



IN-VITRO BIOCIDAL ACTIVITY OF SODIUM DICHLORO ISOCYANURATE (NaDCC)



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NaDCC

BIOCIDAL ACTIVITY

1. DESCRIPTION

Sodium dichloroisocyanurate (NaDCC) is also known as sodium troclozene and sodium dichloro-s-triazine trion. The ingredient is the sodium salt of 1,3-dichloro-1,3,5-triazine-2,4,6 (1H,3H,5H).

NaDCC has the general specification of the chlorine and hypochlorites. The biocidal activity of the chlorine products generally applied to the NaDCC products. However, NaDCC has the definite advantages against other chlorine products.

The product is remained consistently very active in wide pH range. The product produces acidic solutions with more biocidal activity than alkaline hypochlorite products. NaDCC contains uniquely combined chlorine which is released in the presence of high chlorine, ie when organic contamination is present.

2. Biocidal Activity

The long and widespread use of chlorine compounds has been introduced in laboratories (in-vitro) and field (in-vivo). The biocidal activity of the chlorine compounds increased by different factors.

pH: pH is important enhancing. Low pH (acidic solutions) has bigger activity.

Concentration: high concentration is higher effectiveness.

Heat: higher heating is more effectiveness.

Organic Contamination: It is noted that NaDCC has better capacity against hypochlorites (more than 4 times). Especially sensitive and high risky areas (catering, operation room etc.) and farming environments the cleaning is recommended before disinfection.

Exposure time: longer exposure time is higher effectiveness.

Surface: mixed surfaces on configurations (joints, tubes etc) complicated the disinfection of microorganisms. The type and level of the microbial contamination affect the effectiveness.

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1.0 INTRODUCTION

Sodium dichloroisocyanurate (NaDCC) is also known as sodium troclozene and sodium dichloro-s-triazine trion. The substance is the sodium salt of 1,3-dichloro-1,3,5-triazine-2,4,6 (1H, 3H, 5H) -trione (dichloroisocyanuric acid).

NaDCC has general properties of chlorine and hypochlorites. The biocidal activity of chlorine products is generally applicable to NaDCC products. However, NaDCC has definite advantages over other chlorine products.

- The product remains active in a wide pH range (6 - 10)
- The product produces acidic solutions having a greater biocidal activity than alkaline hypochlorite products
- The product contains uniquely bound (conceivable) chlorine, which is freed up when there is a high chlorine requirement ie organic contamination

2.0 BIOCIDAL ACTIVITY

The long history and extensive use of chlorine compounds have been introduced in laboratories (in-vitro) and field (in-vivo). The biocidal activity of chlorine compounds has been increased by several factors.

pH: pH is an important enhancer. Low pH (acidic solutions) is more active.

Concentration: High concentration is higher efficacy. Note: the concentration of the available chlorine is in the range of. . (1 p.p.m. = 1 mg per liter, 1.25% hypochlorite solution = 10,000 ppm)

Heat: high heat is more effective.

Organic pollution: organic pollution (or reducing agents) reduces the effectiveness. It should be noted that NaDCC has a better capacity than hypochlorites (more than 4 times). Especially in sensitive and high-risk areas (food processing, operating theater, etc.), cleaning is advised before disinfection in the farming environment. Water hardness does not have any biocidal action on chlorine products.

Exposure time: longer exposure is higher efficacy.

Surface: mixed surfaces or configurations (joints, tubes, etc.) make disinfection of microorganisms difficult. The type and level of microbial pollution affects the effectiveness. The following durability is a rough guideline for reduced disinfection activity.

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Bacterial Spores
Bacillus subtilis
Clostridium spp.

Mycobacterium
Mycobacterium tuberculosis
Mycobacterium smegmatis

Nonlipid or small viruses
Poliomyelitis

NaDCC

Fungi
Aspergillus spp.
Candida albicans

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Vegetative bacteria
Escherichia coli,
Pseudomonas aeruginosa,
Staphylococcus aureus,
Salmonella spp.

3.0 Activity of NaDCC

Below is a summary of the biocidal activity of NaDCC against bacteria, fungi, mycobacteria, spores and viruses.

The data includes many in-vitro studies and printed papers that are independently conducted on KLORTAB NaDCC products.

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4.0 Bacteria

Organism	Surface test	Suspension test	Organic red	pH	Temperature °C	Exposure time (min.)	Available chlorine (ppm)	Biocidal result %	Reference
Aerobacter aerogenes	X	√	X	-	-	1	50,0	100,0	1
Aerobacter aerogenes	√	X	X	-	20	10	200,0	100,0	2
Aeromonas hydrophile	X	√	X	-	-	1	50,0	100,0	1
Bacillus anthracis	X	√	5% yeast	-	4	30	1.000,0	99,99	3
Bacillus cereus	X	√	X	-	-	30	50,0	100,0	1
Bacillus subtilis	X	√	X	-	-	1	50,0	100,0	1
Bordetella bronchiseptica	X	√	X	-	22	1	200,0	100,0	4
Bordetella bronchiseptica	X	√	0,25% yeast	-	22	1	200,0	>99,999	4
Enterococcus faecalis	X	√	10% horse serum	-	-	5	1000,0	>99,99	5
Enterococcus faecium	X	√	X	-	20	5	100,0	99,999	6
Enterococcus faecium	X	√	1% milk	-	20	5	150,0	99,999	6
Enterococcus faecium	X	√	10% horse serum	-	-	5	1.000,0	>99,999	5
Enterococcus faecium	Glass disc	X	X	-	20	5	100,0	99,999	6
Erwinea sp	X	√	X	-	-	1	50,0	100,0	1
Erwinea carotovora	X	√	X	-	-	1	14,0	100,0	7
Erwinea carotovora	X	√	1% yeast	-	-	5	350,0	100,0	7
Erwinea carotovora	X	√	5% yeast	-	-	1	700,0	100,0	7
Erysipelotrix rhusopathie	X	√	X	-	22	15	200,0	>99,99	4
Erysipelotrix rhusopathie	X	√	X	-	22	1	500,0	100,0	4
Erysipelotrix rhusopathie	X	√	0,25% yeast	-	22	1	200,0	100,0	4
Escherichia coli	X	√	X	-	-	-	0,83	99,9	8
Escherichia coli	X	√	X	-	-	1	50,0	100,0	1
Escherichia coli	X	√	X	-	5	<1	100,0	100,0	9
Escherichia coli	X	√	X	-	-	1	140,0	100,0	10
Listeria innocula	X	√	Serum	-	-	1	10,0	>99,9	15
Listeria innocula	X	√	Serum	-	-	1	60,0	>99,9999	15
Listeria innocula	X	√	Tryptic soy broth	-	-	1	10,0	>99,999	15
Listeria innocula	Stainless steel disc	√	Tryptic soy broth	-	-	1	60,0	>99,9999	15
Listeria innocula	Stainless steel disc	X	Serum	-	-	1	60,0	>90,0	15
Listeria monocytogenes	X	√	Serum	-	-	1	10,0	>99,9	15
Listeria monocytogenes	X	√	Serum	-	-	1	60,0	>99,9999	15
Listeria monocytogenes	X	√	Tryptic soy broth	-	-	1	10,0	>99,999	15
Listeria monocytogenes	Stainless steel disc	X	Tryptic soy broth	-	-	1	60,0	>99,99	15
Micrococcus luteus	X	√	X	-	-	1	50,0	100,0	1
Micrococcus luteus	X	√	X	-	-	1	50,0	100,0	1
Micrococcus roseus	X	√	X	-	-	1	50,0	100,0	1
Mycoplasma sp	X	√	5% yeast	-	4	30	1.000,0	99,99	3
Pasturella multocida	X	√	X	-	22	1	200,0	>99,99	4
Pasturella multocida	X	√	0,25% yeast	-	22	1	200,0	>99,999	4
Proteus vulgaris	X	√	X	-	-	5	15,0	>99,9999	12
Proteus vulgaris	X	√	X	-	-	<10	140,0	100,0	11
Proteus vulgaris	X	√	20% human serum	-	-	<30	140,0	100,0	11
Pseudomonas aeruginosa	X	√	X	-	-	-	2,0	99,9	8
Pseudomonas aeruginosa	X	√	X	6,1	25	2	5,0	>99,999	16
Pseudomonas aeruginosa	X	√	X	-	-	1	50,0	100,0	1
Pseudomonas aeruginosa	X	√	X	-	5	<10	100,0	100,0	9
Pseudomonas	X	√	X	-	20	5	100,0	99,999	6

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aeruginosa									
Pseudomonas aeruginosa	X	√	X	-	-	1	140,0	99,9999	10
Pseudomonas aeruginosa	X	√	X	-	-	<10	140,0	100,0	11
Pseudomonas aeruginosa	X	√	1% milk	-	5	<10	100,0	100,0	9
Pseudomonas aeruginosa	X	√	1% milk	-	20	5	150,0	99,999	6
Pseudomonas aeruginosa	X	√	2% milk	-	-	5	140,0	99,999	10
Pseudomonas aeruginosa	X	√	5% milk	-	-	1	700,0	99,99	10
Pseudomonas aeruginosa	X	√	10% plasma	-	25	5	2.500,0	100,0	13
Pseudomonas aeruginosa	X	√	1% horse serum	6,7	25	2	90,0	>99,999	16
Pseudomonas aeruginosa	X	√	1% horse serum	6,6	25	30	75,0	>99,999	16
Pseudomonas aeruginosa	X	√	2% horse serum	6,3	25	2	200,0	>99,999	16
Pseudomonas aeruginosa	X	√	2% horse serum	6,4	25	30	165,0	>99,999	16
Pseudomonas aeruginosa	X	√	10% horse serum	6,7	25	10	1.000,0	>99,999	17
Pseudomonas aeruginosa	X	√	20% horse serum	-	-	<30	140,0	100,0	11
Pseudomonas aeruginosa	X	√	30% horse serum	6,5	25	10	3.750,0	>99,999	17
Pseudomonas aeruginosa	X	√	30% horse serum	6,5	25	2	4.000,0	>99,999	17
Pseudomonas aeruginosa	X	√	50% horse serum	6,5	25	10	6.000,0	>99,999	17
Pseudomonas aeruginosa	X	√	70% horse serum	6,5	25	10	9.750,0	>99,999	17
Pseudomonas aeruginosa	X	√	70% horse serum	6,5	25	2	10.000,0	>99,999	17
Pseudomonas aeruginosa	Glass disc	X	X	-	20	5	100,0	99,999	6
Pseudomonas aeruginosa	√	X	X	-	20	10	200,0	100,0	2
Pseudomonas cepacia	X	√	X	-	-	5	50,0	100,0	1
Pseudomonas fragi	X	√	X	-	-	1	50,0	100,0	1
Pseudomonas malleri	X	√	5% yeast	-	4	30	1.000,0	99,99	3
Pseudomonas mirabilis	X	√	X	-	-	<10	140,0	100,0	11
Pseudomonas mirabilis	X	√	20% human serum	-	-	<30	140,0	100,0	11
Salmonella sp	X	√	X	-	-	5	15,0	>99,9999	12
Salmonella faecalis	X	√	X	-	-	<10	140,0	100,0	11
Salmonella faecalis	X	√	20% human serum	-	-	<30	140,0	100,0	11
Salmonella paratyphi A	X	√	X	-	-	<10	140,0	100,0	11
Salmonella paratyphi A	X	√	20% human serum	-	-	<30	140,0	100,0	11
Salmonella typhi	X	√	X	-	-	-	0,83	99,9	8
Salmonella typhi	X	√	X	-	-	<10	140,0	100,0	11
Salmonella typhi	X	√	X	7,0	40	<1	273,0	100,0	18
Salmonella typhi	X	√	1% egg white	7,0	40	30	96,0	100,0	18
Salmonella typhi	X	√	20% human serum	-	-	<30	140,0	100,0	11
Salmonella typhimurium	X	√	X	-	5	<1	100,0	100,0	9
Salmonella typhimurium	X	√	X	-	-	<10	140,0	100,0	11
Salmonella typhimurium	X	√	1% milk	-	5	<1	100,0	100,0	9
Salmonella typhimurium	X	√	20% human serum	-	-	<1	100,0	100,0	11
Serratia marcescens	X	√	X	-	-	-	1,14	99,9	8
Shigella sp	X	√	X	-	-	5	15,0	>99,999	12
Staphylococcus aureus	X	√	X	-	-	-	1,12	99,9	8
Staphylococcus aureus	X	√	X	6,1	25	2	12,5	>99,999	16
Staphylococcus aureus	X	√	X	-	-	15	15,0	>99,9999	12

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Staphylococcus aureus	X	√	X	6,6	25	5	45,0	100,0	19
Staphylococcus aureus	X	√	X	-	5	<10	100,0	100,0	9
Staphylococcus aureus	X	√	X	-	20	5	100,0	99,999	6
Staphylococcus aureus	X	√	X	-	-	1	140,0	99,9999	10
Staphylococcus aureus	X	√	X	-	-	<10	140,0	100,0	11
Staphylococcus aureus	X	√	1% milk	-	5	<10	100,0	100,0	9
Staphylococcus aureus	X	√	1% milk	-	20	5	150,0	99,999	6
Staphylococcus aureus	X	√	2% milk	-	-	1	140,0	99,9999	10
Staphylococcus aureus	X	√	5% milk	-	-	10	350,0	99,9999	10
Staphylococcus aureus	X	√	10% plasma	-	25	5	2.500,0	100,0	13
Staphylococcus aureus	X	√	20% human serum	-	-	<30	140,0	100,0	11
Staphylococcus aureus	X	√	40% serum	-	-	10	150,0	100,0	14
Staphylococcus aureus	Glass disc	X	X	-	20	5	100,0	99,999	6
Staphylococcus aureus	X	√	X	-	20	10	200,0	100,0	2
Staphylococcus aureus	Penicillin	X	X	-	-	30 (and 8 hour)	200,0	100,0	20
Staphylococcus aureus	X	√	1% milk	-	-	10	150,0	100,0	14
Staphylococcus aureus	X	√	5% yeast	-	-	60	200,0	100,0	14
Staphylococcus aureus	X	√	40% serum	-	-	60	500,0	100,0	14
Streptococcus sp	X	√	X	-	-	5	15,0	>99,9999	12
Streptococcus uberis	X	√	X	-	-	1	140,0	99,9999	10
Streptococcus uberis	X	√	2% milk	-	-	1	140,0	99,99	10
Streptococcus uberis	X	√	5% milk	-	-	1	350,0	99,9999	10
Yersinia enterocolitica	X	√	X	-	-	-	0,72	99,9	8

5.0 FUNGUS

Organism	Surface test	Suspension test	Organic red	pH	Temperature °C	Exposure time (min)	Available chlorine (ppm)	Biocidal result %	Reference
Aspergillus flavus	X	√	X	-	20	10	200,0	>99,99	21
Aspergillus niger	X	√	X	-	20	10	200,0	100,0	21
Aspergillus niger	Penicillin	X	X	-	-	30 (and 8 hour)	1.000,0	100,0	20
Aspergillus versicolor	X	√	X	-	20	10	200,0	100,0	21
Candida albicans	X	√	X	-	-	-	45,9	99,9	8
Candida albicans	X	√	X	-	20	15	50,0	99,999	22
Candida albicans	X	√	X	-	5	<10	100,0	100,0	9
Candida albicans	X	√	X	-	-	<10	140,0	100,0	11
Candida albicans	X	√	X	-	-	-	250,0	100,0	23
Candida albicans	X	√	1% milk	-	5	<10	100,0	100,0	9
Candida albicans	X	√	X	-	-	10	150,0	100,0	14
Candida albicans	X	√	X	-	-	15	1.000,0	100,0	14
Candida albicans	X	√	40% serum	-	-	60	1.000,0	100,0	14
Candida guilliermondii	X	√	X	-	-	-	125,0	100,0	23
Candida krusei	X	√	X	-	-	-	250,0	100,0	23
Candida parakrusei	X	√	X	-	-	-	250,0	100,0	23
Candida tropicalis	X	√	X	-	-	-	250,0	100,0	23
Cladosporium sp	X	√	X	-	20	10	200,0	100,0	21
Cryptococcus neoformans	X	√	X	-	20	10	200,0	100,0	21
Gypseum trikofiton	X	√	40% serum	-	-	60	1.000,0	100,0	14
Hyphopichia burtonii	X	√	X	-	20	10	200,0	100,0	21
Kluyvermyces bulgaricus	X	√	X	-	-	-	125,0	100,0	23
Monascus ruber	X	√	X	-	20	10	200,0	100,0	21
Moniliella suaveolens	X	√	X	-	20	10	200,0	100,0	21
Neosartorya pseudofischeri	X	√	X	-	20	10	200,0	100,0	21
Penicillium caseifulum	X	√	X	-	20	10	200,0	99,0	21
Penicillium chrysogenum	X	√	X	-	20	10	200,0	100,0	21
Penicillium corylophilum	X	√	X	-	20	10	200,0	100,0	21
Penicillium commune	X	√	X	-	20	10	200,0	99,99	21
Penicillium crustosum	X	√	X	-	20	10	200,0	100,0	21
Penicillium discolor	X	√	X	-	20	10	200,0	99,0	21
Penicillium nalgiovense	X	√	X	-	20	10	200,0	>99,99	21
Penicillium solitum	X	√	X	-	20	10	200,0	100,0	21
Penicillium verrucosum	X	√	X	-	20	10	200,0	100,0	21

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Pichia anomola	X	√	X	-	20	10	200,0	100,0	21
Pichia fluxum	X	√	X	-	-	-	250,0	100,0	23
Pichia haplophila	X	√	X	-	-	-	250,0	100,0	23
Pichia norvegensis	X	√	X	-	20	10	200,0	100,0	21
Prototheca zopfii	X	√	X	-	-	-	62,5	100,0	23
Saccharomyces cerevisiae	X	√	X	-	-	-	72,0	99,9	8
Saccharomyces italicus	X	√	X	-	-	-	125,0	100,0	23
41WTorulopsis sp	X	√	X	-	-	-	250,0	100,0	23
Torulaspora delbrueckii	X	√	X	-	20	10	200,0	100,0	21
Trichosporon cutaneum	X	√	X	-	-	-	250,0	100,0	23

6.0 MYCOBACTERIUM

Organism	Surface test	Suspension test	Organic red	pH	Temperature °C	Exposure time (min.)	Available chlorine (ppm)	Biocidal result %	Reference
Mycobacterium smegmatis	X	√	X	-	-	1	60,0	>99,9999	24
Mycobacterium smegmatis	X	√	X	-	20	5	100,0	99,999	6
Mycobacterium smegmatis	X	√	X	-	-	30	200,0	>99,99	25
Mycobacterium smegmatis	X	√	X	-	-	5	1.000,0	99,99	25
Mycobacterium smegmatis	X	√	1% milk	-	20	5	150,0	99,999	6
Mycobacterium smegmatis	X	√	Sputum	-	-	1	60,0	>99,9999	24
Mycobacterium smegmatis	Stainless steel disc	X	X	-	-	1	60,0	>99,99	24
Mycobacterium smegmatis	Glass disc	X	X	-	20	5	100,0	99,999	6
Mycobacterium smegmatis	Stainless steel disc	X	Sputum	-	-	1	60,0	>99,99	24
Mycobacterium terrae	X	√	X	-	-	30	300,0	>99,999	25
Mycobacterium terrae	X	√	X	-	-	5	1.000,0	>99,999	25
Mycobacterium tuberculosis	X	√	X	-	-	30	200,0	>99,99	25
Mycobacterium tuberculosis	X	√	X	-	-	5	1.000,0	>99,99	25
Mycobacterium tuberculosis	X	√	X	-	-	60	200,0	100,0	14
Mycobacterium tuberculosis	X	√	40% serum	-	-	60	500,0	100,0	14

7.0 SPORES

Organism	Surface test	Suspension test	Organic red	pH	Temperature °C	Exposure time (min.)	Available chlorine (ppm)	Biocidal result %	Reference
Bacillus subtilis	X	√	2% horse blood	-	-	15	5.750,0	99,99	29
Bacillus subtilis	X	√	4% horse blood	-	-	30	5.750,0	99,0	29
Bacillus subtilis	X	√	4% horse blood	-	-	45	5.750,0	>99,999	29
Bacillus subtilis	X	√	20% serum	-	-	<120	140,0	100,0	11
Bacillus subtilis	Silk suture / porcelain	X	X	-	20	Up to 10 hours	140,0	100,0	11
Bacillus subtilis	X	X	X	-	20	10	200,0	100,0	2
Clostridium perfringenes	X	√	X	-	-	<60	140,0	100,0	11
Clostridium perfringenes	X	√	20% serum	-	-	<120	140,0	100,0	11
Clostridium perfringenes	Silk suture / porcelain	X	X	-	20	Up to 10 hours	140,0	100,0	11
Clostridium tetani	X	√	X	-	-	<60	140,0	100,0	11
Clostridium tetani	X	√	20% serum	-	-	<120	140,0	100,0	11
Olpidium brassicae	X	√	X	-	-	-	1.000,0	100,0	30

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8.0 VIRUSES

Organism	Surface test	Suspension test	Organic red	pH	Temperature °C	Exposure time (min.)	Available chlorine (ppm)	Biocidal result %	Reference
Herpes simplex	Glass disc	X	X	-	-	1	2.500,0	99,998	33
Herpes simplex	Glass disc	X	X	-	-	1	10.000,0	100,0	33
Human immunodeficiency	X	√	X	-	25	2	50,0	100,0	34
Human immunodeficiency	X	√	X	-	-	5	100,0	100,0	35
Human immunodeficiency	X	√	10% plasma	-	25	2	2.500,0	100,0	34
Human immunodeficiency	X	√	Equal blood volume	-	25	2	5.000,0	100,0	34
Infectious bovine rhinotrachetis	X	√	X	-	10	10	6.000,0	100,0	32
Infectious bursal disease	X	√	X	-	20	10	6.000,0	100,0	34
Japanese encephalitis	X	√	X	-	20	10	6.000,0	100,0	34
Japanese encephalitis	X	√	10% serum	-	20	10	6.000,0	100,0	34
Newcastle disease	X	√	X	-	4	30	666,0	99,99	3
Newcastle disease	X	√	X	-	20	10	6.000,0	100,0	32
Newcastle disease	X	√	10% serum	-	20	10	6.000,0	100,0	32
Poliomyelitis	X	√	X	-	-	20	150,0	100,0	14
Poliomyelitis	X	√	X	-	-	60	500,0	100,0	14
Poliomyelitis II	X	√	X	-	-	30	650,0	100,0	36
Poliomyelitis II (Sabin)	X	√	X	-	-	30	650,0	100,0	36
Poliomyelitis	X	√	1% milk	-	-	20	150,0	100,0	14
Poliomyelitis	X	√	40% plasma	-	-	60	500,0	100,0	14
Reovirus	X	√	X	-	20	10	6.000,0	100,0	32
Swine vesicular disease	X	√	X	-	4	30	500,0	99,99	3
Adenovirus	X	√	X	-	20	30	131,0	99,999	34
Avian Infectious	X	√	X	-	20	10	6.000,0	100,0	32
Bovine adenovirus	X	√	X	-	20	10	6.000,0	100,0	32
Canine parvovirus	X	√	X	-	20	10	6.000,0	100,0	32
Cocksackie B1	X	√	X	-	-	15	650,0	100,0	36
Cocksackie B1	X	√	X	-	-	30	650,0	100,0	36
Cocksackie B1	X	√	40% serum	-	-	30	650,0	100,0	36
Cocksackie B6	X	√	X	-	-	15	380,0	>99,999	36
Cocksackie B6	X	√	X	-	-	15	650,0	100,0	36
Cocksackie B6	X	√	X	-	-	30	650,0	100,0	36
Cocksackie B6	X	√	40% serum	-	-	30	650,0	100,0	36
Enterovirus	X	√	X	-	20	30	97,0	99,999	31
Feline calcivirus	X	√	X	-	20	10	6.000,0	100,0	32
Feline rhinotrachetis	X	√	X	-	20	10	6.000,0	100,0	32
Foot & mouth disease	X	√	X	-	4	30	1.000,0	99,99	3
Hepatitis B	X	√	X	-	-	45	140,0	100,0	11
Hepatitis B	X	√	20% serum	-	-	60	140,0	100,0	11
Herpes simplex	X	√	X	-	-	30	140,0	100,0	11
Herpes simplex	X	√	20% serum	-	-	30	140,0	100,0	11
Herpes simplex	Glass disc	√	X	-	-	10	1.000,0	100,0	33

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BACTERIA	
Aerobacter aerogenes	Gas-forming microorganisms
Bacillus anthracis	Bacillus that causes anthrax in humans and in some animals (Davaine's bacillus)
Bordetella bronchiseptica	A gram-negative bacterium that causes respiratory disease
Brucella spp	A gram-negative bacterium with a brucellosis effect (The disease affects people through animal food, with fluctuating fever, sweating, weakness and muscle soreness, and a clear disease pattern.
Enterococcus faecalis	A gram-positive bacterium grouped as small chains and relatively resistant to light
Erysipelothrix	A gram-positive bacterium
Escherichia coli	Bacterial species usually found in large intestines without disease and often causing infection in the urinary system
Klebsiella pneumonia	Klebsiella spp., Accompanied by other bacterial pathogens in respiratory tract infections, primarily lobar pneumonia,
Listeria innocua	A gram-positive bacterium
Listeria monocytogenes	Meningitis and encephalitis in adulthood, Listeria species causing pregnancy to fall through the fetus.
Micrococcus luteus	A gram-positive bacterium
Proteus vulgaris	Proteus genus, which usually lives on spoiled materials and can cause urinary tract infection in some cases.
Pseudomonas aeruginosa	A gram-negative bacterial species that is found in the urinary system, ear and eye infections and in infected wounds and sometimes responsible for infection
Salmonella spp	A kind of bacteria, gram negative rods. They live in humans and animals as parasites and often carry disease-causing properties
Salmonella paratyphoid A	Salmonella species that cause type A paratyphoid.
Salmonella typhi	Salmonella species that cause typhoid.
Shigella spp	Some species are causing bacterial dysentery immature, gram-negative bacteria
Staphylococcus aureus	Apse etc. A gram-positive bacterial strain with rounded shape that causes cystic lesions.
Streptococcus spp	Gram-positive round, stationary bacteria that are arranged in chains. (Streptococci are classified as alpha hemolytic, beta hemolytic and non hemolytic according to hemolytic activity in the culture medium consisting of bloody agar.
Yersinia enterocolitic	Gram-negative bacterial species that cause inflammation in the small intestine and colon, some of which are pathogenic

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FUNGUS	
Aspergillus	Some species are a type of fungus that settles in various organs and causes disease.
Candida albicans	It is usually a saprophytic fungus that shows thin extensions in the form of fibers that cause vaginosis in females and thrush in infants.
Cryptococcus neoformans	It is a fungus type
Gypseum trichopyhton	It is a type of fungus that causes disease by locating in hair and skin hairs.
Trichosporon cutaneum	A fungus that causes trichoporosis.
MYCOBACTERIUM	
Mycobacterium smegmatis	A long, gram-positive bacterial strain in the form of a rod
Mycobacterium tuberculosis	Type of mycobacteria causing tuberculosis, Koch basil.
SPORES	
Bacillus anthracis	Bacillus (Davaine's bacillus), which causes anthrax in man and in some animals,
Clostridium perfringenes	It is a type of bacterium that contains gram-positive spore bacilli that live in an oxygen-free environment, causing gaseous gangrene. Clostridium welchii.
Clostridium tetani	Clostridium species causing tetanus.
VIRUSES	
Adenovirus	A group of virus-containing DNA.
Avian Infectious Bronchitis	A group of viruses that cause infectious bronchitis and spread from birds.
Herpes Simplex	The same named virus is caused by a marked acute infection with the formation of common small vesicles on various skin and mucosa areas.
Human Immunodeficiency	AIDS
Japanese encephalitis	A certain viral epidemic encephalitis seen in remote far east countries, mainly Japan.
Poliomyelitis	Inflammation of spinal cord gray matter, viral disease, childhood, polyomyelitis, which starts suddenly with fever, headache, muscle aches, nausea and vomiting, which is seen in children, and which is atrophy and numbness in the muscles.
Reovirus	Abbreviated words of "respiratory enteric orphan virus"

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