

# Mlt1 task 5

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Clinical Microbiology Uses of methyl red test When bacteria utilise glucose through fermentation, they liberate large amount of threetypes of acids that include succinic, lactic, and acetic that lowers the pH of the media (McDevitt, 2009). Testing of microbes that ferments glucose is tested by adding methyl red reagent in the broth, which turns from yellow to red to signify reduced levels of the pH to around 4. 4 (Buchanan & Cibbons, 1974). However, if the broth remains red it indicates negative because the organisms cannot ferment glucose (McDevitt, 2009).

Which organisms ferment glucose

The major groups of glucose fermenting bacteria include *Escherichia coli*, *Streptococci* (e. g. *Streptococci lacti*) and *Lactobacilli* (e. g. *Lactobacillus casei*, *L. pentosus*), which produce lactic acid as the end product of fermentation (Buchanan & Cibbons, 1974). Other glucose fermenting bacteria that produce these acids are *Proteus*, *Shigella*, *Salmonella*, *Escherichia coli*, *Microbacterium* and *Leuconostoc* (Buchanan & Cibbons, 1974).

Organisms producing measurable acid by-product

When using phenol red indicator in the broth media, two bacterias that ferment glucose were the *E. coli* and *Shigella sonnei*, they produced measurable acid by-product because the broth media changed from red to yellow. Therefore, organisms like *Escherichia coli*, ferments glucose through fermentation thereby liberating large amount of three types of acids like succinic, lactic, and acetic, which changes the media from yellow to red (McDevitt, 2009).

Uses of Voges-Proskauer test

The Voges - Proskauer test is appropriate because of the detection capability  
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of acetoin, which is produced by the bacteria that use it as metabolic intermediate by following the butane diol pathway (Buchanan & Gibbons, 1974). This test is used when differentiating *Escherichia coli* from other *Enterobacter* species like *Enterobacter aerogenes* because *E. coli* is positive in Methyl red yet negative Voges-Proskauer while the *Enterobacter aerogenes* is negative in Methyl red test and positive in Voges-Proskauer (McDevitt, 2009).

Organisms using alternative pathways to metabolise glucose

Availability of main source of food determines the enzymes and the pathway of glucose metabolism because different nutrients require specific enzymes hence determining the pathway (Dannessa, 2014). However, alternative pathways are used when organism require a specific amount of ATP, since different pathway produce a certain amount of ATP after oxidation of glucose (Dannessa, 2014).

#### References

- Buchanan RE, Gibbons NE (eds). (1974). *Bergeys Manual of Determinative Bacteriology*. 8th Ed. Williams & Wilkins, Baltimore
- Dannessa, M. (2014). *Introduction to Diagnostic Microbiology for the Laboratory Sciences*, New York: Jones & Bartlett Publishers
- McDevitt, S. (2009). Methyl red and Voges-Proskauer test protocol. Retrieved from [http://www. microbelibrary. org/component/resource/laboratory-test/3204-methyl-red-and-voges-proskauer-test-protocols](http://www.microbelibrary.org/component/resource/laboratory-test/3204-methyl-red-and-voges-proskauer-test-protocols)