accuracy and quality as a science

tcs biosciences

Selectrol® Technical Guide

Selectrol® : Manufactured under licence from Public Health England Culture Collections

SELECTROL® - FREEZE-DRIED ORGANISMS IN A DISC

Quality control of microbial characterisation tests, culture media and antimicrobial susceptibility determinations is best accomplished by the use of microorganisms with well-documented and stable phenotypic and genotypic characteristics.

Bacterial and fungal strains have been selected and recommended by expert bodies, such as EUCAST, CLSI and the European Pharmacopoeia, on the basis of their suitability for monitoring test performance and ensuring the validity of results for testing used in clinical, food, pharmaceutical, water and veterinary laboratories.

Products derived from the cultures in the collections should be manufactured using the minimum number of sub-cultures, to minimise the possibility of alterations to the phenotype due to mutations. See also page 14.

Selectrol strains are manufactured exclusively from Public Health England Culture Collections (NCTC® and NCPF®) and are first generation subcultures, unlike many products on the market which are 2nd, 3rd or 4th generation subcultures. They are preserved by long-term storage as freeze-dried cells in order to minimise any alterations to the phenotype caused by mutations.

Passages

A Selectrol® disc is a first generation subculture from a **master culture** sourced from Public Health England Culture Collections, and is designed to be used to obtain **working stock** cultures for use in testing. It is generally accepted that no more than a total of five passages should be made from the **master culture**, in order to avoid genetic drift and mutant selection. Therefore, no more than four passages (fresh cultures) from the **working stock** should be made.

Shelf life

For most strains, Selectrol® discs are guaranteed to contain at least 10^6 organisms at the time of purchase; this number is sufficient to ensure that when the discs are used and stored as directed there will be viable organisms cultivable up to the stated end of the shelf life, which is usually 9 months from the time the vial is first opened.

Quality Control

Selectrol® batches are tested in our UKAS accredited testing laboratory number 2496. A test report for each batch of Selectrol® can be accessed via our website. The reporting of Selectrol® test results via the website comes under our UKAS accreditation.

Selectrol® cultures are rigorously tested to confirm identity, to confirm the possession of essential phenotypic characteristics and to exclude contamination with other organisms. Photographic evidence of the test results is retained for each batch, along with retained appropriately stored samples.

Glossary

AMRHAI: Antimicrobial Resistance and Healthcare Associated Infections reference unit

ATCC®: American Type Culture Collection. ATCC® strains are listed for reference only. ATCC® is a registered trademark of the American Type Culture Collection.

BSAC: British Society for Antimicrobial Chemotherapy - Now superseded by EUCAST

CLSI: Clinical Laboratory Standards Institute. (USA)

CPE: Carbapenemase Producing Enterobacteriaceae

CRE: Carbapenem Resistant Enterobacteriaceae

Culture collection: Cultures of fully characterised organisms maintained in such a way as to minimise sub-culturing. See page 14.

ESBL: Extended Spectrum Beta-Lactamase-producing organism.

EUCAST: European Committee on Antimicrobial Susceptibility Testing.

First generation derivative: A single passage from a master culture, for example a Selectrol® disc.

Master culture: Culture derived from a reference culture vial.

NCPF®: National Collection of Pathogenic Fungi. NCPF® is a registered trademark of Public Health England.

NCTC®: National Collection of Type Cultures. NCTC® is a registered trademark of Public Health England.

Passage: An equivalent term for a subculture.

PHE: Public Health England.

Reference cultures: Quality control strains selected on the basis of their phenotypic biochemical and antimicrobial susceptibility characteristics to be used as controls in microbiological testing. These are obtained as freeze-dried vials from culture collections.

Stock culture: Cultures derived from a Selectrol® disc, which can be stored for up to a week, usually on agar slants.

Working cultures: Stock cultures further sub-cultured to provide 18-24 hour growth for use in testing.

WDCM: World Data Centre for Microorganisms

WFCC: World Federation for Culture Collections

Culture Collections

Cultures of microorganisms have been deposited and subsequently maintained in 589 collections in 68 countries, and many of the cultures are derived from the same original isolate; the history of each organism, its properties and names of the culture collections which hold it are detailed in the relevant catalogues and websites.

Some of the organisms have been selected and recommended by expert organisations to be supplied as controls for microbiological tests, and when the identical cultures are present in more than one collection they will have a specific designation for each, incorporating the abbreviation for the collection and a reference number.

For example:- *Staphylococcus aureus* NCTC 7447, widely recommended as a control for antimicrobial susceptibility testing, is held in 30 collections, and consequently the phenotypically and genotypically identical organism has 30 different references, such as ATCC 6538P, CIP 53.156, DSM 346 and so on.

In an effort to minimise potential confusion and help users find local sources of reference strains, the WFCC and the WDCM initiated a system that ascribes each recommended QC strain a reference number (WDCM 00001 onwards), cites all collections that contain it and provides contact details and each collection's unique reference. For example, the strain of *Staphylococcus aureus* NCTC 7447 (Selectrol® strain MM33) mentioned above is designated WDCM 00033.

Staphylococcus aureus WDCM 00033

AHU 1142; ATCC™ 6538P; BCRC 10451 ; BTCC 209P; BU 395; CCM 2022; CCTM 596; CCUG 1828; CECT 240; CIP 53.156; CN 3784; CNCTC Mau 28/58; DSM 346; FIRDI 451; IAM 1011; IAM 12082; IEM Mau 28/58; IFO 12732; IFO 3061; IID 671; IMET 10904; JCM 2151; LMG 8195; NCIMB 8625; NCTC 7447; NRRL B-313; OUT 8232; PCI 1209; PZH 8/54; RIMD 3109007; VNIIA 209P;

Products derived from the cultures in the collections should be manufactured using the minimum number of sub-cultures, to minimise the possibility of alterations to the phenotype due to mutations. Ideally, as in the case of **Selectrol®**, a single sub-culture only is used, so the **Selectrol®** product is a 'first generation derivative' of a culture supplied by NCTC, and will be identical with regard to its properties and suitability for use in QC applications to a culture of the particular organism obtained from any of the other WDCM listed culture collections.

Selectrol Strain Index

Strain Name	Designation	Code	WDCM
Aspergillus brasiliensis	NCPF® 2275 / ATCC® 16404	MM94	00053
Bacillus cereus	NCTC® 10320 / ATCC® 9634	MM21	00001
Bacillus cereus	NCTC® 7464 / ATCC® 10876	MM86	
Bacillus subtilis	NCTC® 10400 / ATCC® 6633	MM29	00003
Bacteroides fragilis	NCTC® 9343 / ATCC® 25285	MM44	
Campylobacter jejuni	NCTC® 11351 / ATCC® 33560	MM36	
Campylobacter jejuni	NCTC® 11322 / ATCC® 29428	MM82	00156
Candida albicans	NCPF® 3255 / ATCC® 2091	MM28	00055
Candida albicans	NCPF® 3179 / ATCC® 10231	MM42	00054
Citrobacter freundii	NCTC® 9750 / ATCC® 8090	MM27	
Clostridium perfringens	NCTC® 8237 / ATCC® 13124	MM45	00007
Clostridium sporogenes	NCTC® 532 / ATCC® 19404	MM31	00008
Enterobacter aerogenes	NCTC® 10006 / ATCC® 13048	MM26	00175
Enterobacter cloacae	NCTC® 13380 / ATCC® 23355	MM01	00082
Enterobacter cloacae	NCTC® 13406	MM51	
Enterococcus faecalis	NCTC® 775 / ATCC® 19433	MM17	00009
Enterococcus faecalis	NCTC® 12697 / ATCC® 29212	MM18	00087
Enterococcus faecalis	NCTC® 13379 / ATCC® 51299	MM52	00085
Enterococcus hirae	NCTC® 13383 /ATCC® 10541	MM35	00011
Escherichia coli	NCTC® 12241 / ATCC® 25922	MM02	00013
Escherichia coli	NCTC® 11954 / ATCC® 35218	MM24	
Escherichia coli	NCTC® 10418 / ATCC® 10536	MM33	
Escherichia coli	NCTC® 12923 / ATCC® 8739	MM38	00012
Escherichia coli	NCTC® 11560	MM63	
Escherichia coli	NCTC® 9001 / ATCC® 11775	MM75	00090
Escherichia coli CRE	NCTC® 13476	MM57	
Escherichia coli (mcr-1)	NCTC® 13846	MM34	
Escherichia coli O157 (non-toxigenic)	NCTC® 12900 / ATCC® 700728	MM93	00014
Haemophilus influenzae	NCTC® 8468 / ATCC® 9334	MM100	
Haemophilus influenzae	NCTC® 12975 / ATCC® 49766	MM37	
Haemophilus influenzae	NCTC® 12699 / ATCC® 49247	MM81	
Haemophilus influenzae	NCTC® 11931	MM98	
Klebsiella aerogenes	NCTC® 9528	MM88	
Klebsiella pneumoniae	NCTC® 9633 / ATCC® 13883	MM04	00097
Klebsiella pneumoniae	NCTC® 13368 / ATCC® 700603	MM83	
Klebsiella pneumoniae CRE	NCTC® 13440	MM55	
Klebsiella pneumoniae CRE	NCTC® 13443	MM56	
Klebsiella pneumoniae CRE	NCTC® 13438	MM58	

Selectrol Strain Index

Strain Name	Designation	Code	WDCM
Klebsiella pneumoniae CRE	NCTC® 13442	MM59	
Lactobacillus brevis	NCTC® 13386 / ATCC® 8287	MM76	
Legionella pneumophila serogroup 1	NCTC® 11192 / ATCC® 33152	MM08	00107
Listeria innocua	NCTC® 11288 / ATCC® 33090	MM92	00017
Listeria monocytogenes	NCTC® 7973 / ATCC® 35152	MM48	00109
Listeria monocytogenes	NCTC® 13372 ATCC® 7644	MM77	
Listeria monocytogenes	NCTC® 11994	MM87	00019
Neisseria gonorrhoeae	NCTC® 8375 / ATCC® 19424	MM05	
Neisseria gonorrhoeae	NCTC® 12700 / ATCC® 49226	MM96	
Proteus mirabilis	NCTC® 13376 / ATCC® 14153	MM43	
Proteus mirabilis	NCTC® 10975	MM68	
Proteus vulgaris	NCTC® 4175 / ATCC® 13315	MM09	
Pseudomonas aeruginosa	NCTC® 12903 / ATCC® 27853	MM10	00025
Pseudomonas aeruginosa	NCTC® 12924 / ATCC® 9027	MM40	00026
Pseudomonas aeruginosa	NCTC® 13359 / ATCC® 15442	MM41	
Pseudomonas aeruginosa	NCTC® 10662 / ATCC® 25668	MM65	00114
Rhodococcus equi	NCTC® 1621 / ATCC® 6939	MM97	00028
Saccharomyces cerevisiae	NCTC® 10716/ ATCC® 9763	MM50	00058
Saccharomyces cerevisiae	NCPF® 3178	MM73	
Salmonella Nottingham	NCTC® 7832	MM84	
Salmonella Poona	NCTC® 4840	MM89	
Salmonella Typhimurium	NCTC® 12023/ ATCC® 14028	MM11	00031
Serratia marcescens	NCTC® 13382 / ATCC® 8100	MM12	
Staphylococcus aureus	NCTC®12981 / ATCC® 25923	MM13	00034
Staphylococcus aureus	NCTC® 12973 / ATCC® 29213	MM14	00131
Staphylococcus aureus	NCTC® 7447 / ATCC® 6538P	MM30	00033
Staphylococcus aureus	NCTC® 10788 / ATCC® 6538	MM46	00032
Staphylococcus aureus	NCTC® 6571 / ATCC® 9144	MM85	00035
Staphylococcus aureus (MRSA)	NCTC® 12493	MM64	00212
Staphylococcus aureus (MRSA)	NCTC® 13373 / ATCC® 43300	MM91	00211
Staphylococcus epidermidis	NCTC® 13360 / ATCC® 12228	MM15	00036
Streptococcus agalactiae	NCTC® 8181 / ATCC® 13813	MM16	
Streptococcus pneumoniae	NCTC® 12695 /ATCC® 6303	MM19	
Streptococcus pneumoniae	NCTC® 12977 /ATCC® 49619	MM95	
Streptococcus pyogenes	NCTC® 12696 /ATCC® 19615	MM20	
Vibrio parahaemolyticus	NCTC® 10885	MM06	00185
Yersinia enterocolitica	NCTC® 12982 / ATCC® 9610	MM80	00038

Selectrol Strains Listed by WDCM Number

WDCM	Strain Name	Designation	Code
00001	*Bacillus cereus*	NCTC® 10320 / ATCC® 9634	MM21
00003	*Bacillus subtilis*	NCTC® 10400 / ATCC® 6633	MM29
00007	*Clostridium perfringens*	NCTC® 8237 / ATCC® 13124	MM45
00008	*Clostridium sporogenes*	NCTC® 532 / ATCC® 19404	MM31
00009	*Enterococcus faecalis*	NCTC® 775 / ATCC® 19433	MM17
00011	*Enterococcus hirae*	NCTC® 13383 /ATCC® 10541	MM35
00012	*Escherichia coli*	NCTC® 12923 / ATCC® 8739	MM38
00013	*Escherichia coli*	NCTC® 12241 / ATCC® 25922	MM02
00014	*Escherichia coli* O157 (non-toxigenic)	NCTC® 12900 / ATCC® 700728	MM93
00017	*Listeria innocua*	NCTC® 11288 / ATCC® 33090	MM92
00019	*Listeria monocytogenes*	NCTC® 11994	MM87
00025	*Pseudomonas aeruginosa*	NCTC® 12903 / ATCC® 27853	MM10
00026	*Pseudomonas aeruginosa*	NCTC® 12924 / ATCC® 9027	MM40
00028	*Rhodococcus equi*	NCTC® 1621 / ATCC® 6939	MM97
00031	*Salmonella* Typhimurium	NCTC® 12023/ ATCC® 14028	MM11
00032	*Staphylococcus aureus*	NCTC® 10788 / ATCC® 6538	MM46
00033	*Staphylococcus aureus*	NCTC® 7447 / ATCC® 6538P	MM30
00034	*Staphylococcus aureus*	NCTC® 12981 / ATCC® 25923	MM13
00035	*Staphylococcus aureus*	NCTC® 6571 / ATCC® 9144	MM85
00036	*Staphylococcus epidermidis*	NCTC® 13360 / ATCC® 12228	MM15
00038	*Yersinia enterocolitica*	NCTC® 12982 / ATCC® 9610	MM80
00053	*Aspergillus brasiliensis*	NCPF® 2275 / ATCC® 16404	MM94
00054	*Candida albicans*	NCPF® 3179 / ATCC® 10231	MM42
00055	*Candida albicans*	NCPF® 3255 / ATCC® 2091	MM28
00058	*Saccharomyces cerevisiae*	NCTC® 10716/ ATCC® 9763	MM50
00082	*Enterobacter cloacae*	NCTC® 13380 / ATCC® 23355	MM01
00085	*Enterococcus faecalis*	NCTC® 13379 / ATCC® 51299	MM52
00087	*Enterococcus faecalis*	NCTC® 12697 / ATCC® 29212	MM18
00090	*Escherichia coli*	NCTC® 9001 / ATCC® 11775	MM75
00097	*Klebsiella pneumoniae*	NCTC® 9633 / ATCC® 13883	MM04
00107	*Legionella pneumophila* serogroup 1	NCTC® 11192 / ATCC® 33152	MM08
00109	*Listeria monocytogenes*	NCTC® 7973 / ATCC® 35152	MM48
00114	*Pseudomonas aeruginosa*	NCTC® 10662 / ATCC® 25668	MM65
00131	*Staphylococcus aureus*	NCTC® 12973 / ATCC® 29213	MM14
00156	*Campylobacter jejuni*	NCTC® 11322 / ATCC® 29428	MM82
00175	*Enterobacter aerogenes*	NCTC® 10006 / ATCC® 13048	MM26
00185	*Vibrio parahaemolyticus*	NCTC® 10885	MM06
00211	*Staphylococcus aureus* (MRSA)	NCTC® 13373 / ATCC® 43300	MM91
00212	*Staphylococcus aureus* (MRSA)	NCTC® 12493	MM64

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