter* species tolerable to highertemperature may be because of poor storage while the presence of *Bacillus* species maybe due to processing machinery and insufficient chemical usage.
existence of *Staphylococcus* species might be due to highly its commensal and ubiquitous nature. Hence, the packaged water to be properly stored and the quality and environment of the bottling factories to be carried out regular basis. It is very important to inculcate new techniques for studying the microbiota of the bottled water as new brands are being developed day by day. Bottled water is treated properly with disinfectants before they are made available to the public as it believed to be one of the safest water for consumption. Therefore proper guidelines should be followed and disinfection and treatment should be monitored at every step. HPC helps to detect the microbiota of water but there is variations on the number of the bacterial count according to different places, environmental conditions and even in the cases of same samples taken consecutively (Bartram et al. 2003). Any kind of negligence at the industry of bottled water could lead to a huge impact in public health; proper inspection at each step is required as some bottles arrive with broken seal which is very vulnerable point for contamination with microbes (Oyedeji et al. 2010). The older procedures like membrane filter, spread plate, standard plate counts are not practiced anymore and are being substituted by new methods like HPC, new media which have low nutrient content are also being developed to allow growth of bacteria which have specific requirements. It has been observed that the plate counts show higher results when provided with low nutrient media and incubated for a longer time period in lower temperature (Reasoner, D.J., 2004). It was found that 30°C is optimum temperature for incubation and allows the growth of pathogenic microbes and showed similar growth to the ones kept under 37°C in 24 h. The bacterial counts were found to very similar (Ramalho et al. 2001).

Proper check at every step of the bottle water industry is very crucial, various guidelines are set by the regulatory bodies and these need to follow to ensure the safety of public health. (Joseph et al. 2018). Fungal growth has also been observed in some cases while checking bottled water samples (Sharma, B. and Kaur, S., 2015). A study conducted in Thailand showed absence of E.coli in all the samples and the presence of coliform and fecal coliforms present in the water sample was lesser than 1.8 MPN/100 mL (Nimrat et al. 2015). The storage temperature and conditions play a very important role for the growth of heterotrophic bacteria pathogenic bacteria are not able to grow under contact of direct sunlight, cool temperature conditions and a significant increase in growth was seen after bottling (Shams et al. 2019). The total coliform and fecal coliform are the important areas that should be kept in mind while checking bottled water quality (De Rekha et al. 2016). Any detection of pathogenic microbes need to regulated as it is a major shout out to the employees responsible for handling the bottles as certain isolates indicates their negligence (Jeena et al. 2006)

**CONCLUSION**

From the present study, it can be concluded that the microbial quality of some brands of the bottled water samples available is not as per recommendations, which may have an effect on the health of the individuals consuming it. The isolation of potentially pathogenic microorganisms such as *Enterobacter* spp. and *Bacillus* spp. indicated that bottled water is unsafe. Therefore, it is necessary to improve the processing and bottling operations to completely eliminate them. People these days are highly invested on improving their lifestyle and the welfare of their health. Improved quality of bottled drinking water is a major need otherwise the consequences could be extreme. Drinking water is one of the easiest targets for any type contagious infections and a major risk to human health. Giving awareness to the public not to blindly trust these bottled drinking water brands and making sure the quality of these bottled waters meet the set standards.
standards is the main step to be taken at the moment. The study gave more clarifications to the cautions that need to be taken and the awareness that needs to be provided to the people, mostly the affected communities and the regulatory bodies of this particular area. There is a need to continue further studies regarding this issue as the relevance of this study to the current scenario is very significant.

ACKNOWLEDGEMENTS

All authors are acknowledged to Chandigarh University, Mohali Punjab for proving all the facilities to carry out the research work.

FIGURES:

Figure.1
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of water bottle</th>
<th>Presence of microbial Growth</th>
<th>Picture of plates</th>
<th>Type of bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Himalayan</td>
<td>Present</td>
<td><img src="image1" alt="Image" /></td>
<td>Gram positive</td>
</tr>
<tr>
<td>2.</td>
<td>Bisleri</td>
<td>Present</td>
<td><img src="image2" alt="Image" /></td>
<td>NO BACTERIAL GROWTH</td>
</tr>
<tr>
<td>3.</td>
<td>Aquafina</td>
<td>Present</td>
<td><img src="image3" alt="Image" /></td>
<td>Gram positive</td>
</tr>
<tr>
<td>4.</td>
<td>Aquareal</td>
<td>Present</td>
<td><img src="image4" alt="Image" /></td>
<td>Gram positive</td>
</tr>
<tr>
<td>5.</td>
<td>Springwell</td>
<td>Present</td>
<td><img src="image5" alt="Image" /></td>
<td>Gram positive</td>
</tr>
<tr>
<td>6.</td>
<td>Kingfisher</td>
<td>Present</td>
<td><img src="image6" alt="Image" /></td>
<td>Gram positive</td>
</tr>
<tr>
<td>7.</td>
<td>Kinley</td>
<td>Absent</td>
<td><img src="image7" alt="Image" /></td>
<td>NO BACTERIAL GROWTH</td>
</tr>
</tbody>
</table>

Figure.2
The picture given below is the result of the sample of bottled drinking water “Springwell” and a clear zone of inhibition was observed around the antibiotic disks (Ampicillin, Penicillin and Methycillin).  

The picture given below is the result of the sample of bottled drinking water “Himalayan” a clear zone of inhibition was not observed around the antibiotic disks (Ampicillin, Penicillin and Methycillin). However, there was minimal growth on the plates.  

The picture given below is the result of the sample of bottled drinking water “Kingfisher” and a clear zone of inhibition was not observed around the antibiotic disks (Ampicillin, Penicillin and Methycillin). This gives us an idea that the microbes present in this particular water sample have antibiotic resistance.  

The picture given below is the result of the sample of bottled drinking water “Auarcaal” and a clear zone of inhibition was not observed around the antibiotic disks (Ampicillin, Penicillin and Methycillin). However, no microbial growth was detected on the plates as well.

TABLES

Table-1

### Table 2: Biochemical Characterization

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Test Carried</th>
<th>Himalayan</th>
<th>Bisleri</th>
<th>Aquafina</th>
<th>Aquareal</th>
<th>Springwell</th>
<th>Kingfisher</th>
<th>Kinley</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motility at 22°C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Gram</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Pigmentation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Citrate reduction</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Starch reduction</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Nitrate reduction</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Gelatin hydrolysis</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Slow</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Catalase</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>Oxidase</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Coagulase</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Indole</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>H₂S</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Vogesproskauer</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>14</td>
<td>Methyl red</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bacteria found</td>
<td>Bacillus</td>
<td>Bacillus</td>
<td>Bacillus</td>
<td>Staphyococci</td>
<td>Bacillus</td>
<td>Enterococcus</td>
<td>Baillus</td>
<td></td>
</tr>
</tbody>
</table>

### References


