

Optimizing Culture Growth



Introduction

Determine which media to use for which culture with help from Flinn Scientific. Use the following information to choose the appropriate media for bacteria, fungus, protozoa and chromista cultures.

Concepts

- Nutrient media
- Bacterial cultures
- Fungal cultures
- Protozoa cultures
- Chromista cultures

Background

Determining the type of media required for the multitude of bacteria, fungus, protozoa and chromista cultures can be cumbersome. Several different media types are available, and these can come prepared, dehydrated or are easily created following a simple recipe. The information below is a condensed explanation of available media and a list of the organisms that utilize each media.

Prepared Media

Prepared agar media is formulated under controlled conditions and inspected for sterility. Bottle, tube and plate media are available. Tubes are prepared as slants in standard 16 × 125 mm screw-cap culture tubes. The types of bottle media include 100 mL of media, which is enough to pour 6–7 standard 15 × 100 mm Petri dishes or 15–16 culture tubes. Plates are 15 × 100 mm polystyrene and are sealed to prevent contamination and dehydration. Media should be ordered as close as possible to the use date, refrigerated upon arrival and used within one month for optimal results.

There are also several media options for photosynthetic and non-photosynthetic protozoa and chromista cultures. Photosynthetic cultures receive nutrient-rich media that is suitable for most algae types. Non-photosynthetic cultures receive a balanced liquid medium with appropriate supplements for long-term health of protozoans.

Catalog No.	Description	Package	Media Type
FB1138	Blood Agar (TSA with 5% Sheep Blood)	10 plates	Agar –based media for bacterial and fungal cultures.
E0057	EMB Agar	3 bottles	
N0064	Nutrient Agar	6 tubes	
N0077		3 bottles	
FB0526		10 plates	
P0263	Potato Dextrose Agar	3 bottles	
S0424	Sabouraud Dextrose Agar	3 bottles	
T0076	Tryptic Soy Agar	6 tubes	
T0085		3 bottles	
FB0528		10 plates	
FB1820	Bristol's Algae Media Concentrate	100 mL	Nutrient-rich, supplemented media for protozoa and chromista cultures.
K0003	Knop's Solution	500 mL	
FB0595	Amoeba medium	1000 mL	
FB0514	Paramecium medium	946 mL	

Dehydrated Media

Dehydrated media provide nutritional requirements, such as oxygen, nitrogen, carbon, water, inorganic salts, trace elements and other growth factors, while allowing an extended media shelf-life. It does require preparation prior to use. Each type of dehydrated media has slightly different instructions, which can be found on the label. Here is an example of how to

prepare potato dextrose agar, a wide-spectrum agar for many fungal cultures:

“Suspend 39 grams in 1000 mL of distilled or deionized water. Heat with frequent agitation and boil for one minute. Sterilize for 15 minutes at 15 lbs of pressure at 121 °C.”

Some helpful hints when preparing dehydrated media include:

- The preparation container should have a capacity 50 to 100 percent larger than the final volume of media being prepared.
- Agar-based media should be heated slowly to the boiling point to dissolve the agar. Stir or swirl frequently and avoid prolonged boiling.
- Large volumes of medium in a single container require extended sterilization periods that may cause deterioration. Uneven heating in a large container could result in incomplete sterilization. Volumes to be sterilized should not exceed one liter in a single container.
- Do not attempt to sterilize tightly closed containers. Containers should be loosely capped or mouths covered with aluminum foil. Air and steam must be allowed to pass freely into and out of the container.
- Liquid media should be slowly exhausted at the end of the sterilization cycle to avoid boiling over. Pressure-cooker type sterilizers should be removed from heat and not opened until pressure indicators read zero (ambient).
- One liter of medium is sufficient to pour 50–60 standard (15 × 100 mm) Petri dishes or 130–140 standard (16 × 150 mm) culture tubes.

Catalog No.	Description	Package Size (grams)	Concentration (grams/Liter)
B0191	Blood Agar Base, Infusion Powder (contains no blood)	100	40
C0408	Corn Meal Agar	50	17
FB2012	Corn Meal Glucose Agar	40	40
D0049	Dextrose Agar	100	43
E0021	EMB Agar	100	36
M0209	MacConkey Agar	100	50
M0203	Mueller Hinton Agar	100	38
N0092	Nutrient Agar	23	23
N0019		100	
N0020		500	
N0021	Nutrient Broth	100	8
N0022		500	
P0098	Potato Dextrose Agar	100	36
P0099		500	
S0337	Sabouraud Dextrose Agar	100	65
S0444	Sabouraud Dextrose Broth	100	30
T0093	Thioglycollate Medium	100	29.8

Specialty Agar

Finally, specialty agar recipes, such as Lysogeny Broth (LB) for culturing *E. coli* or photobacterium agar for culturing *V. fischeri* are readily available from Flinn Scientific. The Safety Reference section of the *Flinn Scientific Catalog/Reference Manual* contains several recipes for biological solutions including media preparation. On the website, www.flinnsci.com, type in the key words, media preparation, in the search bar to find several recipes and videos under Resources.

Media and Culture

Medium	Culture	Catalog No.
Nutrient Agar	<i>Bacillus cereus</i>	LM1000
	<i>Bacillus mycoides</i>	LM1001
	<i>Bacillus megaterium</i>	LM1002
	<i>Bacillus subtilis</i>	LM1003
	<i>Enterobacter aerogenes</i>	LM1005
	<i>Escherichia coli</i>	LM1006, LM1148, LM1149
	<i>Micrococcus luteus</i>	LM1007
	<i>Micrococcus roseus</i>	LM1008
	<i>Pseudomonas fluorescens</i>	LM1009
	<i>Sarcina aurantiaca</i>	LM1011
	<i>Sarcina subflava</i>	LM1012
	<i>Serratia marcescens</i>	LM1013
	<i>Staphylococcus epidermidis</i>	LM1256
Nutrient Broth	<i>Spirillum voltans</i>	LM1255
Tryptic Soy Agar	<i>Neisseria subflava</i>	LM1258
	<i>Rhodospirillum rubrum</i>	LM1010
	<i>Staphylococcus epidermidis</i>	LM1256
	<i>Streptococcus lactis</i>	LM1015
	<i>Streptococcus salivarius</i>	LM1257
Blood Agar	<i>Streptococcus salivarius</i>	LM1257
Photobacterium Agar	<i>Vibrio fischeri</i>	LM1016
Potato Dextrose Agar	<i>Aspergillus niger</i>	LM1019
	<i>Penicillium chrysogenum</i>	LM1020
	<i>Rhizopus stolonifer (nigricans)</i>	LM1021, LM1022
	<i>Saccharomyces cerevisiae</i>	LM1023
	<i>Saccharomyces cerevisiae var. ellipsoides</i>	LM1024
Corn Meal Glucose Agar	<i>Sodaria fimicola</i>	LM1150, LM1219, LM1259
Oatmeal Agar	<i>Physarum polycephalum</i>	LM1025, LM1026, LM1027

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Medium	Culture	Catalog No.
Bristol's Modified Medium	<i>Chlamydomonas</i>	LM1041, LM1042
	<i>Chlorella</i>	LM1043, LM1044
	<i>Eudorina</i>	LM1153, LM1154
	<i>Gonium</i>	LM1155, LM1156
	<i>Hydrodictyon</i>	LM1047, LM1048
	<i>Oedogonium</i>	LM1049, LM1050
	<i>Pandorina</i>	LM1151, LM1152
	<i>Ulothrix</i>	LM1053, LM1054
	<i>Euglena</i>	LM1039, LM1040
	<i>Gloeocapsa</i>	LM1029, LM1030
	<i>Oscillatoria</i>	LM1031, LM1032
	<i>Anabaena</i>	LM1033, LM1034
	<i>Nostoc</i>	LM1035, LM1036
	<i>Peridinium</i>	LM1251
Pringsheim's Soil Water	<i>Chlamydomonas</i>	LM1041, LM1042
	<i>Chlorella</i>	LM1043, LM1044
	<i>Desmids</i>	LM1045, LM1046
	<i>Eudorina</i>	LM1153, LM1154
	<i>Gonium</i>	LM1155, LM1156
	<i>Pandorina</i>	LM1151, LM1152
	<i>Spirogyra</i>	LM1051, LM1052
	<i>Ulothrix</i>	LM1053, LM1054
	<i>Zygnema</i>	LM1157, LM1158
	<i>Batrachospermum</i>	LM1252
	Diatoms	LM1037, LM1038
	<i>Synura</i>	LM1253
	<i>Gloeocapsa</i>	LM1029, LM1030
	<i>Oscillatoria</i>	LM1031, LM1032
	<i>Anabaena</i>	LM1033, LM1034
	<i>Nostoc</i>	LM1035, LM1036
	<i>Peridinium</i>	LM1251
Infused Media (Timothy Hay)	<i>Volvox</i>	LM1055, LM1056
	<i>Chilomonas</i>	LM1254
	<i>all types of protozoa</i>	

Medium	Culture	Catalog No.
Infused Media (Wheat Seed)	<i>Blepharisma</i>	LM1072, LM1073
	<i>Paramecium aurelia</i>	LM1159, LM1160
	<i>Paramecium bursaria</i>	LM1161, LM1162
	<i>Paramecium caudatum</i>	LM1076, LM1077, LM1175
	<i>Paramecium multimicronucleatum</i>	LM1078, LM1079
	<i>Spirostomum</i>	LM1080, LM1081
	<i>Stentor</i>	LM1082, LM1083
	<i>Vorticella</i>	LM1084, LM1085
	<i>Chilomonas</i>	LM1254
Knop's Solution	Diatoms	LM1037, LM1038
	<i>Synura</i>	LM1253
Lysogeny Broth	<i>Escherichia coli</i> (transformation activities)	LM1006, LM1148, LM1149
Chalkley's Medium	<i>Amoeba proteus</i>	LM1062, LM1063, LM1174
	<i>Chaos carolinensis</i>	LM1064, LM1065
	<i>Paramecium aurelia</i>	LM1159, LM1160
	<i>Paramecium bursaria</i>	LM1161, LM1162
	<i>Paramecium caudatum</i>	LM1076, LM1077, LM1175
	<i>Paramecium multimicronucleatum</i>	LM1078, LM1079
	<i>Vorticella</i>	LM1084, LM1085

Safety Precautions

Wear chemical goggles, gloves and a chemical-resistant apron whenever working with chemicals, heat or glassware. Wash hands thoroughly with soap and water before leaving the laboratory. Follow all laboratory safety guidelines. Please review current Safety Data Sheets for additional safety, handling and disposal information.

Materials for *Optimizing Culture Growth* are available from Flinn Scientific, Inc.

Catalog No.	Description
AP1051	Inoculating Loop, Nichrome Wire
AP1052	Inoculating Loop, Platinum
FB1168	Inoculating Loop and Needle, Blue, 10uL capacity
FB1169	Inoculating Loop and Needle, Clear, 1 uL capacity
AP7382	Autoclave, Tuttau® 9"
MS1125	Flinn Advanced Compound Binocular Microscope
MS1122	Flinn Economy Compound Microscope

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.