



Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -20°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Achromobacter xylooxidans	12
Acinetobacter calcoaceticus	132
Acinetobacter iwoffii	12
Acinetobacter baumannii	18
Aeromonas hydrophila	24
Alcaligenes faecalis	12
Arthrobacter aurescens	12
Asperigillus niger	15*
Bacillus subtilis	48*
Bacillus cereus	60*
Bacillus lichiformis	60
Bacteroides fragilis	18*
Bordetella bronchiseptica	10
Burkholderia capacia	24
Campylobacter jejuni	10
Campylobacter coli	11
Candida albicans	36*
Candida geochares	36*
Candida glabrata	36*
Candida keyfr	36*
Candida krusei	36*
Candida spp.	72
Citrobacter freundii	60
Citrobacter koseri	24*
Clostridium spp.	24
Clostridium bifermentans	36*
Clostridium difficile	24*
Clostridium perfringens	24*
Clostridium sordelli	36*
Clostridium sporogenes	24*
Corynebacterium diphtheriae (nps)	24
Corynebacterium spp.	36
Corynebacterium minutissimum	36
Enterobacter aerogenes	60*
Enterobacter cloacae	60*
Enterobacter sakazakii	60*
Erwinia spp.	24
Escherichia coli	120*
Escherichia coli O157 (nps)	60
Escherichia coli	120*
Enterococcus faecium	48*
Enterococcus faecalis	20*
Flavobacterium psychrophilum	12
Fusobacterium nucleatum	12*
Geobacillus stearothermophilus	24

Cont'd

Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -20°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Haemophilus influenzae	24
Hafnia alvei	36
Klebsiella aerogenes	48*
Klebsiella pneumoniae	48*
Lactobacillus brevis	24*
Lactobacillus casei	24*
Lactobacillus fermentum	120
Lactobacillus jensenii	120
Lactobacillus piscicola	12
Lactobacillus plantarum	12
Legionella pneumophila	12
Leuconostoc mesenteroides	144
Listeria innocua	48*
Listeria ivanovii	48*
Listeria monocytogenes	48*
Listeria seeligeri	48*
Listeria grayi	48*
Micrococcus luteus	36
Micrococcus diversius	36
Moellerella wisconsensis	12
Morganella morganii	24
MRSA (hospital acquired)	60*
MRSA (wild strains)	60*
Mycobacterium phlei	36
Neisseria gonorrhoeae	12
Neisseria meningitidis	12
Nocardia asteroides	12
Ochrobacterium anthropi	12
Paenibacillus polymyxa	12
Pasturella aerogenes	8
Pasteurella pneumotropica	7
Penicillum aurantiogriseum	24*
Penicillum notatum	24*
Peptostreptococcus anaerobius	12*
Prevotella melaninogenicus	24*
Propionibacterium acnes.	15*
Proteus mirabilis	60
Proteus vulgaris	60
Providencia stuartii	48
Pseudomonas aeruginosa	108*
Pseudomonas fluorescens	48*
Pseudomonas putida	48*
Renibacterium salmoninarum	12
Rhizopus stolonifer	12*
Rhodococcus equi	24
Rhodotrula glutinus	12*

Cont'd

Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -20°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Rhodotrula rubrum	24*
Saccharomyces cervisiae	12*
Salmonella dublin	72*
Salmonella enteritidis	72*
Salmonella gallarum	60
Salmonella hadar	72*
Salmonella spp. (wild)	36
Salmonella panama	48*
Salmonella seftenburg	48*
Salmonella typhimurium	48*
Salmonella virchow	36
Serratia marcescens	132
Serratia spp.	36
Shigella sonnei	36
Shigella flexneri	24
Staphylococcus saprophyticus	36
Staphylococcus hominis	36
Staphylococcus aureus (MRSA)	60
Staphylococcus spp.	72
Staphylococcus aureus	72
Staphylococcus epidermidis	36
Stenotrophomonas maltophilia	24
Streptococcus agalactiae	15
Streptococcus spp. (Beta haemolytic) Grp B	24
Streptococcus spp. (Beta haemolytic) Grp C	24
Streptococcus avium	18
Streptococcus bovis	18
Streptococcus equisimilis	120
Streptococcus pneumoniae	15*
Streptococcus pyogenes	36
Streptococcus salivarius	132
Streptococcus mitis	120
Streptococcus pyogenes	36
Streptococcus rattus	132
Streptococcus sanguis	132
Streptococcus sobrinus	132
Streptococcus thermophilus	120
Streptococcus viridans	18
Trichophyton rubrum	12*
Xanthomonas campestris	12
Xanthomonas maltophilia	12
Vibrio cholerae (nps)	10
Vibrio parahaemolyticus	6
Yersinia ruckeri	24
Yersinia enterocolitica	24

Cont'd

**The accuracy of this database relies on information supplied to Technical service Consultants Ltd by the existing users of the Protect System.



Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -70°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Actinobacillus pleuropneumoniae	132
Acinetobacter spp.	36*
Acinetobacter baumannii	24
Actinobacillus actinomycetemcomitans	72
Actinomyces israelii	72
Actinomyces naeslundii	72
Actinomyces odontolyticus	72
Actinomyces meyeri	60(12*)
Aerococcus viridans	60
Aeromonas hydrophila	84
Aeromonas salmonicida	84
Aspergillus brasiliensis	36*
Bacillus amyloliquefaciens	36*
Bacillus aneurinilyticus	72
Bacillus cereus	60*
Geobacillus stearothermophilus	72
Bacillus subtilis	24*
Bacteroides fragilis	24
Bordetella pertussis	12
Campylobacter jejuni	18
Candida albicans	60*
Candida krusei	60*
Candida spp.	72*
Citrobacter freundii	60
Clostridium perfringens	72*
Clostridium sporogenes	18*
Staphylococcus saprophyticus	24
Corynebacterium bovis	36
Corynebacterium diphtheriae	36
Deinococcus radiophilus	60
Escherichia coli C600	120
Escherichia coli XL1 blue MRF	48
Enterococcus spp.	36
Enterobacter aerogenes	72
Enterobacter cloacae	72
Enterbacter taylorae	72
Enterococcus faecalis	72
Enterococcus faecium	36
Escherichia coli	84
Escherichia coli O157	36
Eubacterium spp.	72
Fusobacterium nucleatum	24*
Helicobacter pylori	36
Haemophilus aphrophilus	72
Haemophilus influenzae	72
Haemophilus somnus	96
Klebsiella pneumoniae	24

Cont'd



Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -70°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Lactobacillus casei	72*
Legionella pneumophila	14
Listeria grayi	60
Listeria innocua	60
Listeria ivanovii	60
Listeria monocytogenes	60
Moraxella spp.	36
Mycoplasma spp.	60
Neisseria gonorrhoeae	24*
Neisseria meningitidis (meningococcus)	60
Ornithobacterium rhinotracheale	60
Pasteurella gallinarum	108
Pasteurella haemolytica	96
Pasteurella multocida	120
Pasteurella spp.	24
Porphyromonas gingivalis	60*
Prevotella intermedia	60*
Pneumococcus spp.	48
Prevotella melaninogenicus	72
Proteus mirabilis	60*
Proteus vulgaris	60
Pseudomonas aeruginosa	60*
Pseudomonas putida	60*
Rhodococcus equi	24
Riemerella anatipestifer	60
Salmonella arizonae	60
Salmonella enteritidis	120
Salmonella hadar	60*
Salmonella infantis	60*
Salmonella Poona	12*
Salmonella seftenburg	48*
Salmonella spp.	120
Salmonella typhimurium	60
Serratia marcescens	60
Shigella sonnei	24
Staphylococcus spp.	72
Staphylococcus aureus	84
Staphylococcus aureus (MRSA)	84
Staphylococcus epidermidis	72
Staphylococcus hyicus	36
Streptococcus agalactiae	36
Streptococcus anaerobius	36
Streptococcus suis	120
Streptococcus spp.	72
Streptococcus bovis	60

Cont'd



Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -70°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Streptococcus group A	24*
Streptococcus group G	24
Streptococcus milleri	60
Streptococcus mutans	60
Streptococcus pneumoniae	48
Streptococcus pyogenes	36
Streptococcus sanguis	24
Streptococcus salivarius	24
Veillonella spp.	72
Vibrio cholerae (Marine isolates)	84
Vibrio parahaemolyticus	18
Yersinia enterocolitica	108

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Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -80°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Acinetobacter baumannii	36*
Actinomyces pyogenes	68
Aeromonas hydrophila	5*
Aspergillus fumigatus	24*
Aspergillus brasiliensis	36*
Campylobacter jejuni	69*
Campylobacter spp.	24
Candida albicans	70*
Cryptococcus neoformans	72*
Enterococcus faecalis	12*
Epidermophyton floccosum	15
Erwinia spp.	120
Erysipelothrix rhusiopathiae	67
Escherichia coli	60*
Escherichia hermannii	60*
Fonsecaea pedrosoi	15
Fusarium oxysporum	20*
Haemophilus influenzae	30
Klebsiella pneumoniae	96
Klebsiella aerogenes	24
Lactobacillus spp.	14*
Legionella spp.	30
Microsporium canis	67
Microsporium gypseum	68*
Methicillin Resistant Staphylococcus aureus (MRSA)	72*
Pasteurella multocida	63
Pasteurella spp.	62
Pseudomonas spp.	120*
Rhodococcus equi	70
Salmonella enteritidis	69*
Staphylococcus aureus	30*
Streptococcus spp.	30
Streptococcus bovis	60*
Streptococcus group A	48*
Streptococcus group G	48
Streptococcus milleri	60
Streptococcus mutans	60
Streptococcus pneumoniae	48*
Streptococcus pyogenes	48
Streptococcus equi	67
Trichophyton rubrum	15*
Trichosporon ovoides	24*
Xanthomonas campestris	120
Yersinia pseudotuberculosis	67

Cont'd



Recovery times** of Micoorganisms after storage in PROTECT.

Microorganisms Stored at -80°C	
Bacteria/Yeast/Fungi	Longest Successful Storage Time (Months)
Vibrio cholerae (Marine isolates)	84
Vibrio parahaemolyticus	24
Yersinia enterocolitica	108

**The accuracy of this database relies on information supplied to Technical service Consultants Ltd by the existing users of the Protect System.

Key

* – results recorded in PROTECT Anaerobe, PROTECT Yeast & Mould, PROTECT Meat Free or Further Testing ongoing.

UT – Under test and will be updated once full results are known.

nps – Non-pathogenic (attenuated) strain used.

