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Жинақ еліміздің оқу орындарында еңбек етіп жүрген ұстаздар қауымына, докторанттарға, магистранттарға, студенттерге арналған.

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BACTERIA'S CLASSIFICATION AND ITS NORMS

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Looking at the title of this issue, I have classified the bacteria in the light of the various types of standards. Mostly, I have selected and used genetical, physical chemistry and visible features, i.e., morphological standards, in addition to all other standards for the classification of bacteria based on exist. In connection with the research, I have collected most of the studies and materials in the form of library research. At the same time, I have collected the texts related to the title and content from the best internal, foreign and international references and I have tried to look at the title, and I have worked separately from the first hand, second hand and third hand references. At the end of this research, I reached the goal that microorganisms are the only organisms that can survive in any kind of extremophile conditions. For example, *Pyrodictium occultum* grows at 110°C and can survive in an autoclave at 121°C for one hour. Also, from the microorganisms, we can store bacteria at 70 degrees centigrade. [Kermanshahi, 1389].

Since the value and development of a country, a nation and a language is revealed from their educational works, unfortunately we have to say that the current problem of our country is not only in the direction of development and strengthening in other aspects of life. It has become a barrier, but it has also deprived us of success in the field of knowledge. Our devastated and war-torn country, Afghanistan, needs to train many academic staff for its development and leadership, so that with their knowledge, they can find ways to achieve the aspirations of this suffering nation and take positive and valuable steps in the way of solving the problems. And in the end, let his land and his nation out of this terrible situation and lead them towards a brighter future. Since the recognition of bacteria is important and its value is high, I also considered it necessary to write an article under the title of classification of bacteria. And by looking at Persian articles, monographs, theses and books, I will use first-hand, second-hand and third-hand sources, so that biology lovers, students and teachers can use them.

New standards for the classification of bacteria such as: extremophilic condition and genetic structure of bacteria are considered as important standards for classification. Since there are no necessary facilities for conducting laboratory research in the field of biology in the dear country of Afghanistan, on this basis, library research and internet sources have been used as sources. It is worth mentioning that for better understanding and convenience, I have written my article in simple and commonly understood words, I hope that it will be able to be enjoyed and benefited by the readers.

Bacteria are derived from the word bacteriomalatin, which means droplet, and are small single-celled organisms that can be seen with an ordinary microscope and are measured in microns. Bacteria were first observed in 1657 by Leon Hooke. Later, Robert Hooke³ and Louie Pasteur⁴ confirmed that these organisms cause a series of diseases in animals and plants, and these organisms are found in the soil, air, water, and the inside of living bodies. [Abazar, 1395].

Scientists classify bacteria in many ways such as shape, disease production, benefit, harm and other characteristics. In general, for the purpose of identifying the traces of all organisms, their classification is necessary so that a researcher can easily understand the characteristics of a microorganism, which is the cause of classification. Classification can lead to the prediction of common characteristics among microorganisms. Also, classification is a good standard for understanding the relationships between organisms. Basic standards for the classification of prokaryotes and especially bacteria, which will be discussed in the future. We should focus on the first stages. That, each characteristic should be a good standard for the classification of prokaryotes and bacteria. For example, similarity cannot be a valuable standard for classification. For example, the presence of DNA is not an appropriate standard for distinguishing microorganisms because all cells contain DNA.

The presence or absence of plasmid structure cannot be a good standard for classification because, although many plasmids exist in different cells, they may not be permanently incorporated into the host cell. In addition to the structure, physiology and biochemical and genetical structure of microorganisms, cultivation is considered a good standard for classification. There are some other standards that are used in classification, such as: spore production, sugar fermentation ability, gram staining and genetic standards which are under development are the best standards for classification. [Muhammad Ali, 1389].

Some of the bacteria use three ways to survive in unfavorable conditions such as: unsuitable pH, temperature, lack of food, use of antibiotics. Endospore, Exospore and Cyst. [Kermanshahi, 1389].

One of the appropriate standards for classification is the growth of bacteria in cultivation. Disease-causing bacteria against viruses and parasites can be grown in solid culture. Bacterial cultures require metabolic nutrients. These cultures include: non-selective culture, selective culture and differential culture.[Hossein W., 1394].

1. Photo trophic: Bacteria that get their necessary energy from light.

2. Chemotropism: These bacteria get the necessary energy from chemicals and cannot carry out photosynthesis.

3. Autotrophs: Those bacteria are included in this group, which get the necessary energy from the carbon source and make their own food and carry out photosynthesis.[Gholamreza, 1397].

1. Gram-negative bacteria: This type of bacteria appears red with gram staining, the main types of which are: Enter bacteria, Helicobacter, Pseudomonas, Campylobacter Vibrio.

2. Gram positive bacteria: These bacteria are seen with violet color when stained by Gram stain. The species include: Bacillus, Clostridium, Enterococcus, Streptococcus, Staphylococcus, Nocardia, Listeria Corynebacterium. [Abbas, 1395].

Over the last few years, extremophile microorganisms, which are capable of living in extreme conditions, have been identified. Difficult environmental conditions are those conditions that are lethal or ineffective for many microorganisms. But some microorganisms can survive in these harsh conditions. So, these microorganisms are called extremophiles. The extremophile condition is not only that these microorganisms can tolerate it, but these conditions are necessary and useful for their growth, so that they can continue their life. The word extremophile It was presented for the first time by Mac Elroy in 1974, and then in 1990, research was carried out on the extremophile and development was given to it. An international conference on extremophile was held in Portugal in June 1996 and the first scientific journal Extremophile Journal was published in February 1997. [Muhammad Ali, 1389].

1- Acidophilus: Bacteria that live in an acidic environment such as: Thiobacillusthiooxidans.

2- Alkalophiles: Bacteria that live in an alkaline environment such as: Vibrio cholera.

3-Neutrophilus: Bacteria that survive in neutral pH. Such as: E coli. [Muhammad Ali, 1389].

1- Destructive bacteria against sunlight: those rays with a wavelength of 290-400 nm. It causes disorders in the transcription and replication of bacteria such as: E.coli.

2- Bacteria resistant to sunlight: Meanwhile, a dose of radiation up to 5×10^5 is enough to kill a person. Except for some bacteria, including *Dinococcus radiodurans* bacteria, can tolerate 15,000 doses of radiation. These bacteria continue to live in dry areas. (Muhammad Ali, 1389).

1- Aerobic bacteria: These bacteria usually live in an environment where there is a lot of oxygen and reproduce in the presence of oxygen. [Javatz, 1395].

2- Anaerobic bacteria: These bacteria live in the absence of oxygen, so they live in an environment where there is no oxygen and they die if there is oxygen. [Javatz, 1395].

3- Facultative: If any kind of environment is available for these bacteria, i.e. if there is oxygen or not, these bacteria can live and grow as anaerobic, aerobic and selective bacteria. [Javatz, 1395].

4- Microaerophilic: These bacteria can grow and survive in a very small amount of oxygen (2%). Can survive in a small amount of oxygen. [Javatz, 1395].

5- Air tolerant bacteria: Air tolerant bacteria are included in this group, which work in the presence of oxygen, but do not use oxygen electrons. [www.google scholar.com].

1- Psychrophilic: Psychrophilic at this temperature is 0-20 degrees Celsius and bacteria can grow at this temperature and need this temperature.

2- Mesophilic: Mesophilic bacteria in this temperature need a temperature of 20-45 degrees centigrade for life and growth.

3- Thermophilic: Thermophile: In this temperature, those bacteria come which need a temperature of 50-70 degrees centigrade, such as *Thermatoga*.

4- Hyperthermophiles: Focusable. which grows at 110 °C and can survive in an autoclave at 121 °C for one hour. [Muhammad Ali, 1989]

1- Cocci Shape: These bacteria have a round oval shape, which can be seen in several places according to their characteristics.

2- Bacilli: These bacteria have a long cylindrical shape, some of these bacteria have spores and some bacteria do not have spores.

3- Vibrio Bacteria: These bacteria have curved cylindrical shape and are gram negative. These bacteria are motile.

4- Spirochete: *Spirulina* is a type of bacteria which has a spiral shape and spiral shape.

5- Polymorphic: These bacteria do not have a fixed shape and are seen with different shapes, which are neither cocci nor bacilli, but they are not identified with these shapes and people are mistaken about them, such as: [Cocci bacilli]. [Javatz, 1395].

1- Swimming: This movement is more common in bacteria than any other movement. For this type of movement, the presence of flagella is necessary in bacteria. [Zahra, 1395].

2- Gliding Motility: compared to all other movements, this type of movement is more stable and slower in bacteria. This movement is clearly seen in *Bacillus* bacteria. And does not require flagellum. [Ruhakhsari, 1389].

Bacteria by flagella

A- Monotrichous: This group includes those bacteria which have a flagellum at one end. Like: *Diphtheria bacilli*.

B- Lophotrichous: The group bacteria are classified in this part. of which there is more than one flagellum in one head such as: *Salmonella Typhus*.

C- Amphitrichous: This part includes those bacteria that have a flagella at both ends of their structure, such as: *Rhodospirillum rubrum*.

D- Peritrichous: The type of bacteria that have flagella on the entire surface, such as: *Bacillus subtilis*.

E- Amphitrichous: Bacteria that have more than one flagellum at both ends are included in this group. Like: *Alcaligenes faecalis*.

F- Atrichous: This group includes those bacteria, which have no flagella on the outer surface, such as: *Bacillus typhus's*. [Ruhakhsari, 1389].

By the grace of God, I have prepared an article under the title of classification of bacteria and its criteria. Taxonomy is the science of classification, identification, and nomenclature. For classification purposes, organisms are usually organized into subspecies, species, genera, families, and higher orders. For eukaryotes, the definition of the species usually stresses the ability of similar organisms to reproduce sexually with the formation of a zygote and to produce fertile offspring.

However, bacteria do not undergo sexual reproduction in the eukaryotic sense. Other criteria are used for their classification.

Finally, we can say that; Classification is the orderly arrangement of bacteria into groups. There is nothing inherently scientific about classification, and different groups of scientists may classify the same organisms differently. For example, clinical microbiologists are interested in the serotype, antimicrobial resistance pattern, and toxin and invasiveness factors in *Escherichia coli*, whereas geneticists are concerned with specific mutations and plasmids.

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Ғылыми басылым

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