SIGMA-ALDRICH®
sigma-aldrich.com
3050 Spruce Street, St. Louis, MO 63103 USA
Tel: (800) 521-8956 (314) 771-5765 Fax: (800) 325-5052 (314) 771-5757
email: techservice@sial.com sigma-aldrich.com

Product Information

60787 Kligler Agar (Kligler Iron Agar)

Useful differential medium proposed by Kligler for the identification of gram-negative intestinal microorganisms (Enterobacteriaceae).

Composition:

Ingredients	Grams/Litre
Meat extract	3.0
Yeast extract	3.0
Meat peptone	10.0
Casein peptone	10.0
Lactose	10.0
Glucose	1.0
Sodium chloride	5.0
Ferrous sulfate	0.2
Sodium thiosulfate	0.5
Phenol red	0.025
Agar	12.0

Final pH 7.4 +/- 0.2 at 25°C

Store prepared media below 8°C, protected from direct light. Store dehydrated powder, in a dry place, in tightly-sealed containers at 2-25°C.

Appearance:	Faintly brown colored, homogeneous, free flowing powder.
Gelling:	Firm
Color and Clarity:	Red colored, clear to slightly opalescent gel forms in petri plates.

Directions:
Dissolve 54.7 g in 1 litre distilled water and fill into test-tubes. Sterilize by autoclaving at 121°C for 15 minutes. Let cool as agar slants.

Inoculation:
Pick off colonies from enteric plating media such as Bismuth Sulphite Agar, Desoxycholate Citrate Agar, Mac Conkey Agar, etc. Then stab into the medium in the butt of the tube, and then streak back and forth along the surface of the slant.

Principle and Interpretation:
Meat -, yeast extract and peptone from meat and casein provide nitrogenous compounds, vitamins and other essential growth nutrients. Lactose and glucose are the fermentable sugars and phenol red is the indicator which makes the acid production visible by change the color to yellow. Lactose nonfermenters like *Salmonella* and *Shigella* initially produce a yellow slant due to acid produced by the fermentation of the small amount of dextrose. When the dextrose in the media is used up the suface of the media change to red due to the oxidation of the acids in the aerobic environment of the slant. In the anaerobic environment, in the butt, the acid can not be oxidized and the medium remains yellow. Lactose fermenters produce yellow slants and butts because the concentration of lactose is high and enough acid is produced to keep a low pH under aerobic conditions. Organisms incapable of fermenting either carbohydrate produce red slants and butts. The hydrogen sulphide production from the reduction of sodium thiosulfate is detected with ferric sulfate as an indicator (black colouration, FeS). Sodium chloride maintains the osmotic balance.

This agar can be modified by adding 0.2 % urea to give iron-urea agar [4].

Cultural characteristics after 18-24 hours at 35°C.

Organisms (ATCC)	Growth	Butt	Slant	Gas*	H_2S
Escherichia coli (25922)	+++	yellow	yellow	+	-
Citrobacter freundii (8090)	+++	yellow and black	yellow	+	+
Enterobacter cloacae (13047)	+++	yellow	yellow	+	-
Shigella flexneri (12022)	+++	yellow	red	-	-
Salmonella typhimurium (14028)	+++	yellow and black	red	+	+
Salmonella enteritidis (13076)	+++	yellow and black	red	+	+
Proteus mirabilis (14153)	+++	yellow	red	-	-
Proteus vulgaris (13315)	+++	yellow and black	red	-	+
Yersinia enterocolitica (9610)	+++	yellow	red	variable	-
Morganella morganii (23585)	+++	yellow	red	variable	-

*Gas production (aerogenic reaction) is detected as individual bubbles or by splitting or displacement of the agar.

References:

1. Russell, J. Med. Res., 25, 217 (1911)
2. I.J. Kligler, A simple medium for the differentiation of members of typhoid-paratyphoid group, Am. J. Publ. Health, 7, 1042-1044 (1917)
3. I.J. Kligler, Modification of culture media used in the isolation and differentiation of typhoid, dysentery and allied bacilli, J. Exper. Med., 28, 318-322 (1918)
4. R.E. Bader, G. Hotz, Eisen-Harnstoff-Agar, eine Modifikation des Eisen-Agars nach Kliger, Z. Hyg. Infekt.-Kr., 133, 20-25 (1951)
5. S.F. Bailey, G.R. Lacey, J. Bact., 13, 182-189 (1927)
6. Ewing, Edwards and Ewing's identification of the *Enterobacteriaceae*, 4th ed. Elsevier Science Publishing Co., Inc. New York, N.Y. (1986)

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.