AYURVEDIC ASPECT OF BACTERIA AND BACTERIAL FOOD POISONING

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ABSTRACT: Bacterial Food Poisoning’ is a common name given to predominantly gastro-intestinal infections which arise after the consumption of food or drink that is contaminated with disease-causing bacteria. Over 250 organisms are known to cause food borne illnesses. Ayurveda is an ancient medical science & has described the food poisoning indirectly in the form of Anna Vishakata. The aims of present study are to collect, elaborate, evaluate & discuss the Bacteria and Bacterial Food Poisoning in aspect of Ayurveda. In Ayurveda there are so many words are used for bacteria like invisible krimi, Vaikaric krimi, Agantuj, Rakshasa, Bhit and Pisachā directly, indirectly. In the 19th century Acharya Gannath Sen translate the word bacteria in the form of Jeevanu which is causative factor for many diseases. The infectious food poisoning which may be due to ingestion of food/water contaminated with poisons of Agantuj (pathogens including bacteria) is also found in Ayurveda. The infectious disease is given under Aupasargik Vyadhī & Epidemiology is elaborated under the heading of Janapadadhwansa in Ayurveda. The utilization of unhygienic utensil, uncooked, semi cooked food, decomposed meats etc. are the causes of food poisoning as per Ayurveda which is similar as described in Modern Medicine. There are abundant of herbal, mineral and herbo-mineral ayurvedic drug useful for bacterial food poisoning which having significant in vitro antibacterial efficacy on enteric pathogens. The method described for the prevention in Ayurveda is equally important as Modern Medicine with some addition.

INTRODUCTION: Food poisoning is a common, usually mild, but sometimes deadly illness. Several factors could contribute to food poisoning. Food poisoning comes from eating foods that contain germs like pathogenic bacteria or toxins, which are poisonous substances. Food borne illnesses are prevalent in all parts of the world, and the toll in terms of human life and suffering is enormous. Contaminated food contributes to 1.5 billion cases of diarrhea in children each year, resulting in more than three million premature deaths, according to the World Health Organization (WHO). Those deaths and illnesses are shared by both developed and developing nations. The World Health Organization (WHO) reports that each year two billion illnesses are caused by unsafe food; globally this number is growing. In Asia 700,000 people have dies each year as a result of food poisoning illnesses. Under the Integrated Disease Surveillance Project (IDSP) in India, food poisoning outbreaks reported from all over India in 2009 increased to more than double as compared to the previous year (120 outbreaks in 2009, as compared to 50 in the year 2008).

According to the Sushruta Krimidosh is one of cause of Atisar, which mean micro-organism affect the human being and cause many infectious diseases. Many time these organism cause massive effect on community. Yajurveda also mention the Food Poisoning caused due to eating in unhygienic utensils. Ayurveda has described the pathogenic
micro-organism indirectly in the form of invisible krimi responsible for producing many diseases. Ayurveda has also described herbal, mineral and herbo-mineral compound for such infectious disease including bacteria along with food poison prevention.

**MATERIAL & METHOD:**
The material about Bacteria and Bacterial Food Poisoning collected from the text books of Atharva Veda, Yajurveda, Kautilaya Arthashastra, Brihatrayi & Laghutrayi. The research article of concerns subjects published in national-international journals are referred & discussed. The text book of Modern Medicine also referred whenever necessary.

**Ayurvedic Concept of Infectious Disease:**
Acharya Charak stated that there are two factor responsible for disease one is internal factor mean doshavikriti and second is external factor mean Agantuj (contaminated water, food, microbes, trauma). Acharya Susruta has described that the diseases like kustha (Leprosy), Jwara (pyrexia), Shosha (kock’s or tuberculosis) are contagious and spreads or occurring direct contact or by use of contaminated objects. all forms of Prasnaga (contacts), Gatra Sansparsha (direct contacts), eating together, sleeping together (including sexual contact), sharing and using of others cloths, ornaments, ointments etc. leads to diseases like Kustha, Jwara, Shosha, Netrabhishyanda (conjunctivitis), and in this manner the disease spread from person to person, which is called as an Aupsargic disease.

Acharya Charaka has described role of Vayu (air), Udak (Water), Desha (soil & area), Kala (Time) responsible for Janapadodhwansa (epidemics), most of the infectious disease and contamination of physical, chemical & biological factors in occurrence of disease. Dalhan in his commentary on sushruta stated that upsargaja means micro -organism affect the human being and cause many infectious diseases. Many times these organism cause massive effect on community. Acharya sushruta also described the causative animal, clinical feature of Jalsantras which is very much similar to hydrophobia which approved today that it is a viral disease.

**Ayurvedic Concept of Bacteria:**
In Atharvaveda two types of krimi (organism) described- Drisya (visible) and Adrisya (invisible) and minute form of krimi is called “Kshullaka”. Atharvaveda has also mentioned that there are two type of krimi namely Durnam which mean pathogenic and sunam which means non-pathogenic. In Mahabharata Maharshi Veda Vyasa mentioned that there are abounded of microbes which will identify by conclusion. Acharya charak also stated 2 type of krimi one is vaikaric means pathogenic and second is sahaj which means non-pathogenic. In Charak samhitita three major division of disease i.e. Agantuj Vyadhis are caused also due to krimi. Today bacteriologist also classified the pathogenic and nonpathogenic bacteria.

In 19th century Acharya Gananath Sen has translated the bacteria as a Jeevanu which is responsible most of the infectious disease and Enteric fever under the heading of Antrik Jwar & stated that it is due to ingestion of bacterial contaminated food and water which is spread by stool & urine.

**Ayurvedic Concept of Bacterial Food Poisoning:**
According to Atharvaveda jantu (organism) can originate anywhere in the environment. They grow on the earth, in forest, water air, soils also in bird’s animals etc. These organisms may grow where ever they get favorable conditions. Spreading of krimis taken placed through food, gruel, milk and water. Atharvaveda also stated that microbes may invade uncooked; semi cooked food and contaminates them. If an individual consumes such food material it has potential to harm the body.

**Ayurvedic Aspect of Nidan (Causes) of Bacterial Disease and Bacterial Food Poisoning:**
Charak, Sushrut and Vagabhat have been accepted that food material whether fresh or rotten, is one of the causative factors for krimiroga. Charak further stated that Puti ahara (fetid), Klinna ahara (Putrefied) Sandust ahara (ill disposed) and Asuchi ahara (foul) are the synonym, which are used for rotten and contaminated food. Such food material is a good vehicle for Krimi (micro-organism) to get enter in host. Athrava Veda.
mentioned the microbes may invade uncooked; semi cooked food and contaminates them. If an individual consumes such food material it has potential to harm the body 22. Gananath Sen has mentioned the diarrhea caused due to ingestion of Jeeyavu (translated for bacteria) and its toxin contaminated food and waters. He also stated that Anna Visa (food poisoning) one of the cause of diarrhea 23.

**Ayurvedic Aspect of Samprapati (Pathogenesis):**
Jeeyavu (Micro-organism) and its toxin causes vitiation of entire Doshas and then irritation, inflammation to Annavaha and Purishvah Srotas (gastro intestinal tract) which produce vomiting, loose motion, colic pain and fever generally.

**Bacterial Etiology of Food Poisoning As Per Modern Medicine:**
Bacterial food poisoning may be divided into two groups 1. Infection Type- This results from ingestions of viable micro-organisms that multiply in the gastrointestinal tract producing infections as, for example, salmonella group of organisms 2. Toxin Type- This results from ingestions of the micro-organisms which presents in the food & produces toxin before or after being ingested. Bacteria are tiny organisms that can cause infections of the GI tract.

**TABLE 1: EXAMINATION OF CONTAMINATED LIQUID FOOD (MILK) AS PER AYURVEDA**

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Name of Examination</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Examination by means of touch</td>
<td>Slimy, insect laden, disagreeable to teeth, hot or thick feeling.</td>
</tr>
<tr>
<td>2</td>
<td>Examination by means of appearance</td>
<td>Discolored, insanitary &amp; frothy.</td>
</tr>
<tr>
<td>3</td>
<td>Examination by means of taste</td>
<td>Distasteful, tasteless, sour &amp; salty.</td>
</tr>
<tr>
<td>4</td>
<td>Examination by means of smell</td>
<td>Fowl or flesh</td>
</tr>
</tbody>
</table>

Touch of the contaminated water will be slimy, insect laden, disagreeable to teeth, hot or thick feeling and discolored, insanitary & frothy in appearance. Taste of this water will be distasteful, Tasteless; Sour & Salty while Fowl or Flesh in smell 27, 28, 29, 30.

**Clinical Feature of Bacterial Food Poisoning As Per Ayurveda:**
Acharya Trimal Bhatt mentioned the clinical manifestation like diarrhea, vomiting, abdominal pain, fever of Agantu Jwar (Exoteric) due to Visjanya Abhisang (Exotoxin) which is mimics to bacterial food poisoning 24. Gananath Sen in his commentary Siddanth Nidan mentioned Anna Visaj Atisar (Food Poisoning) and its clinical manifestation like diarrhea, vomiting, abdominal pain, fever, thirst which are exactly similar to bacterial food poisoning 25. Sushrita again stated that Food mixed with poison, when it reaches the Amasaya (stomach) gives rise to vomiting, Atisara (loose motion), and distention of the abdomen, a burning sensation, shivering and a derangement of the sense-organs & Syncope 26.

**Clinical Feature of Bacterial Food Poisoning as Per Modern Medicine:**
Patients with food borne illnesses typically present with gastrointestinal tract symptoms (example-vomiting, diarrhea, abdominal pain); however nonspecific symptoms & neurologic symptoms may occur. When someone does not drink enough fluids to replace those that are lost through vomiting and diarrhea, dehydration can result.

**Examination of Contaminated Food as Per Ayurveda:**
Poisoned food burns making loud cracks, and when cast into the fire it assumes the colour of a peacock's throat, becomes unbearable, burns in severed and disjointed flames and emits irritating fumes and it cannot be speedily extinguished 31. Preparations of potherbs, soups, boiled rice and cooked meat are instantaneously decomposed, and become putrid, tasteless and omit little odour when in contact with poison. All kinds of food become tasteless, odourless and colorless when in contact with poison 32.

**Ayurvedic Management of Bacterial Food Poisoning:**
Rigveda has mentioned the physician called Rakshoha who manage the invisible minute krimi 33 Atharvaveda has mention that Agni 34 and Surya 35 has Rakshoghn properties which will be helped to destroy the invisible minute krimi. Acharya charak has described the YukiVyapaashrya Chikitsa which is unique three fold management
for the disease esp. occurring due to any infections. Further Charaka Acharya has described the three different modalities in management of Krimi (micro & macro organisms tend to produce disease) – Apakarshana (removal of the causative factor), Prakriti Vighata (interruption in the nature of causative factor) and Nidaana Parivarjana (escaping of causative factor) 36.

**TABLE 2: CHIEF INGREDIENT OF HERBAL AND HERBO-MINERAL COMPOUND USED FOR BACTERIAL FOOD POISONING WITH SPECIAL REFERENCE TO ATISAR**

<table>
<thead>
<tr>
<th>Sr.no.</th>
<th>Compound</th>
<th>Chief ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rasjanadi Churna</td>
<td>Berberis aristata, Aconitum heterophyllum, Holarrhena antidysenterica, Woodfordia fruticosa</td>
</tr>
<tr>
<td>2</td>
<td>Kapitthadi Churna</td>
<td>Woodfordia fruticosa, Zingiber officinale, Piper longum, Piper nigum</td>
</tr>
<tr>
<td>3</td>
<td>Pippyladi Yog</td>
<td>Piper longum, Plumbago zeylanica</td>
</tr>
<tr>
<td>4</td>
<td>Kataj Phanti</td>
<td>Holarrhena antidysenterica</td>
</tr>
<tr>
<td>5</td>
<td>Atisarhar Yog</td>
<td>Glycyrrhiza glabra, Aegle marmelos</td>
</tr>
<tr>
<td>6</td>
<td>Atisarhar Twak</td>
<td>Terminalia arjuna, Manifera indica, Syzygium cumini, Boswellia serrata</td>
</tr>
<tr>
<td>7</td>
<td>Kapatthastak Churna</td>
<td>Limonia acidissima, Zingiber officinale, Piper longum, Piper nigum, Plumbago zeylanica</td>
</tr>
<tr>
<td>8</td>
<td>Darimaastak Churna</td>
<td>Punica granatum, Zingiber officinale, Piper longum, Piper nigum</td>
</tr>
<tr>
<td>9</td>
<td>Jambvadi Patra Svaras</td>
<td>Syzygium cumini, Manifera indica, Phyllanthus emblica</td>
</tr>
<tr>
<td>10</td>
<td>Babul Patradi Ras</td>
<td>Acacia nilotica, Holarrhena antidysenterica</td>
</tr>
<tr>
<td>11</td>
<td>Ankot Kalk</td>
<td>Alangium Salvifolium</td>
</tr>
<tr>
<td>12</td>
<td>Laghu Gangadhar Churna</td>
<td>Cyperus rotundus, Holarrhena antidysenterica, Aegle marmelos, Symplocos racemosa, Woodfordia fruticosa, Salmalia malbarica</td>
</tr>
<tr>
<td>13</td>
<td>Dhanya Panchak quath</td>
<td>Coriandrum sativum</td>
</tr>
<tr>
<td>14</td>
<td>Gangadh Churna</td>
<td>Salmalia malbarica, Cyperus rotundus</td>
</tr>
<tr>
<td>15</td>
<td>Satavari Kalk</td>
<td>Asparagus racemosus</td>
</tr>
<tr>
<td>16</td>
<td>Chitrakadi Quath</td>
<td>Plumbago zeylanica</td>
</tr>
<tr>
<td>17</td>
<td>PurnChandrodayRas</td>
<td>Hartal, Lauha, Abhrak, Murcury, Zingiber officinale, Piper longum, Piper nigum</td>
</tr>
<tr>
<td>18</td>
<td>Vrihad Gagansunder Ras</td>
<td>Parad, Abhrak, Lauha, Aconitum heterophyllum</td>
</tr>
<tr>
<td>19</td>
<td>Jatiphalara</td>
<td>Mercury, Abhrak, Holarrhena antidysenterica, Tankan, Zingiber officinale, Piper nigum</td>
</tr>
<tr>
<td>20</td>
<td>AbhaynrisinghoRas</td>
<td>Hingul, Aconitum ferox, Zingiber officinale, Piper nigum, Tankan, Mercury, Abhrak</td>
</tr>
<tr>
<td>21</td>
<td>KarpuraRas</td>
<td>Hingul, Papaver somniferum, Cyperus rotundus, Holarrhena antidysenterica, Myristica fragrans, Karpura</td>
</tr>
<tr>
<td>22</td>
<td>AtisarVarnoRas</td>
<td>Hingul, Karpura, Cyperus rotundus, Holarrhena antidysenterica</td>
</tr>
<tr>
<td>23</td>
<td>Kanadhay Lauha</td>
<td>Zingiber officinale, Piper longum, triphala (Termenalia chebula + Termenalia belrica + Phyllanthus emblica), Zingiber officinale, Piper longum, Piper nigum, Hingul, Aconitum ferox, Suhaga, Piper nigum, Piper longum</td>
</tr>
<tr>
<td>24</td>
<td>AnandbhairavRas</td>
<td>Mercury, Holarrhena antidysenterica, Aconitum ferox, Zingiber officinale</td>
</tr>
<tr>
<td>25</td>
<td>SudhasarRas</td>
<td>SudhasarRas + Zingiber officinale, Cyperus rotundus</td>
</tr>
<tr>
<td>26</td>
<td>RasotamRas</td>
<td>Mercury, trikatu</td>
</tr>
<tr>
<td>27</td>
<td>LaghulaiChurna</td>
<td>Mercury, Abhrak, Piper longum, Holarrhena antidysenterica</td>
</tr>
<tr>
<td>28</td>
<td>MritSanjivanRas</td>
<td>Cyperus rotundus, Coriandrum sativum, Asparagus racemosus</td>
</tr>
</tbody>
</table>

As the causative organisms of Atisar (diarrhoea) and bacterial food poisoning are nearly similar. Hence the herbal and herbo-mineral compound mention in Ayurveda for treatment of Atisar will be used for treatment of bacterial food poisoning.

The commonly used herbs as an ingredient of Ayurvedic compounds used for treatment of Atisar are Berberis aristata, Aconitum heterophyllum, Holarrhena antidysenterica, Woodfordia fruticosa, Limonia acidissima, Piper longum, Piper nigum, Zingiber officinale, Plumbago zeylanica, Aegle marmelos, Syzygium cumini, Punica granatum, Acacia nilotica, Alangium salviifolium, Cyperus rotundus, Coriandrum sativum, Asparagus racemosus.

The antimicrobial activity of aqueous and ethanolic extracts of Berberis aristata and berberine, an active principle of Berberis aristata shows the zone of inhibition on enterogenic pathogen like Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa, Escherichia coli and Bacillus subtilis 66. Another study showed the strong antibacterial potential against gram negative bacteria including Pseudomonas aeruginosa, Proteus Vulgaris and Enterobacter aerogenes 67.
The antibacterial study revealed that antibacterial activity of *Aconitum heterophyllum* alkaloids from root shows synergistic effect of different alkaloids\(^{68}\). It was observed that methanolic extract of *Aconitum heterophyllum* was the most potent extract which showed significant inhibition of the growth of Gram positive bacteria, *Staphylococcus aureus* and *Bacillus subtilis*\(^{69}\).

The antimicrobial study showed that extracts of bark, seed and callus of *Holarrhena antidysenterica* possess nearly similar potential for antibacterial activity against pathogenic bacteria like *Staphylococcus aureus*, *Salmonella typhimurium* and *Escherichia coli*\(^{70}\). The antimicrobial activity of *H. antidysenterica* bark extract has been reported against enteropathogens like enteroinvasive *Escherichia coli*, *Salmonella typhimurium*, *Salmonella enteritidis*, *Shigella flexneri*, *Sh. boydii* and *Vibrio cholerae*\(^{71}\).

Extract prepared from leaf and flower samples of *Woodfordia fruticosa* showed antimicrobial property against *Bacillus subtilis*, *Staphylococcus aureus*, *Salmonella Typhi*, *Salmonella paratyphi*, *Citrobacter freundii*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Shigella dysenteriae*, *Enterobacter spp.*, and *Acenitobacter spp.*\(^{72}\).

The methanolic extract of Pulp of *Limonia acidissima* was found to possess highest antibacterial activity against *Staphylococcus epidermidis* followed by *Staphylococcus aureus* and *Bacillus subtilis*\(^{73}\).

The study showed that *Zingiber officinale* (ginger) has antimicrobial activities on the *Pseudomonas aeruginosa* and *Escherichia coli* due to its inhibitory effect\(^{74}\). Another study showed that two extracts of *Zingiber officinale* had antimicrobial activity, methanol extract was superior than n-hexane extract against the same tested microorganisms- *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Klebsiella sp.*, *Escherichia coli*, *Proteus sp.*, *Enterococcus sp.* and *Pseudomonas fluorescent*\(^{75}\).

In the antimicrobial study Piperine (chemical constituent of *Piper nigrum*) was evaluated for its antimicrobial activity against *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa* and *Escherichia coli*\(^{76}\). In another study the extract of *Piper nigrum* was evaluated for antibacterial activity. The results indicate excellent inhibition on the growth of gram positive bacteria like *Staphylococcus aureus*, followed by *Bacillus cereus* and *Streptococcus faecalis*\(^{77}\).

The antimicrobial study showed that among the entire gram positive bacteria *Staphylococcus aureus* was highly sensitive in presence of ethyl acetate extract of fruit of *Piper longum*\(^{78}\). In another study the antimicrobial activity of *P. longum* extracts has been evaluated in vitro against two gram positive bacteria stains such as *Streptococcus faecalis*, *Steptococcus pyogens* and two gram negative bacteria such as *E. coli* and *Salmonella paratyphi*\(^{79}\).

The antimicrobial effect of *Plumbago zeylanica* Linn. (*Plumbaginaceae*) leaf extract was evaluated on microbial strains like gram positive species *Staphylococcus aureus*, and *Bacillus subtilis* and gram negative species *Escherichia coli* and *Pseudomonas aeruginosa*\(^{80}\).

The *in vitro* antimicrobial activity of petroleum ether, chloroform and methanol extracts from leaves of *Aegle marmelos* exhibited broad spectrum antimicrobial activity against bacteria: *Staphylococcus aureus*, *Streptococcus haemolyticus*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Salmonella typhi*\(^{81}\). The other antibacterial study showed that the methanolic extract from the leaves, bark and fruit of *A. marmelos* has significant antibacterial activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Escherichia coli*, *Salmonella paratyphi A* and *Salmonella paratyphi B*\(^{82}\).

The methanol and aqueous extracts of the leaves of *Syzygium cumini* showed the antimicrobial activity against *Salmonella enteritidis*, *Salmonella typhi*, *Salmonella typhi A*, *Salmonella paratyphi A*, *Salmonella paratyphi B*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Bacillus subtilis*, and *Staphylococcus aureus*\(^{83}\).
The in vitro antibacterial activities of different extracts of pomegranate fruit peels and arils (with seeds) were investigated Escherichia coli, and Salmonella typhimurium against food-related bacteria (Bacillus subtilis, Staphylococcus aureus) 84.

The methanolic extract of leaf of the plant Acacia nilotica showed significant antibacterial activity against Bacillus subtilis, Escherichia coli, staphylococcus aureus and pseudomonas fluorescence 85. Ethanolic extract of different plant parts of Alangium salviifolium Linn, showed significant antibacterial activity against Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus 86.

The Antibacterial activity of Cyperus rotundus oil was shown a remarkable activity against microorganisms (Staphylococcus aureus, Klebsiella pneumoniae, Proteus vulgaris, Streptococcus pyogenes, Escherichia coli and Pseudomonas aeruginosa) 87.

Antimicrobial effects of seed extract of coriander (Coriandrum sativum) was shown inhibitory activity on Pseudomonas aeruginosa, Mycobacterium smegmatis, Klebsiella pneumoniae, Staphylococcus aureus, Escherichia coli, Salmonella typhimurium, Enterococcus faecalis and Micrococcus luteus 88.

Methanolic extract of Asparagus racemosus was found to be effective against bacterial Strains: Klebsiella pneumoniae, Escherichia coli, Pseudomonas alkaligenes, Proteus specie, Shegella, Salmonella typhi, Vibrio cholera and Staphylococcus aureus 89. Hingul, Parad, and Gandhak are the chief ingredient of herbo-mineral ayurvedic compound along with herbal medicine. Hingul have significant antimicrobial efficacy with special reference to enterogenic pathogens and bacteria causing Food Poisoning 90. Metal chelates of mercury have been screened for antimicrobial activity on Escherichia coli, Bacillus subtilis and Staphylococcus aureus 91. The herbs used in this compound having Usna, Tikshna, Katu and Tikta in properties which will helped to remove the bacteria and its toxins from human body.

Ancients Method of Prevention of Bacterial Food Poisoning:
In his famous book Arthshastra, Kautilya stated and warned to public not to permit to sale the contaminated, putrefied and decomposed meat of any animals which are cute outside of slaughter house and died due to any disease. The person who will infracted this rule will be punished with penalty of twelve Panha (Moryakalin currency) 92. Sushrit stated about the mode of preparing the soup that the flesh of a Godha, mongoose, or deer should be cooked and spiced with pasted Pdlindi (Trivrit), Yashti-madhu and sugar.

The flesh of a peacock should be similarly cooked and spiced with sugar, Ativisha and Sunthi and that of a Prishata deer with Pippali and sunthi. The soup of Simbi taken with honey and clarified butter should, similarly, be deemed beneficial (as being possessed of similar antitoxic properties). A king should always use food and drink of poison destroying properties 93. Sushrita has mentioned the guideline for the Rajavaidya (Doctor) that Pakashala (kitchen) for the King should be constructed in Agneya (south-eastern) direction & excellent environments. Further he stated that vessels used in kitchen should be clean & neat, so that bacterial & any other contamination will be prevented 94.

Current Method of Prevention of Bacterial Food Poisoning:
Food borne illnesses can be prevented by properly storing, cooking, cleaning, and handling of edible foods. It is need to take the fresh foods always in dinner, lunch or breakfast. The remaining foods should be keep in refrigerator by setting below 40 degree F and freezer on 0 degree F. The raw foods like meat should be cooked long enough at high temperature to kill the harmful bacteria that causes illness. The chop of beef, pork and lamb should be roasted on 145 degree and 165 degree for poultry. Cold foods should be kept in cold pot and hot foods should be kept in hot pot. People should wash their hands for at least 20 seconds with warm, soapy water before and after handling raw meat, poultry, fish, shellfish, produce, or eggs. Utensils and surfaces should be washed with hot, soapy water before and after they are used to prepare food 95.
DISCUSSION: Ayurveda has also found the description about the infectious & contagious diseases under the heading of Aupsargik & Sankramak Vyadi respectively along with Janapadadhwansa (Epidemiology) of infectious & other disease. Though the description of Sukshmajaeeva (micro –organism) has known to our ancient Rishimunies & Acharya which is found in Veda & Ayurveda, the term ‘Jeevanu’ has been used to translate Bacteria at first time in the 19th century. As such direct description of food poisoning & bacterial food poisoning is not found in any texts of Veda & Ayurveda, but the Atharva Veda stated about the contaminations due to microbes may invade uncooked, semi cooked, cooked food.

Acharya Gananath Sen also mentioned the Atisar (Diarrhea) due to ingestion of Jeevanu-janya Anna (bacterial contaminated food) and its clinical feature similar to bacterial food poisoning. The examinations stated in Ayurveda for poisonous & contaminated food are very important & practical because it may be helped to decide whether the food having contaminated or not and may help to prevent the poisoning. Charaka describes in three different modalities in management of Krimi (micro & macro organisms tend to produce disease) like Apakarshana, Prakriti Vighata and Nidaana Parivarjana.

Apakarshana is the process of removal of disease producing Krimi (micro &macro organisms) out of body using therapeutic purification. But Bacterial Food Poisoning having already vomiting and purgation and micro-organism, its toxin removed out in this process. So there is no needing have further induce emesis and purgation in Bacterial Food Poisoning. PrakritiVighata is a very unique medicament described by Charaka that uses the drugs which stops growth of disease producing microbes by creating an unfavourable condition of growth of these organisms.

In Prakriti Vighata drugs having Katu, Tikta, Kashaaya, Kshra, Ushna etc. Gunas (properties) are utilized which decreases Kapha and Malas on which these microorganisms leading to disease. As increased number of the microbes will increase toxin load and also uses body physiological mechanism in increasing the number more, thus disease progress and if this chain is blocked at this level, disease even though occurs will be of mild form, requires very less medication, reduces toxicity & complications and early recovery.

Thus load on the medical management may be decreased. Nidaana Parivarjana is the most efficient method of managing the disease condition. Stopping the invasion of pathognomic organisms into the body will ceases the chances of getting disease. The herbal and herbo-mineral compound described in Ayurveda for Atisar can be used as antimicrobial agent for bacterial food poisoning, as the maximum ingredients like Hingula, Parada, Piper longum, Piper nigum, Berberis aristata, Aconitum heterophyllum, Holarrhena antidysenterica, Woodfordia fruticosa, Limonia acidissima, Zingiber officinale, Plumbago zeylanica, Aegle marmelos, Syzygium cumini, Punica granatum, Acacia nilotica, Alangium salvifolium, Cyperus rotundus ,Coriandrum sativum, Asparagus racemosus having antimicrobial activity with special reference to enteric pathogens.

The matter of prevention of mass from contaminated, decomposed of meat has also found in Kautilaya Arthashastra which is much practical to prevent epidemiology.

CONCLUSION: Food Poisoning caused by Bacteria can be managed & prevented successfully by applying the basic concept & Drugs of Ayurveda.

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