

Carbohydrates Differentiation Discs

Carbohydrates Differentiation Discs are used to differentiate bacteria on the basis of carbohydrate fermentation abilities.

Following Carbohydrates are available as Differentiation Discs.

Cat. #	Carbohydrate	Code on Discs	Cat. #	Carbohydrate	Code on Discs
55876	Adonitol	(Ad)	94438	Mannitol	(Mn)
80372	Arabinose	(Ar)	94445	Mannose	(Mo)
56481	Cellobiose	(Ge)	93196	Melibiose	(Mb)
63367	Dextrose	(De)	94226	Raffinose	(Rf)
73044	Dulcitol	(Du)	93999	Rhamnose	(Rh)
53901	Fructose	(Fc)	92971	Salicin	(Sa)
89608	Galactose	(Ga)	93998	Sorbitol	(Sb)
89614	Inositol	(Is)	94309	Sucrose	(Su)
90058	Inulin	(In)	92961	Trehalose	(Te)
28816	Lactose	(La)	07411	Xylose	(Xy)
77653	Maltose	(Ma)			

Store protected from direct light, in a dry place, in tightly-sealed vials at the recommended temperature (see on label).

Composition:

(1 vial contains 25 discs)

Sterile filter paper discs impregnated with carbohydrates.

Directions:

A Sugar free medium base is prepared as desired, dispensed and sterilized. Following media are recommended for this test:

Liquid Media

Andrade Peptone Water (Cat. No. A0715, Cat. No. 28943)

Andrade Peptone Water with Meat Extract

Phenol Red Broth Base (Cat. No. P8976)

Phenol Red Broth with Meat Extract

Purple Broth

Yeast Fermentation Broth

Semisolid Media

Cystine Tryptone Agar

OF Basal Medium (Cat. No. 75315)

Tryptone Agar

Solid Media

Phenol Red Agar

Purple Agar Base

Sanders Agar



Any Medium-Liquid or Semisolid or Solid can be used as per choice. Liquid and Semisolid media are dispensed in 5 ml amounts in test tubes for testing fermentation and sterilized. A single Carbohydrate disc is added to each tube aseptically and inoculated with test organisms in semisolid medium the disc is pushed in the medium along with the inoculum just below the surface of the medium. So that the medium at the bottom can serve as control while fermentation can be detected at the surface level. Using Solid media, it is possible to detect fermentation of number of sugars on same plate. Sterile plates containing the agar medium of choice are surface seeded with test organism(s) and required Carbohydrate discs are placed and pressed gently on the surface of the plate at sufficient distance (2 cm) from each other. Incubation is carried out at $36 \pm 1.0^{\circ}\text{C}$ for 18 - 48 hours and results are recorded at 18-24 hours and again at 48 hours. The results should be frequently observed since reversal of fermentation can take place. In case of Liquid medium gas produced during fermentation is collected in the inverted Durham's tube while acid produced changes colour of the medium. In Semisolid media gas produced is trapped and seen as bubbles. On agar plates fermentation is visualised by change in colour around the disc.

Principle and Interpretation:

Microorganisms can only ferment certain carbohydrates. Depending on the enzymes they possess they are able to cleave different carbohydrates. This can be detected by gas production (CO_2) in liquid media and/or color change of pH indicator because of the acid production.

*Cultural characteristics when incubated in Phenol Red Broth Base♦ after 18-24 hours at $35-37^{\circ}\text{C}$.

Organisms (ATCC)	Growth	Adonitol		Arabinose		Cellobiose		Dextrose		Dulcitol		Fructose		Galactose	
		Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas
<i>Citrobacter freundii</i> (8090)	luxuriant	-	-	+	+	+	-	+	+	-	-			+	+
<i>Enterobacter aerogenes</i> (13048)	luxuriant	+	+	+	+	+	+	+	+	-	-	+	+	+	+
<i>Escherichia coli</i> (25922)	luxuriant	-	-	+	+	-	-	+	+	-	-	+	+	+	+
<i>Klebsiella pneumoniae</i> (13883)	luxuriant	+	+	+	+	+	+	+	+	-	-	+	+	+	+
<i>N. meningitis</i> (13090)	luxuriant							+	-			-	-	-	-
<i>Proteus vulgaris</i> (13315)	luxuriant	-	-	-	-	-	-	+	+	-	-	-	-	+	+
<i>Salmonella typhimurium</i> (14028)	luxuriant	-	-	+	+	-	-	+	+	+	+	+	+	+	+
<i>Salmonella typhi</i> (6539)	luxuriant	-	-	-	-	-	-	+	-	-	-	-	-	+	-
<i>Serratia marcescens</i> (8100)	luxuriant	-	-	-	-	-	-	+	+	-	-	+	-	+	-
<i>Shigella flexneri</i> (12022)	luxuriant	-	-	-	-	-	-	+	-	-	-	+	+	+	-
<i>Strep. pneumoniae</i> (6303)	luxuriant	-	-	+	-	-	-	+	-	-	-	+	+	+	-
<i>Strep. pyogenes</i> (19615)	luxuriant							+	-						

Organisms (ATCC)	Growth	Inositol		Inulin		Lactose		Maltose		Mannitol		Mannose		Melibiose	
		Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas
<i>Citrobacter freundii</i> (8090)	luxuriant	-	-			+	+	+	+	+	+	+	+	-	-
<i>Enterobacter aerogenes</i> (13048)	luxuriant	+	+			+	+	+	+	+	+	+	+	+	+
<i>Escherichia coli</i> (25922)	luxuriant	-	-			+	+	+	+	+	+	+	+	+	+
<i>Klebsiella pneumoniae</i> (13883)	luxuriant	+	+			+	+	+	+	+	+	+	+	+	+
<i>N. meningitis</i> (13090)	luxuriant							+	-						
<i>Proteus vulgaris</i> (13315)	luxuriant	-	-			-	-	+	+	-	-	-	-	-	-
<i>Salmonella typhimurium</i> (14028)	luxuriant	+	+			-	-	+	+	+	+	-	-	+	+
<i>Salmonella typhi</i> (6539)	luxuriant	-	-			-	-	+	-	+	-	+	+	+	+
<i>Serratia marcescens</i> (8100)	luxuriant	+	-			-	-	+	-	+	-	+	+	-	-
<i>Shigella flexneri</i> (12022)	luxuriant	-	-			-	-	+	-	+	-	+	+	-	-
<i>Strep. pneumoniae</i> (6303)	luxuriant			+	-	+	-	+	-						
<i>Strep. pyogenes</i> (19615)	luxuriant			-	-			+	-						

Organisms (ATCC)	Growth	Raffinose		Rhamnose		Salicin		Sorbitol		Sucrose		Trehalose		Xylose	
		Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas	Acid	Gas
<i>Citrobacter freundii</i> (8090)	luxuriant	-	-	+	+	-	-	+	+	+	+	+	+	+	+
<i>Enterobacter aerogenes</i> (13048)	luxuriant	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Escherichia coli</i> (25922)	luxuriant	-	-	+	+	-	-	+	+	-	-	+	+	+	+
<i>Klebsiella pneumoniae</i> (13883)	luxuriant	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>N. meningitis</i> (13090)	luxuriant				+					-	-				
<i>Proteus vulgaris</i> (13315)	luxuriant	-	-	-	-	+	+	-	-	+	+	+	+	+	[+]
<i>Salmonella typhimurium</i> (14028)	luxuriant	-	-	+	+	-	-	+	+	-	-	+	+	+	+
<i>Salmonella typhi</i> (6539)	luxuriant	-	-	-	-	-	-	+	-	-	-	+	-	+	-
<i>Serratia marcescens</i> (8100)	luxuriant	-	-	-	-	+	[+]	+	-	+	+	+	[+]	-	-
<i>Shigella flexneri</i> (12022)	luxuriant	-	-	-	-	-	-	+	-	-	-	+	-	-	-
<i>Strep. pneumoniae</i> (6303)	luxuriant									+	-				
<i>Strep. pyogenes</i> (19615)	luxuriant					+	-			+	-				

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Key:

- (§) = longer if necessary
- + = positive reaction, yellow colour
- = negative reaction, no colour change or red
- [+] = weak / slight
- * for more details see references
- ◆ When Basal medium is inoculated with test organisms, it gives negative reaction, i.e. no change of colour

References:

1. Bergey's Manual of Systematic Bacteriology, 1984, Vol. 1, Williams and Wilkins, Baltimore.
2. Bergey's Manual of Systematic Bacteriology, 1994, 9th ed., Williams and Wilkins, Baltimore.

Precautions and Disclaimer

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