**Pathogens In Aquatic-Related Environment :**

-The major potentially water transmitted pathogenic agents (bacteria, viruses, protozoa, and helminths eggs ), causes illnesses in humans and outbreaks listed in Table 1.

--The primary source of pathogenic (disease-causing) is human excreta, the animals and birds feces also play a role as reservoirs of pathogens that are potentially transmissible to humans via water.

A summary of the common human diseases or clinical symptoms caused by water-borne pathogenic agents:

|  |  |
| --- | --- |
| Disease or symptoms | Bacterial Agent |
| **Typhoid fever** | ***Salmonella typhi*** |
| **Salmonellosis** | ***Salmonella spp*** |
| **Shigellosis** | ***Shigella spp*** |
| **Diarrhoea** | ***Escherichia coli***  ***Clostridium perfringens*** |
| **Gastroenteritis/enteritis** | ***Campylobacter spp***  ***Vibrio parahaemolyticus*** |
| **Cholera dysentery** | ***Vibrio cholerae*** |

* The microbial pathogens are often difficult to determine because testing for each pathogen separately would be extremely costly and time-consuming. pathogens are usually present in low numbers so it is necessary to monitor waters using “indicator” organisms, e.g : total coliforms ,thermotolerant (faecal) coliforms and faecal streptococci . That means the presence of bacterial indicator organisms is associated with the presence of microbial pathogens.
* If indicator organisms are present in large numbers, the contamination is considered to be recent and/or severe.
* Faecal indicators are excreted by humans and warm-blooded animals are the best indicators for fecal pollution. So a water sample that contains indicators common in animal intestines (including human), it should not be consumed.
* The indicators use for water quality assessment, accordingly determine beneﬁcial uses of water as essential & non-essential water uses : inside (drinking, cooking ,washing / personal hygiene , washing clothes ,…) or outside ( garden , swimming pool,…)

Indicators of water quality

|  |  |
| --- | --- |
| Traditional faecal indicators | Alternative indicators |
| -Total coliforms  -Faecal coliforms / FC (thermotolerant)  -E. coli  -Faecal streptococci (FS)  -Clostridium perfringens | -Staphylococci (S. aureus)  -Pseudomonas aeruginosa  -Vibrio spp  -Salmonella & Shigella |





