

# Urine culture and urinalysis experiment



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**Abstract**

This lab report analyses the findings of two important tests. These are microbiological analysis of urine on CLED agar plate (urine culture) and biochemical analysis of urine (urinalysis). Urine culture test examined urine sample cultured on cystine-lactose-electrolyte deficient agar plate for any possible bacterial growth after the incubation period. Gram positive or gram negative bacteria growth can be found or not. However the presence of 10 colonies of each in this experiment which were *E. coli* and *S. aureus* bacteria indicated either possible contamination of the urine sample or infection of the urinary tract by various disease and disorders of the urinal tract.

The biochemical analysis of urine was also done where by the sample urine both positive and negative controls were subjected to tests for presence of different constituents not normally found in normal urine using test strip with absorbent pads capable of testing different constituents by observation of color change. Presence of unexpected urine constituents indicates infection of the urinal tract and sometimes certain diseases, disorders and nutrition imbalance.

**Introduction**

Urinalysis which is also termed as biochemical analysis of urine is a biochemical test on urine sample purposely meant to assist in diagnosis of a wide range of urinary tract diseases. Examples of such diseases include high urinary glucose levels in people suffering from diabetes, high ketone bodies levels in urine in situations of ketonuria among other urinary disorders. Urine is also subject to immunological analysis and these tests are the ones used to detect pregnancy (Carricajo, 1999).

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Microbiological analysis of urine also termed as urine culture is a microbial test responsible for detection of pathogenic microbes capable of causing urinal tract diseases and disorders (Martinko, 2005). The enumeration of such microbes for our case is by use of cysteine-lactose and electrolyte-deficient agar mostly abbreviated as CLED agar. However other types of agar media that can be used instead of CLED agar include blood agar and MacConkey agar. CLED agar medium is a non selective medium which is able to support growth of many pathogens found in the urinary tract and has the ability to give a clear differentiation of such pathogen's colonies with minimum or no proteus species spread (Kee, 2001).

## **Methodology**

For biochemical analysis of urine, both positive and negative control samples of urine were conducted by strict following of the instructions by the manufacturer. A test strip detecting eight different substances was dipped into the urine sample, then the strip was taken out and the extra urine was removed by wiping the edge of the strip to the inner side of the tube. The color of the pads on the strip was observed for any changes and the pads were read in the direction of the arrow and within the time given in the container. The reading was recorded and the test was repeated for a negative control urine sample (Clarridge, 1998).

For the urine culture test, the cysteine-lactose and electrolyte-deficient agar medium was prepared according to the instructions provided on the label by the manufacturer by first weighing accurately and dissolving in appropriate amount of distilled water. Sterilization of the media was then conducted at 121 degrees Celsius for fifteen minutes in an autoclave (Nunez, 1995). The <https://assignbuster.com/urine-culture-and-urinalysis-experiment/>

sterilized media was the poured on to several sterilized plate for solidification and this was done on a clean and sterile microbiology working bench. After obtaining the urine sample for microbial analysis, the sample was mixed gently to avoid foaming and the end of a sterile 10 micro-liter calibrated loop was dipped in the urine sample to just below the surface and was removed vertically. Then the volume of urine within the calibrated loop was inoculated over the entire surface of CLED agar plate, which was then incubated in ambient air overnight at 37 degree Celsius (Chernecky, 2001).

## **Results**

For the urine culture test, this examined a urine sample cultured on cystine-lactose- electrolyte deficient agar plate for any possible bacterial growth after the incubation period of 24-48hours. Urine culture was positive with two bacterial species growth observed according to the typical colonial morphology and colors on the CLED agar plate. A count of 10 colonies of Gram negative bacteria E. Coli were recorded on the CLED plate as well as 10 colonies of gram positive S. aureus. The number of colony from each bacterial species isolated on the agar plate was then multiplied by the dilution factor of 1. 000. 000 to obtain a density of 10. 000. 000 CFU/L of urine.

For urinalysis, a test that enables us detect abnormal constituents of urine such as glucose, protein, ketones bodies, blood and bile pigment, the positive control urine test results showed abnormalities in its constituents by the presence leukocytes, blood, nitrites, proteins and ketones bodies in the sample compared to the negative control urine which showed normal results in its constituents.

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## **Discussion of the results**

Urine is a by product and it is produced in the kidneys and then into the urinary bladder where it accumulates till enough stretching of the bladder walls is achieved which leads to its release via the urethra. Urinalysis is very important to determine whether the urine is normal or if it is from unhealthy individual since it contains different ranges of waste products which should be present in normal urine and others which are not expected in normal urine thus their presence indicates certain diseases and disorders. Urinalysis gives us a clear indication of the internal biochemical processes of the patient under test. According to this experiment, the presence of leukocytes, blood, nitrites, proteins and ketones bodies in the positive control urine sample indicated the following. Presence of leukocytes indicates shows us that the urinary tract from which the urine was obtained was infected and this is evident due to detection of esterase enzyme which is normally absent in normal urine. This indicates that this sample of urine should be subjected to further tests like culture test, sensitivity and even microscopy (Kouri, T. (2000).

Healthy individuals do not contain ketone bodies in their urine. Therefore presence of ketone bodies in the urine sample tested indicates that the individual was deprived of carbohydrates since ketones and acetones are actually the byproducts of metabolism of the fat. This shows that the individual was either suffering from diabetes mellitus or he individual was lacking carbohydrates since both of them are possible causes of presence of ketones and acetones in the urine. When urine is detected to have blood, it indicates a condition known as hematuria. Sometimes the blood may not be

visible to our naked eyes and this is called microscopic hematuria while sometimes the blood stains are visible to our eyes and this is known as frank hematuria. Many renal conditions exhibit this condition of hematuria. “ These include renal, urethral and ureteric calculi, acute nephritis, malignant papiloma, renal ca, and chronic kidney diseases and sometimes the administration of sulfonamides or anticoagulants may cause hematuria” (Wallach, 2000, p. 26). The salt of nitrous acid is known as nitrate. So when the urine tests positive of nitrates, it indicates firmly that the urinary tract is infected and possibly by bacteriuria which is an indication of pyelonephritis, cystitis and sometimes urethritis disorders. But since the second sample of urine did not show any of these constituents, it indicates that the urine came from a healthy individual. However other dangerous constituents that should not be found in normal urine include urobilinogen, glucose, Bilirubin, urobilinogen among others (Henry, 2005).

In the case of urine culture test, E. coli is a bacteria that is often found in the gut and it is harmless unless it finds its way to wrong venue of the body like the bladder. Therefore presence of these bacteria which is a gram positive bacterium detected by pinkish color on the plates and S. aureus which is a gram negative bacteria indicated by bluish or purple coloration on the plate indicated that the person from which the urine was obtained from might be suffering from urinary tract infections mostly the bladder infections. It might also indicate contamination of the urine sample as the results obtained suggests a probable contamination as two bacterial species were isolated and there was no predominance between the two of them (Aspevall, 2000).

## **Conclusion**

In conclusion, these test results were expected and significant in both urine culture and urinalysis. Urine culture on CLED agar plate was very useful for the growth and enumeration of gram positive and gram negative urinary tract microorganisms while urinalysis was equally essential for providing critical information to assist in diagnosis, monitoring and treatment of wide range of diseases.