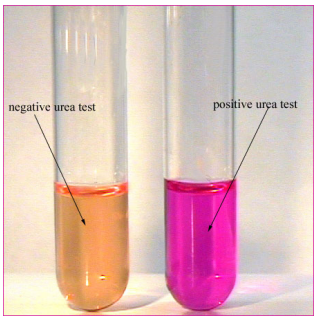
Urease test:

Urea agar (Urea) $\xrightarrow{\text{bacterial urease}}$ NH3 production $\xrightarrow{\text{Increase PH to}}$

Alkaline $\xrightarrow{\textbf{indicator (phenol red)}}$ Red Tube +ve (*Helicobacter pylori*, *Proteus* ,*Klebsiella*)

Yellow tube –ve



……

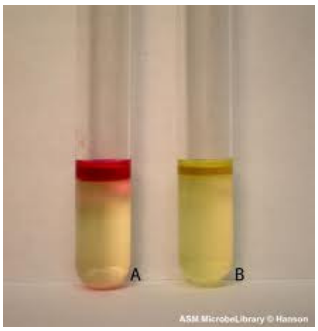
IMVIc

INDOLE:

Peptone water broth (contain a.a. tryptophan) bacteria $\xrightarrow{\textbf{tryptophanse}}$ **Indole molecule** $\xrightarrow{\textbf{Kovac's reagent}}$

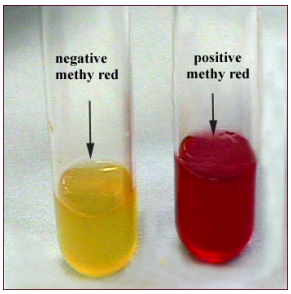
Red ring on the top of broth +ve (E.coli , H.influenza, proteus)

Yellow tube –ve (klebsiella P, salmonella, pseudomonas)



METHYLE RED:

MRVP agar (glucose phosphate agar) - bacteria ferment sugar to acid → decrease PH to ACID → indicator (methyl red) +ve tube Red color (E.coli) -ve tube yellow (Klebsiella)

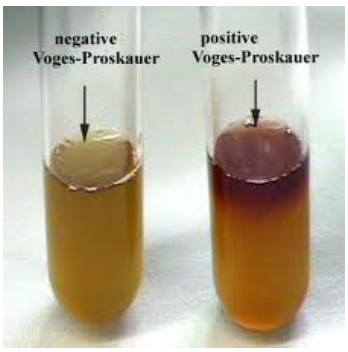


VOGES PROSKAUER:

MRVP agar (glucose phosphate agar) + (alfa Naphthole and KOH) Bacteria → produce acetoin

+ve test tube Cherry Red (klebsiella)

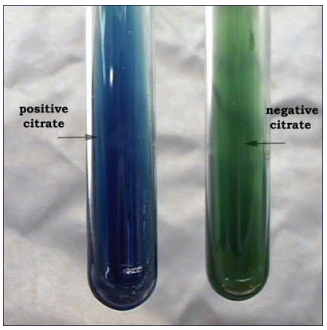
-ve test tube Yellow brown (E.coli)



CITRATE:

Simon Citrate agar – bacteria → use carbon source of citrate → (NH3+NaHCO3) increase PH to Alkaline

(Bromothymol blue) indicator → -ve Control tube Green color (E.coli) +ve tube Blue color (Klebsiella)



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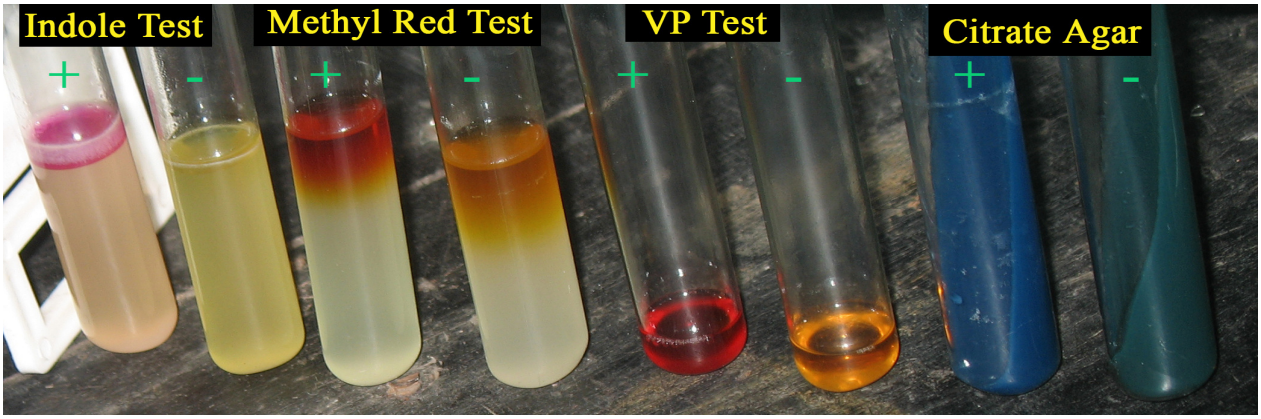


Kliglar Iron agar test

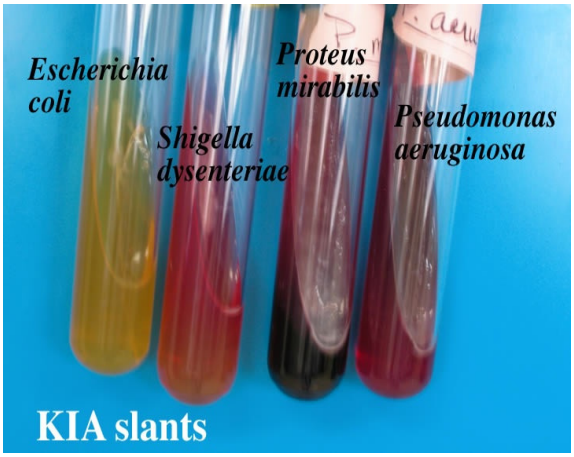
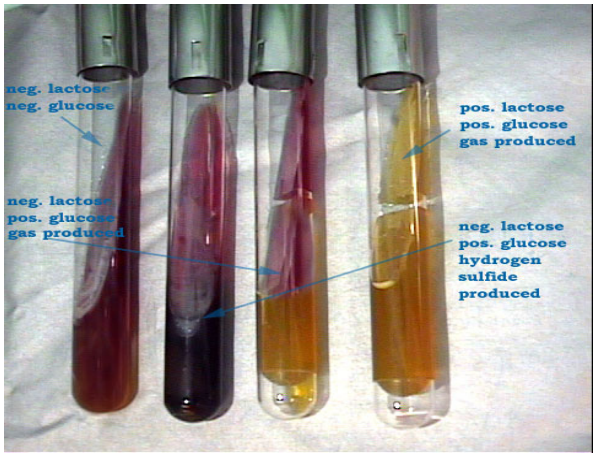
TSI agar (triple sugar: GLS glucose lactose sucrose + Na.thiosulfate + ferrous sulfate+ ferrous ammonium sulfate).

Kliglar agar (2 sugars: Lactose and glucose + other ingredients)

1-Ferment sugar – acid $\xrightarrow{\text{phenol red}}$ Yellow agar +ve Red color -ve

2- Reduce THIOSULFATE to sulfide H2S $\longrightarrow$ black precipitate.

3-Prduce gas = H2 + CO2 .

3- Lactose fermenter A/A

Non Lactose fermenter K/A (glucose fermenter)