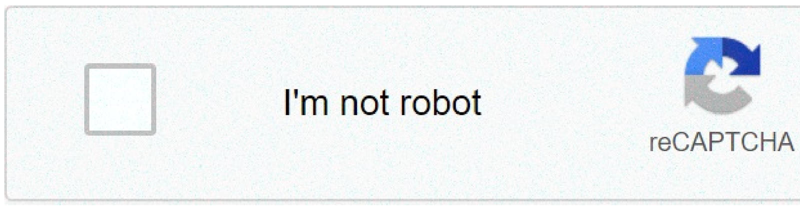

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List of biochemical tests for identification of bacteria pdf

List of biochemical tests for identification of bacteria pdf. How biochemical tests are used to identify bacteria. What are the common biochemical tests used in the identification of bacteria. What is biochemical tests for identification of bacteria.

We may not see them, but the microbes are all around. This fact is revealed to microbiology students who are in charge of a classic project: identify bacteria and mushrooms from their environment. Armed with cotton swabs and petri dishes full of agar nuta, the students direct the laboratory to see what lives on the surfaces meet every day. Many students choose to taste the places in consideration more dirty: toilet handles, laptops, or floors in the school corridor (when I took my first microbiology laboratory course, I championship the dorm bathroom mirror). After scattered and spreading the invisible content on the agar plate, we put our agar plates in the incubator and attest to the microbial surprises of the following class period .ã, once the microbes have turned out to the plates of the Agar, it was time to identify them. (To my disappointment, it has not grown a lot on my bathroom mirror dish. Later I learned that, despite the absence of microbes on my plate, there may still be microbes present on my bathroom mirror. Not all microbes They grow on the same type of nutrients, or at the same temperature). This student project has many parallels to what the microbiologists have made for centuries. From the identification of microbes for physical and functional characteristics to the adaptation of more modern techniques, microbiologists (and future microbiologists) are constantly building a vast toolkit to discover the identities of the previously unknown microscopic life. The first microbial identifications are based on the observations of the physical characteristics of the microbe: form, size and types of dyes that were absorbed. Antoni Van Leeuwenhoek saw microbes for the first time through a microscope in 1670. These microbes came from decadent bodies, animals, vegetables and water. Documented the results, describing what has seen as Ã ¢ â,¬ Å "animalculi", derived from the Latin Ã ¢ â,¬ Ã ¢ â,¬IMALCULUMÃ ¢ â,¬ or "small animal". To better visualize the microscopic between Of us, Hans Christian Gram has developed the grams technique in 1884. Gram has created this technique to make bacteria more visible in the sections of stained pulmonary tissues, and not to classify microbes, as it is commonly applied today. Other types coloring can tell microbiologists if there are certain features: spores (Schaeffer-Fulton coloring), capsules (Indian or nigrosine ink) and mycoholic acids (acid-fast coloring). The scrub Gram differentiates organisms along the way the react With colored spots: Gram-negative auctions (L) Pink / red stain; Gram-positive reeds (R) Blue / purple stain. When scientists started cultivating microbes on agar media in 1880 (thanks to the contributions of Angelina Hesse) , could Ro Study the macroscopic characteristics of microbial populations more easily. What color are the colonies? Do they seem levks? Or rugously? Since microbiologists have combined different formulations of nutrients with Agar to grow a diversified series of microorganisms, they have created another tool for microbial identification: selective and differential media that help microbiologists identify species of bacteria and yeasts. (Identify viruses on Agar Plates is a different story and rely on methods such as differences in viral plaque phenotype.) Selective media contain substances that inhibit organism's growth allowing only a specific type of body. For example, the high concentration of mannitol salt agar salt (MSA) inhibits the growth of most organisms except the species of the staphylococcus (thanks to Brnq, Arrsr and Cardiipino). Selective media can also eliminate the growth of Specific based on other criteria such as pH and the composition of amino acids. Differential media allow more bacterial species to grow, but their growth models differ visually. Blood Agar is a commonly used different medium, containing 5-10% sheep or sheep blood or a requirement to grow streptococcus species. Several species of streptococcus break the blood cells (in a process called hemolisi) in different ways, leading differences differences Appearance: No Multimedia Color Change = No Lisi Blood Cell (Veridani S. Veridani) Green / Brown Media = Lisi of partial blood (S. haemolyticus) Agar lightened around bacterial growth = complete lysis of blood blood cells (Pyogenes) The quantity of blood blood cell lysis of bacteria translates into a different color in the media. Here: Î ± -Hemolisi (S. Mitis, L); Î'-homolysis (S. Pyogenes, m); Î "-Hemolisi (also called non-haemolytic, S. Salivarius, R). Combining different indicators and compounds in the same formulation of the AGAR supports, the supports can be selective and differential. The MSA supports described above actually contains both selective components (salt) and differential (mannitolo). While selecting salt per species Staphylococcus, the media also differentiates species Staphylococcus that mannitolo fermento from those who women t. If a fermented bacterium mannitol (for example, S. Aureus), lowers the pH of the vehicle. The ph of the pH is detectable because the support contains the red phenol that becomes yellow low pH. If a bacterium does not ferment the mannitol (for example, S. Epidermidis), the pH is no lower and the vehicle remains red. A similar example of media that is both differentiated and the selection is the Agar Macconkey. This type of agar includes bile salts, which are in the intestine and help in digestion from emulsifier fats. The microorganisms that live in the intestine (called Enteric Microbes) constantly encounter bile salts and have developed mechanisms to prevent these salts to destroy their membranes. Non-enteric microbes are more susceptible to bile salts and less probability to grow in their presence. Therefore, Agar Macconkey selects for bile-resistant microorganisms. Agar Macconkey's current recipe contains 2 extra ingredients that increase its selectivity and make differential: (1) Adding crystalline purple to the recipe of Agar Macconkey inhibits the growth of gram-positive organisms and (2) the addition of A pH indicator, neutral red, differentiation of lactose fermenters from non-fermenters. While these are just some examples of how media types can help microbiologists distinguish between microbes, there are many other types of selective and differential media. For example: selective average: Agar YM selects for microbes that grow in low pH conditions as yeasts and molds. Eosin methylene blue selects for gram-negative organisms. Baird-Parker selects for Gram-positive staphylococci. Carbon yeast buffered agar selects for some gram-negatives, especially Legionella pneumophila. Sarbouraud Agar, which has a low and high glucose pH concentration, selects for some mushrooms. Differential media: X-Gal Plates identifies LAC Operon mutants during clone selection. Eosin methylene Blue differentiates between lactose fermenters and non-fermenters. Microbiologists can ask for further questions about microbial identity based on microbial behavior during biochemical tests. Some biochemical tests for microbial identification are quite simple. To check if the bacteria contain a catalase enzyme, a microbiologist falls hydrogen peroxide in a stain of bacteria on a microscope slide. If the bacteria contain Catasi, the mixture bubbles while hydrogen peroxide decomposes in water and oxygen. In the clinic, the Catalase test helps to distinguish catalase-positive staphylococci from negative catalase Streptococcus, ã, which are both gram-positive cococcos. In substrate usage tests, a substrate panel, such as carbon or nitrogen sources, can quickly test the capacity of a microbe to use different substrates simultaneously. These essays are generally carried out in 96 wells dishes where each contains a different substrate. If a microbe can use the substrate You will generate a color change in the middle. Analyzing the combination of substrates used on the plate, the bacteria in question could be identified. The use of 95 different carbon sources are tested on this plate. If bacteria can oxidize a specific carbon source, a purple purple Develop. Given the wealth of agar's media, microscopy spots, and biochemical tests, microbiologists have built flow diagrams for the identity of bacteria that surround us. And yet, the numerous growth and biochemical tests that microbiologists have accumulated cannot accurately reveal all ways a microbe can be different from another. These tests also require that the microbes in question are cultivable. How do Microbiologists identify the many microbes that are not cultivable? An example of a flowchart identification Anaerobic bacteria of Gram-positive coconuts. DNA sequencing introduced in many new techniques to identify more precisely microbes, while providing information on the microbial function. Unlike the methods described above, sequencing does not require the microbiologist grow first to the organism. One of these first methods of DNA sequencing is 16s RRNA gene sequencing and is based on the fact that the 16S RRNA is a relatively stable region with a low speed of evolution. This makes the sequence of a large point of interrogation to determine the relationships between the species. The logic is whether the organisms are closely related, the 16S RRNA gene sequences will be more similar than organisms that are not strictly related. To sequence the RRNA 16S gene, youÃ ¢ d first must amplify the region by PCR and then the product sequence. However, this provides a small piece of the microbial puzzle. Sequencing All DNA in a microbe and assemble these sequences in a genome reveals much more than 16s RRNA gene sequencing can. You can get information on almost all genes in the organism and get a sense of what the microbe is able to do. There are different methods of DNA sequencing used to generate a genomic sequence. In the next generation sequencing (NGS), or massively parallel sequencing, the genomic DNA is divided into small segments that are sequenced simultaneously. This translates into 1 million to 43 billion brief law (50-400 BP) per cycle. The large number of readings can be mounted in longer fragments, but often does not determine complete with a genome. Long sequencing methods Read more than 10 KB at once. A popular long light method is a sequencing nanopore; Here, a single DNA molecule filament is fed through a small pore (hence the Nanopore name). As DNA filament passes through the pore, surrounding electric field variations specifically to the DNA sequence in the pore. Looking at the current changes, the DNA sequence can deduce as the molecule passes through the Nano pore. Long read sequencing and NGS can be coupled together in a method called hybrid assembly. When coupled with the long reading sequence, any ambiguitous existing in the NGS results can be better decrypted, and vice versa.ã, Sequencing of the hybrid DNA combines short and long reading assembly light sequencing ambiguitis resolve. Sequencing methods for microbial identification have some additional advantages compared to media-based and biochemical test methods. While agar media-based methods and biochemical tests are used to identify bacteria and mushrooms, they have developed to identify viruses and can only be used for organisms that are cultivable. Sequencing provides a set of more robust tools, since it can identify non-cultivable viruses and microbes. The common microbial identification project in many microbiology laboratory naturally reminds us that the microbes are all around. But despite the number of bacteria and mushrooms that grow from buffered phones or water bottles, most are not harmful. Microbial identification is not just limited to the class but. In the laboratories Microbiologists identify microbes behind the disease in their patients. And for basic research, microbiologists around the world are studying in which microbes reside and what they are doing: appetizers mother, shower, metro, oceans, and soils are just the beginnings of our microbial Exploration. , It is possible that they represent the author point of view and does it necessarily reflect the opinion of the American society for microbiology. Microbiology.

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