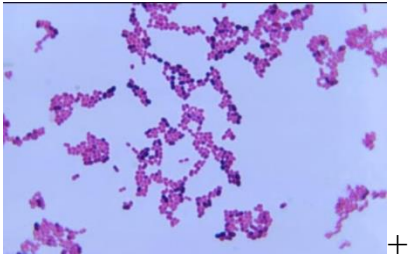


## 1. *Acinetobacter*

Image



### Description:

*Acinetobacter* belong to the class gammaproteobacteria, it is a genus of gram-negative, aerobic, non-motile, bacteria that is commonly found in the soil and water. Some strains of *Acinetobacter* can cause infections in humans, especially in people with weakened immune systems or those who have been hospitalized.

### Features/Characteristics:

- Ability to survive in diverse environments, including on surfaces and within biofilms.
- It shows resistance to multiple antibiotics.

### Economic/Medical Importance:

- Some strains of *Acinetobacter* can contaminate food and water, leading to outbreaks of illness.
- Some strains of *Acinetobacter* have gained attention as multidrug-resistant pathogens, causing healthcare-associated infections like pneumonia, bloodstream infections, and urinary tract infections.
- *Acinetobacter* infections can be difficult to treat because the bacteria are often resistant to many antibiotics.
- In Nigeria, it has been reported to be involved in phosphate solubilisation (Osuyi *et al.*, 2023).

### Diseases Caused:

Pneumonia, wound infections, and bloodstream infections.

### Host Name:

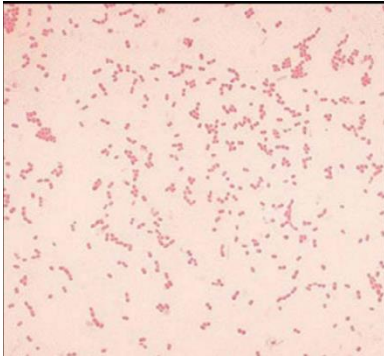
*Acinetobacter* can infect a wide range of hosts including: humans, animals, and plants.

Mode of Transmission:

Person-to-person contact, exposure to contaminated surfaces or objects, and inhalation of contaminated aerosols.

## 2. *Acinetobacter lwoffii*

Image



Description:

*Acinetobacter Lwoffii* is among the species of *Acinetobacter* genus that is commonly found in soil and water.

Features/Characteristics:

Resistance to antibiotics

Economic/Medical Importance:

*Acinetobacter Lwoffii* can cause infections in humans, particularly in intensive care unit (ICU) settings. It has been associated with hospital-acquired infections and can exhibit resistance to multiple antibiotics.

In Nigeria it had been reported to contaminate watermelon (Raufu *et al.*, 2023)

Diseases Caused:

Pneumonia, bloodstream infections, and wound infections.

Host Name:

Humans, animals and plants

Mode of Transmission:

Contaminated surfaces, medical equipment, and person-to-person contact.

### 3. *Aeromonas* spp.

Image



Description:

*Aeromonas* is a genus of gram-negative bacteria that is commonly found in fresh water and marine environments.

Features/Characteristics:

*Aeromonas* exhibits various virulence factors, such as producing toxins and enzymes that enable it to colonize and infect its hosts.

Economic/Medical Importance:

- Some strains of *Aeromonas* can contaminate fish and seafood, leading to outbreaks of illness.
- Certain species within the *Aeromonas* genus can cause infections in humans, particularly those with compromised immune systems or exposure to contaminated water.
- *Aeromonas* infections can cause a variety of illnesses in humans, including wound infections, gastroenteritis, and septicemia.
- In Nigeria, it had been reported to contaminate water (Mohammed *et al.*, 2023)

Diseases Caused:

Gastroenteritis, wound infections, and septicemia.

Host Name:

Humans, fish, and other aquatic animals.

Mode of Transmission:

Consumption of contaminated food or water, exposure to contaminated surfaces or objects, and inhalation of contaminated aerosols.

#### 4. Alcaligenes

Image



Description:

Alcaligenes is a genus of Gram-negative bacteria widely distributed in the environment, including soil, water, and plants.

Features/Characteristics:

Some species of Alcaligenes possess metabolic capabilities that contribute to their role in bioremediation.

Economic/Medical Importance:

Alcaligenes species have both beneficial and pathogenic associations. Some strains have been found to degrade pollutants, while opportunistic pathogens can cause infections in humans, particularly in immunocompromised individuals. In Nigeria, they had been reported to contaminated groundnut paste (Onuoha *et al.*, 2023).

Diseases Caused:

Alcaligenes infections in humans can manifest as respiratory tract infections, urinary tract infections, or bloodstream infections, although they are relatively rare.

Host Name:

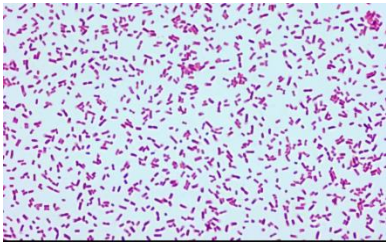
Humans, animals, and plants.

Mode of Transmission:

Person-to-person contact, exposure to contaminated surfaces or objects, and inhalation of contaminated aerosols.

## 5. Alcaligenes Faecalis

Image



Description: *Alcaligenes faecalis* is a gram-negative, non-spore-forming bacterium commonly found in soil, water, and various clinical settings.

Features/Characteristics:

*Alcaligenes faecalis* is known for being motile, oxidase-positive, and capable of utilizing a wide range of organic compounds as energy sources.

Economic/Medical Importance:

While *Alcaligenes faecalis* is generally considered non-pathogenic, it can cause opportunistic infections in immunocompromised individuals.

In Nigeria, it had been reported to contaminate drinking water (Mohammed *et al.*, 2023).

Diseases Caused:

Pneumonia, wound infections, and bloodstream infections

Host Name:

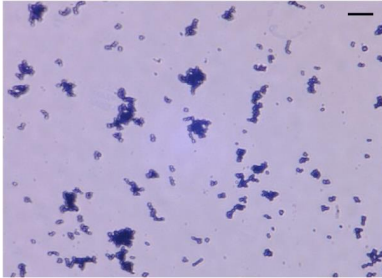
*Alcaligenes faecalis* can be found in various environments, including soil, water, clinical settings and in the body of human and animals. It does not have a specific host organism.

Mode of Transmission:

*Alcaligenes faecalis* is primarily transmitted through direct contact with contaminated sources, such as soil or water, or through healthcare-associated exposure.

## 6. *Arthrobacter* Sp

Image



Description: *Arthrobacter* sp is a genus of gram-positive, non-motile bacteria commonly found in soil, freshwater, and marine environments. It displays a rod-shaped morphology. The genus *Arthrobacter* contains aerobic, catalase-positive rods with respiratory metabolism. Their most distinctive feature is a rod-coccus growth cycle. When in exponential phase, these bacteria are irregular, branched rods that undergo snapping division. As they enter stationary phase, the cells change to a coccoid form. Upon transfer to fresh medium, the coccoid cells differentiate to form actively growing rods. Although arthrobacters often are isolated from fish, sewage, and plant surfaces, their most important habitat is the soil, where they constitute a significant component of the culturable microbial community. They are well adapted to this niche they are resistant to desiccation and nutrient deprivation, even though they do not form spores.

Features/Characteristics:

- *Arthrobacter* have red-coccus growth cycle, metabolism respiratory, catalase positive, mainly in soil.
- *Arthrobacter* sp is characterized by its ability to withstand harsh environmental conditions, including temperature and nutrient limitations. It also exhibits diverse metabolic capabilities, contributing to its role in bioremediation processes.

Economic/Medical Importance:

*Arthrobacter* sp has economic importance in agriculture and bioremediation due to its ability to degrade various organic compounds in soil and water. It also plays a role in nitrogen cycling.

In Nigeria, it had been reported to utilize pesticides (Tere *et al.*, 2023).

Diseases Caused:

*Arthrobacter* sp is generally considered non-pathogenic to humans and animals and does not cause specific diseases.

Host Name:

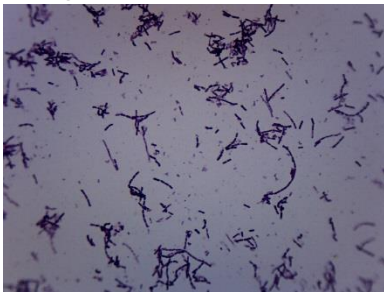
No specific host organism and can be found in various environments, including soil, freshwater, and marine habitats.

Mode of Transmission:

*Arthrobacter* sp is primarily transmitted through environmental exposure, such as soil or water contaminated with the bacteria.

## 7. *Azotobacter*

Image



Description:

*Azotobacter* belong to the class gammaproteobacteria, it is a genus of free-living, gram-negative bacteria known for their ability to fix atmospheric nitrogen into a usable form for plants. The genus *Azotobacter* also is in the family Pseudomonaceae. These bacteria are ovoid, 1.5 to 2.0  $\mu\text{m}$  in diameter, and may be motile by peritrichous flagella.

Features/Characteristics:

- Azotobacter produces large quantities of extracellular polysaccharides, which enable it to form thick-walled cysts, resistant to environmental conditions.
- It has the ability to fix nitrogen and release plant growth-promoting substances.
- It has ovoid cells.
- It is pleomorphic.
- Peritrichous flagella/nonmotile.
- It is aerobic.
- It can form cysts.

#### Economic/Medical Importance:

- Azotobacter has significant economic importance in agriculture since it contributes to soil fertility by providing a natural source of nitrogen for plants.
- It produces biopolymers and enzymes that have industrial applications.
- In Nigeria, it had been reported to produce biosurfactants (Nwachi *et al.*, 2023).

#### Diseases Caused:

Azotobacter is not known to cause diseases in humans or animals.

Host Name: : Azotobacter can be found in soil, freshwater, and marine environments and has a symbiotic relationship with certain plants that allow it to colonize the rhizosphere.

#### Mode of Transmission:

Azotobacter is naturally present in soil and water, and its transmission occurs through environmental exposure.

### 8. *B. thuringiensis*

Image





#### Description:

*Bacillus thuringiensis* is a gram-positive, spore-forming bacterium commonly found in soil, plant surfaces, and insect cadavers.

#### Features/Characteristics:

- *B. thuringiensis* has an ability to produce parasporal crystal proteins that are toxic to specific insects but harmless to other organisms, including humans.
- *B. thuringiensis* parasporal body contains protein toxins that kill over 100 species of moths when activated in the alkaline gut of caterpillars thereby destroying the epithelium.

#### Economic/Medical Importance:

*B. thuringiensis* has enormous economic importance as a biological pesticide. It produces crystal proteins called Bt toxins that are toxic to a wide range of insect pests, making it valuable in agricultural practices.

In Nigeria, it had been reported to contaminate the foods of school children (Ayilara *et al.*, 2023).

#### Diseases Caused:

*B. thuringiensis* causes diseases in susceptible insect larvae, leading to their death. *B. anthracis* is the causative agent of the disease anthrax, which can affect both farm animals and humans.

#### Host Name:

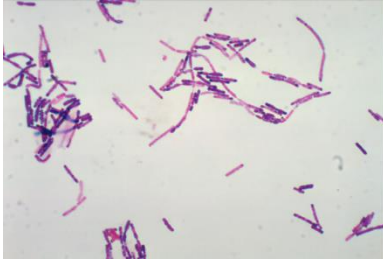
*B. thuringiensis* can be found in soil, plants, and the digestive tracts of insects, where it causes diseases in susceptible species.

#### Mode of Transmission:

*B. thuringiensis* is transmitted through the ingestion of spores or toxin-containing crystals by susceptible insect larvae.

#### 9. *B. cereus*

Image



Description: *Bacillus cereus* is a gram-positive, spore-forming bacterium commonly found in soil, dust, and various food sources.

Features/Characteristics:

*B. cereus* is known for its ability to produce heat-stable toxins that cause food poisoning symptoms. It forms endospores, allowing it to survive harsh conditions and resist disinfection measures.

Economic/Medical Importance:

- *B. cereus* has economic importance in the food industry, where it can cause food spoilage and foodborne illnesses if proper food handling practices are not followed.
- In terms of medical importance, it is known to cause opportunistic infections, including various types of food poisoning.
- Several species are used as insecticides.
- In Nigeria, it had been reported to contaminate the foods of school children (Ayilara *et al.*, 2023). It had also been reported to degrade hydrocarbons/anthracene and also produce polyhydroxyalkanoate (Akinwumi *et al.*, 2023).

Diseases Caused: *B. cereus* causes two types of food poisoning: emetic (causing vomiting) and diarrheal. It can also cause localized infections and systemic infections in immunocompromised individuals.

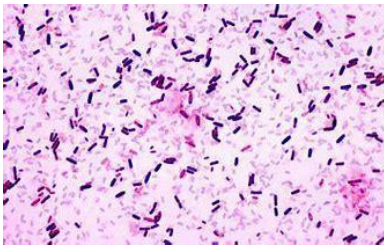
Host Name: *B. cereus* has a broad host range and can be found in soil, dust, and various food sources.

Mode of Transmission:

*B. cereus* is primarily transmitted through the ingestion of contaminated food or water.

#### 10. *B. pumilus*

Image



Description:

*Bacillus pumilus* is a gram-positive, endospore-forming bacterium commonly found in soil, air, and various environments.

Features/Characteristics:

- *B. pumilus* is characterized by its ability to form resistant endospores, which enable survival in harsh conditions.
- It also produces a range of extracellular enzymes, including proteases and amylases, which have industrial applications.

Economic/Medical Importance:

*B. pumilus* has limited economic importance but is known for its ability to produce extracellular enzymes that have industrial applications. It is not usually associated with significant medical importance. In Nigeria, it had been isolated from soft cheese 'wara' (Ahmed *et al.*, 2023).

Diseases Caused:

*B. pumilus* is generally considered non-pathogenic to humans and animals and does not cause specific diseases.

Host Name:

*B. pumilus* can be found in soil, air, water, and various environments.

Mode of Transmission:

*B. pumilus* is transmitted through environmental exposure, such as contact with soil or air contaminated with the bacteria.