

## 80961 Plate Count MUG Agar (Casein-peptone Dextrose Yeast MUG Agar)

For the determination of bacterial counts in milk, dairy products, water and other material. *E. coli* can be identified by fluorescence in the UV and verified by means of a positive indole test.

### Composition:

Ingredients	Grams/Litre
Casein peptone	5.0
Yeast extract	2.5
D(+)-Glucose	1.0
Tryptophan	1.0
4-Methylumbelliferyl- $\beta$ -D-glucuronide	0.07
Agar	14.0

Final pH 7.0 +/- 0.2 at 37 °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.

### Directions :

Dissolve 23.6 g in 1 litre distilled water. Autoclave at 121 °C for 15 minutes. APHA recommends the pour plate technique. The samples are diluted and appropriate dilutions are placed in petri plates. Sterile molten agar is added to these plates and plates are rotated gently to ensure uniform mixing of the sample with agar.

Check the plates under UV light at about 360-370 nm. Light blue fluorescence indicates the presence of *E. coli*. If there is no fluorescence after 24 hours of incubation, continue incubation for another 24 hours and check again for fluorescence. In addition the indole test can be made with Kovac's reagent (Fluka 60983). Cover a colony with 10-20  $\mu$ l Kovac's reagent. A change of color to red after 2-10 seconds shows indole formation.

### Principle and Interpretation:

Casein peptone provides amino acids and other complex nitrogenous substances and yeast extract supplies vitamin B complexes. D(+)-Glucose is the carbohydrate source. The addition of tryptophan improves the indole reaction.

$\beta$ -D-glucuronidase, which is produced by *E. coli*, cleaves 4-methylumbelliferyl- $\beta$ -D-glucuronide to 4-methylumbelliferone and glucuronide. The fluorogen 4-methylumbelliferone can be detected under a long wavelength UV lamp. In addition the indole test can be made with Kovac's reagent (Fluka 60983). Plate Count MUG Agar is also suitable for determining bacterial count from sterile rooms.

Cultural characteristics after 24 hours at 35 °C.

Organisms (ATCC)	Growth	Fluorescence
<i>Escherichia coli</i> (25922)	+++	+
<i>Bacillus subtilis</i> (16633)	+++	-
<i>Lactococcus lactis ssp. lactis</i> (19435)	+++	-
<i>Listeria monocytogenes</i> (19118)	+++	-
<i>Staphylococcus aureus</i> (25923)	+++	-
<i>Streptococcus agalactiae</i> (13813)	+++	-
<i>Lactobacillus acidophilus</i> (4356)	+++	-

### References:

- American Public Health Association, Standard Methods for the Examination of Dairy Products, 14th ed., APHA Inc., Washington, D.C. (1978)
- E.W. Frampton, et al., Comparison of  $\beta$ -glucuronidase and indole-based direct plating methods for enumeration of unstressed *E. coli*, J. Food Protect. 53, 933 (1990)