Microbial quality control in food according to EN ISO 11133

Culture media and certified reference materials

As a worldwide leading provider of industrial microbiology solutions, we address the needs of customers in industries where consumer safety is a major concern. Food manufacturing is particularly sensitive due to the potentially grave consequences that product contamination may have on the health of consumers. To minimize the risk, increasingly stringent standards are being set around the globe to regulate the production of food.

With the food industry frequently facing new or changed guidelines, staying up-to-date with regulatory requirements is challenging. The EN ISO 11133:2014 standard entitled “Microbiology of food, animal feed and water — Preparation, production, storage and performance testing of culture media” describes the general methodology and specifications for the preparation and performance testing of culture media for laboratory testing, while newer ISO standards for specific microorganisms published after 2014 may contain updated culture media formulations and/or quality control (QC) procedures.

For tests according to ISO 11133:2014, culture media and reference materials must fulfil specific quality requirements. Our range of regulatory compliant culture media makes it easier for you to stay compliant and remain one step ahead in microbial testing.

This flyer lists our most commonly used culture media for compliance with ISO 11133 (in GranuCult® prime, NutriSelect® prime or Chromocult® format) and the corresponding QC strains, available as convenient ready-to-use Vitroids™ and LENTICULE® discs.

Millipore®
Preparation, Separation, Filtration & Monitoring Products

Supelco®
Analytical Products

Dehydrated culture media

Our broad range of high-quality dehydrated culture media products for the food industry ensures you will find the right medium for your needs and achieve accurate testing results. We have recently restructured our portfolio, as a consequence of which our dehydrated culture media fall under two main trademarks and three QC levels. This makes it easier for you to find the right medium with the required regulatory compliance.

The NutriSelect® brand covers our broad range of powdered culture media, while the GranuCult® brand represents our superior granulated culture media. The three QC levels **basic, plus and prime** as new brand extensions clearly indicate the degree to which these culture media are compliant. The prime level covers the full compliance spectrum according to F&B and pharma standards and includes QC release under ISO 17025 accreditation for culture media described in F&B standards.

Certified Reference Materials

Authenticated reference materials are necessary for effective QC in the laboratory, and this includes biological resources such as microbial QC strains. Ready-to-use microbiological controls minimize the need for maintaining control strains in the test laboratory and guarantee that an authenticated control culture is used for every test. Such control materials must be fit-for-purpose, bearing in mind that for food samples, the ability to accurately and reliably enumerate microorganisms—often at relatively low numbers—is essential. It is also important that controls can be applied to the wide range of different matrices that are often tested in a single laboratory.

A unique preservation technology involving the controlled drying of authenticated cultures of internationally accepted control strains has resulted in the production of single-use discs containing microorganisms that are suitable for quality testing of culture media according to ISO 11133. These quality control materials, the LENTICULE® and Vitroids™ discs, are manufactured in our ISO/IEC 17025 and ISO 17034 accredited lab in Buchs, Switzerland. The discs contain pure cultures of bacteria, yeasts or molds in a solid water-soluble matrix. Comprehensive certificates of analysis provide details about the mean number of colony forming units (CFU) per disc, the method used to determine the product data, and the number of subcultures from the original strains provided under license by NCTC® and CECT®. The products are designed with a range of CFU concentrations to ensure either no or only minimal dilution steps are required, thereby saving time and reducing the likelihood of cross-contamination.

Culture media and control stain product information

The following table lists most of the culture media mentioned in ISO 11133 in alphabetical order. The first column describes the culture media product, the second its catalogue number. In the following columns, the control strains that are mandatory according to 11133 and the suggested microbiological CRMs are shown. The table also helps to find the products with the best suited CFU range for the corresponding test.

Note that the table contains neither all our media and strains available nor all the media and strains mentioned in ISO 11133. It lists a selection of the most commonly used media and the recommended strains. Our full portfolio can be found on our website **SigmaAldrich.com/culture-media**

SigmaAldrich.com/mibi-crm

Culture media	Cat. No.	Control strain acc. ISO	Test method*	WDCM	Suggested CRM	CFU range
BAIRD-PARKER agar (base) acc. ISO 6888 and FDA-BAM, GranuCult® prime	**105406**	*Staphylococcus aureus*	prod. quant.	00034	VT000343	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Staphylococcus saprophyticus	spec. qual.	00159	VT001596	1,000-10,000
BHI (Brain Heart Infusion) broth acc. ISO 6888, GranuCult® prime	**110493**	*Staphylococcus aureus*	prod. qual.	00034	VT000342	15-80
Bismuth sulfite (BS) agar acc. to WILSON and BLAIR acc. ISO 6579 and FDA-BAM, NutriSelect® prime	**100191**	*Salmonella* Enteritidis / Typhimurium	prod. quant.	00031	VT000313	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
BRILA (Brilliant-green bile Lactose) broth acc. ISO 4831, ISO 4832 and FDA-BAM, GranuCult® prime	**105454**	*Escherichia coli*	prod. qual.	00012	VT000122	15-80
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
Buffered Peptone Water acc. ISO 6579, 19250, ISO 21528, ISO 22964, ISO 6887, FDA-BAM and EP, GranuCult® prime	**107228**	*Salmonella* Enteritidis / Typhimurium	prod. qual.	00031	VT000312	15-80
		Escherichia coli	prod. qual.	00012	VT000122	15-80
		Staphylococcus aureus	prod. quant.	00034	VT000342	15-80
		Listeria monocytogenes 4b	prod. quant.	00021	VT000212	15-80

Culture media	Cat. No.	Control strain acc. ISO	Test method*	WDCM	Suggested CRM	CFU range
Coliform agar acc.to ISO 9308-1, Chromocult®	**110426**	*Escherichia coli*	prod. quant.	00012	VT000123	80-130
		Enterobacter aerogenes	prod. quant.	00175	VT001753	80-130
		Citrobacter feundii	prod. quant.	00006	VT000063	80-130
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
		Pseudomonas aeruginosa	spec. qual.	00025	VT000256	1,000-10,000
FRASER broth (base) acc. ISO 11290, GranuCult® prime	**110398**	*Listeria monocytogenes*	prod. qual.	00021	VT000212	15-80
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
GIOLITTI-CANTONI broth (base) acc. ISO 6888, GranuCult® prime	**110675**	*Staphylococcus aureus*	prod. qual.	00034	VT000342	15-80
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
Glucose OF (Oxidative/ Fermentative) medium (base) acc. ISO 21528 and FDA-BAM, GranuCult® prime	**103865**	*Escherichia coli*	prod. quant.	00012	VT000123	80 - 130
		Pseudomonas aeruginosa	spec. qual.	00025	VT000256	1,000-10,000
Half FRASER (Demi FRASER) broth (base) with antibiotics acc. ISO 11290, GranuCult® prime	**100025**	*Listeria monocytogenes*	prod. qual.	00021	VT000212	15-80
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
Lauryl Sulfate broth acc. ISO 4831, ISO 7251 and FDA-BAM, GranuCult® prime	**110266**	*Escherichia coli*	prod. qual.	00012	VT000122	15-80
		Citrobacter freundii	prod. qual.	00006	VT000062	15-80
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
Listeria agar (base) acc. OTTAVIANI and AGOSTI acc. ISO 11290, Chromocult®	**100427**	*Listeria monocytogenes*	prod. quant.	00021	VT000213	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
MKTTn (MULLER-KAUFFMANN Tetrathionate Novobiocin) broth (base) acc. ISO 6579, GranuCult® prime	**105878**	*Salmonella* Enteritidis	prod. qual.	00030	VT000302	15-80
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Pseudomonas aeruginosa	sel. qual.	00025	VT000257	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
MMGA (Mineral Modified Glutamate) agar acc. ISO 16649, GranuCult® prime	**109045**	*Escherichia coli*	prod. quant.	00012	VT000123	80-130
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
		Citrobacter freundii	spec. qual.	00006	VT000066	1,000-10,000
		Pseudomonas aeruginosa	spec. qual.	00025	VT000256	1,000-10,000
		Escherichia coli	prod. qual.	00202	CRM13216L	30-120
MSRV (Modified Semi-solid RAPPAPORT-VASSILIADIS) medium (Base) acc. ISO 6579, NutriSelect® prime	**109878**	*Salmonella* Enteritidis	prod. qual.	00030	VT000302	15-80
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
MYP (Mannitol egg yolk polymyxin) agar (base) acc. ISO 7932, ISO 21871 and FDA-BAM, GranuCult® prime	**105267**	*Bacillus cereus*	prod. quant.	00001	VT000013	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Bacillus subtilis subsp. *spizizenii*	spec. qual.	00003	VT000036	1,000-10,000
Nutrient agar acc. ISO 6579, ISO 10273 and ISO 21528, GranuCult® prime	**105450**	*Salmonella* Enteritidis	prod. quant.	00030	VT000303	80-130
		Escherichia coli	prod. qual.	00012	VT000123	80-130
PEMBA (Polymyxin Pyruvate Egg yolk Mannitol Bromothymolblue Agar) (base) acc. ISO 21871, GranuCult® prime	**120589**	*Bacillus cereus*	prod. qual.	00001	VT000013	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Bacillus subtilis subsp. *spizizenii*	spec. qual.	00003	VT000036	1,000-10,000
Peptone salt solution (Maximum recovery diluent) acc. ISO 6887 and ISO 8199, GranuCult® prime	**112535**	*Escherichia coli*	prod. quant.	00012	VT000122	15-80
		Staphylococcus aureus	prod. quant.	00034	VT000342	15-80
Plate Count agar acc. ISO 4833, ISO 17410 and FDA-BAM, GranuCult® prime	**105463**	*Bacillus subtilis* subsp. *spizizenii*	prod. quant.	00003	VT000033	80-130
		Escherichia coli	prod. quant.	00012	VT000123	80-130
		Staphylococcus aureus	prod. quant.	00034	VT000343	80-130
Plate Count skimmed milk agar acc. ISO 4833 and ISO 17410, GranuCult® prime	**115338**	*Bacillus subtilis* subsp. *spizizenii*	prod. quant.	00003	VT000033	80-130
		Escherichia coli	prod. quant.	00012	VT000123	80-130
		Staphylococcus aureus	prod. quant.	00034	VT000343	80-130

Culture media	Cat. No.	Control strain acc. ISO	Test method*	WDCM	Suggested CRM	CFU range
Pseudomonas CFC/CN agar (base) acc. ISO 13720 and ISO 16266, GranuCult® prime	**107620**	*Pseudomonas aeruginosa*	prod. quant.	00024	VT000243	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
RVS (RAPPAPORT-VASSILIADIS-Soya) broth (base) acc. ISO 6579, GranuCult® prime	**107700**	*Salmonella* Typhimurium	prod. qual.	00031	VT000312	15-80
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Pseudomonas aeruginosa	sel. qual.	00025	VT000257	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
Selenite Cystine (SC) broth acc. ISO 6579 and FDA-BAM (contains sodium selenite), GranuCult® prime	**100212**	*Salmonella* Typhimurium	prod. qual.	00031	VT000312	15-80
		Pseudomonas aeruginosa	sel. qual.	00012	VT000127	50,000-150,000
		Escherichia coli	sel. qual.	00025	VT000257	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
Sorbitol MacCONKEY (SMAC) agar acc. ISO 16654 and FDA-BAM, GranuCult® prime	**100213**	*Escherichia coli* O157:H7	prod. qual.	00014	VT000143	80-130
		Staphylococcus aureus	sel. qual.	00034	VT000347	50,000-150,000
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
TBX (Tryptone Bile X-glucuronide) agar acc. ISO 16649, Chromocult®	**116122**	*Escherichia coli*	prod. quant.	00012,	VT000123	80-130
		Escherichia coli	prod. quant.	00202	VT002023	80-130
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
		Citrobacter freundii	spec. qual.	00006	VT000066	1,000-10,000
		Pseudomonas aeruginosa	spec. qual.	00025	VT000256	1,000-10,000
Tryptic Soy agar acc. EP, USP, JP, ISO and FDA-BAM, GranuCult® prime	**105458**	*Bacillus cereus*	prod. quant.	00001	VT000013	80-130
		Bacillus subtilis subsp. *spizizenii*	prod. quant.	00003	VT000033	80-130
		Escherichia coli	prod. quant.	00012	VT000123	80-130
		Listeria monocytogenes	prod. quant.	00021	VT000213	80-130
		Staphylococcus aureus	prod. quant.	00034	VT000343	80-130
VRB (Violet Red Bile Lactose) agar acc. ISO 4832 and FDA-BAM, GranuCult® prime	**101406**	*Escherichia coli*	prod. quant.	00012	VT000123	80-130
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
		Pseudomonas aeruginosa	spec. qual.	00025	VT000256	1,000-10,000
VRBD (Violet Red Bile Dextrose) agar acc. EP, USP, JP and ISO 21528, GranuCult® prime	**110275**	*Escherichia coli*	prod. quant.	00012	VT000123	80-130
		Salmonella Enteritidis	prod. quant.	00030	VT000303	80-130
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
XLD (Xylose Lysine Deoxycholate) agar acc. ISO 6579, GranuCult® prime	**105287**	*Salmonella* Enteritidis	prod. quant.	00030	VT000303	80-130
		Escherichia coli	sel. qual.	00012	VT000127	50,000-150,000
		Enterococcus faecalis	sel. qual.	00009	VT000097	50,000-150,000
Yeast Extract agar acc. ISO 6222, GranuCult® prime	**113116**	*Escherichia coli*	prod. quant.	00012	VT000123	80-130
		Bacillus subtilis subsp. *spizizenii*	prod. quant.	00003	VT000033	80-130

***abbreviations:**

prod. = productivity
sel. = selectivity
quant. = quantitative

qual. = qualitative
spec. = specificity
WDCM = World Data Centre for Microorganisms

CRM = Certified Reference Materials
CFU = Colony Forming Units

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