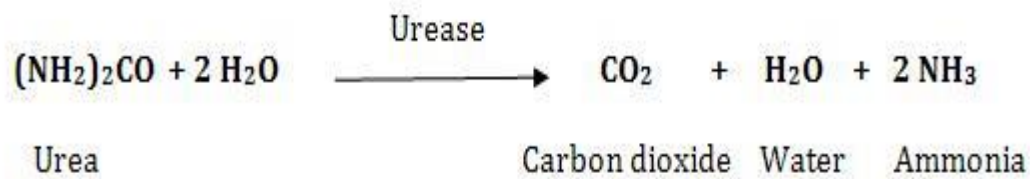


Urease Test

Principle

Urea is a nitrogen containing compound that is produced during decarboxylation of the amino acid arginine in the urea cycle. Urea is highly soluble in water and is therefore an efficient way for the human body to discharge excess nitrogen. This excess urea is then taken out of the body through the kidneys as a component of urine. Some bacteria have the ability to produce an enzyme urease as part of its metabolism to break down urea to ammonia and carbon dioxide.



Urease is a constitutively expressed enzyme that hydrolyzes urea to carbon dioxide and ammonia. Urease test media contain 2% urea and phenol red as a pH indicator. An increase in pH due to the production of ammonia results in a color change from yellow (pH 6.8) to bright pink (pH 8.2). This medium provides all essential nutrients for *Proteus*, for which it is differential. Urea agar has a reduced buffer content and contains peptones and glucose. This medium supports the growth of many enterobacteria allowing for the observation of urease activity.

While many enteric bacteria have the ability to hydrolyze urea as part of their metabolism, members of the genus *Proteus* are considered rapid urease producers due their efficiency in carrying out this process.

Therefore, this experiment is useful in distinguishing members of *Proteus*, a urinary tract pathogen, from other enterics based on their ability to rapidly hydrolyze urea. Many enterics can hydrolyze urea but only a few can degrade it rapidly.

Weakly positive organisms may take several days, and negative organisms produce ***no color change*** or ***yellow*** as a result of ***acid production***.

Purpose

The urease test identifies those organisms that are capable of hydrolyzing urea to produce ammonia and carbon dioxide. It is primarily used to distinguish urease-positive *Proteeae* from other *Enterobacteriaceae*.

Procedure :-

1. Stapping the media of a urea agar with a portion of a well-isolated colony or inoculate slant with 1 to 2 drops from an overnight brain-heart infusion broth culture.
2. Leave the cap on loosely and incubate the tube at 35°-37°C for 24 hours .
3. Examine for the development of a pink color .

Result :-

- 1- A rapidly positive urease test by *Proteus mirabilis* is indicated by a color change to bright pink (fuchsia) throughout the urea agar as compared to the uninoculated control .
- 2- A delayed positive reaction by *Klebsiella pneumoniae* is indicated by a color change the.
- 3- A negative reaction by *Escherichia coli* is indicated by the yellow coloration of the media .

