



Role and Practical Application of Culture Collections in Global Challenge Mitigation

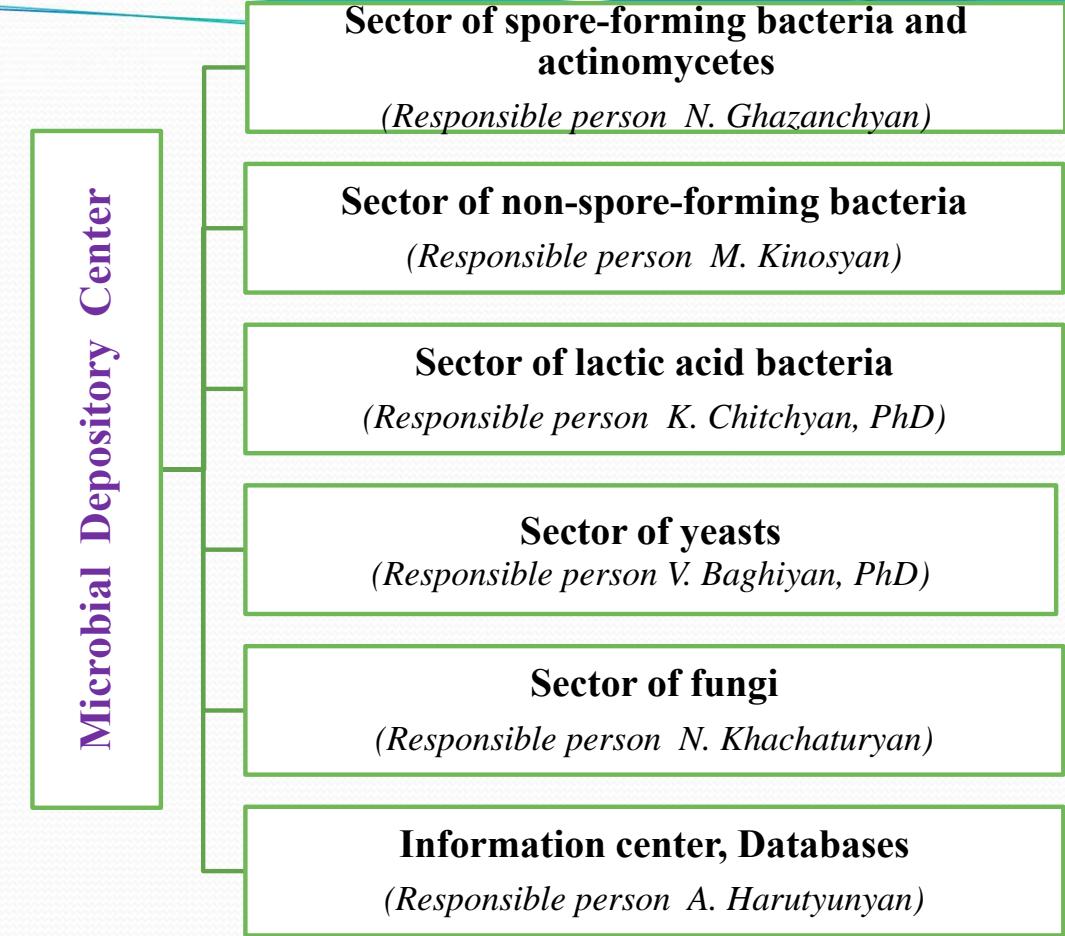
Braunschweig , 28 September 2022

**PhD, Asst.Prof.
V.A. Baghiyan**

LIST of microbial cultures maintained in Microbial Depository Center

Microorganisms groups	Q-ty of strains
Aerobic spore-forming bacteria (<i>Bacillus</i>)	
- Entomopathogens - <i>B. thuringiensis</i> , <i>L. sphaericus</i> , <i>B. laterosporus</i> and others	5000
- Mesophiles	2200
- Extremophyles - Thermophiles, Alkaliphiles, Halophiles, Acidophiles and others	2000
Non-spore-forming bacteria	
- <i>Pseudomonas</i> group	300
- Phytopathogenic cultures	200
- Nitrogen-fixing bacteria	25
- Genus <i>Rhodococcus</i>	10
Fungi	
- Mycosporic fungi	1000
- <i>Basidiomycetes</i>	35
Actinomycetes - <i>Streptomycetes</i> (including typical strains)	20
Yeast , including extremophiles	600
Lactic-acid bacteria	650
Test cultures	40
Total:	12080

Structure



Research Main Directions

- Study of bacterial biodiversity;
- Complex study, isolation and classification of new microbes, development of long-term maintenance methods for their vitality and important industrial features, as well as suggestions for practical use.
- Preservation and expansion of the collection fund of microbiologically and biotechnologically valuable strains.

Applied Potential of MDC Culture Collection

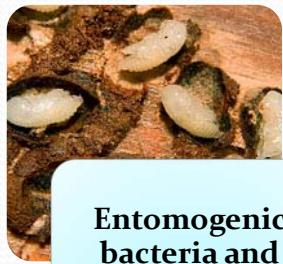
The National Asset
of the Republic of Armenia
Acronyms: INMIA → RCDM → MDC

Registered as a member of World
Federation of Culture Collection
(WFCC) WDCM №803

Holds over 12000 cultures of
microorganisms



Entomopathoge-
nic bacilli
(bacterial
insecticides,
parasporins)



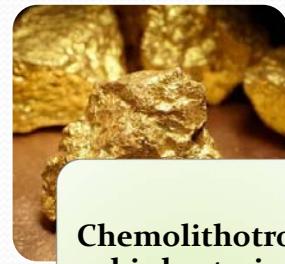
Entomogenic
bacteria and
fungi
(lignocellulolytic
enzymes)



Phytopathogeni-
c bacteria (weed
control)



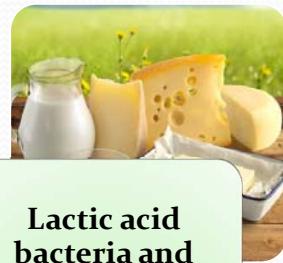
Nitrogen-fixing
bacteria
(biofertilizers)



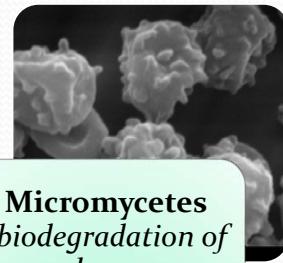
Chemolithotrop-
hic bacteria
(bacterial leaching
of metals)



Photosynthesiz-
ng purple
bacteria
(carotenoids,
vitamins, organic
acids, biogases)



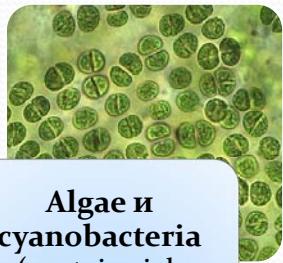
Lactic acid
bacteria and
yeast (milk acid
products,
antibiotics)



Micromycetes
(biodegradation of
polymers,
producers of
enzymes, organic
acids, antibiotics)



Basidiomycetes
(edible fungi,
producers of
enzymes)



Algae и
cyanobacteria
(protein rich
biomass, lipids,
carbohydrates,
fatty acids)

Degrading fungi found in biodamaged polimeric materials

Polimeric materials	Species of fungi - destructors
Silicone materials	<i>Aspergillus niger</i> , <i>A.terreus</i> , <i>A.tamarii</i> , <i>A.flavus</i> , <i>A.candidus</i> , <i>Alternaria alternata</i> , <i>Scopulariopsis brevicaulis</i> , <i>Fusarium sp.</i> , <i>A.fimigatus</i> , <i>Chaetomium olivaceum</i> , <i>A.unilateralis</i> , <i>Penicillium aurantiogriseum</i> , <i>P.aeneum</i>
Fluoroplastics	<i>A.niger</i> , <i>A.terreus</i> , <i>A.flavus</i> , <i>A.candidus</i> , <i>P. aurantiogriseum</i> , <i>Alternaria alternata</i> , <i>A.tamarii</i> , <i>Trichoderma viride</i> , <i>Fusarium sp.</i> , <i>Oidiodendron sp.</i> , <i>P.chrysogenum</i> , <i>A.phoenicus</i>
Polyamides	<i>A.niger</i> , <i>A.terreus</i> , <i>A.candidus</i> , <i>A.flavus</i> , <i>Alternaria alternata</i> , <i>Fusarium sp.</i> , <i>Mucor sp.</i> , <i>Trichoderma viride</i> , <i>A.tamarii</i> , <i>Chaetomium olivaceum</i> , <i>P. aurantiogriseum</i> , <i>P.varabile</i> , <i>P.simplicissimum</i> , <i>P.funiculasum</i>
Polyimides	<i>A.terreus</i> , <i>A.tamarii</i> , <i>Fusarium sp.</i> , <i>A.niger</i> , <i>P.chrysogenum</i> , <i>A.flavus</i> , <i>P. aurantiogriseum</i> , <i>Trichoderma viride</i>
Polyesters	<i>A.terreus</i> , <i>A.niger</i> , <i>P. aurantiogriseum</i> , <i>F.oxysporum</i> , <i>Alternaria alternata</i> , <i>C. olivaceum</i> , <i>P.chrysogenum</i>
Rubber materials	<i>Alternaria alternata</i> , <i>A.niger</i> , <i>A.terreus</i> , <i>C. olivaceum</i> , <i>P.chrysogenum</i> , <i>Fusarium sp.</i> , <i>A.ustus</i> , <i>A.tamarii</i> , <i>Mucor sp.</i>
Leatherette	<i>A.ustus</i> , <i>Aspergillus sp.</i> , <i>Alternaria sp.</i> , <i>Penicillium sp.</i> , <i>A.niger</i> , <i>A.terreus</i> , <i>Fusarium sp.</i> , <i>Verticillium sp.</i>
Leather	<i>A.niger</i> , <i>A.terreus</i> , <i>A.flavus</i> , <i>Alternaria alternata</i> , <i>A.candidus</i> , <i>A.tamarii</i> , <i>P.chrysogenum</i> , <i>P. aurantiogriseum</i> ,
Cellulosic material	<i>A.fumigatus</i> , <i>Aureobazidium pullulans</i> , <i>Chaetomium globosum</i> , <i>Cladosporium herbarum</i> , <i>Paecilomyces variotii</i> , <i>P.aurantiogriseum</i> , <i>P.ochrochoron</i> , <i>P.funiculosum</i> . <i>P.chrysogenum</i> , <i>Scopulariopsis brevicaulis</i> , <i>Ulocladium botrytis</i>

The composition of standard kits.

Kit GOST 9.049-91
(GOST, Russia, c)

Aspergillus niger 8133
Chaetomium globosum 8117
Paecilomyces variotii 8135
Penicillium aurantiogriseum 8119
Penicillium chrysogenum 8128
Penicillium funiculosum 8120
Aspergillus flavus 8134
Aspergillus terreus 8114
Trichoderma viride 8125

Kit “Commission”
(MDC)

Alternaria alternata 8265*
Aspergillus niger 8266
Aspergillus puniceus 8267
Aspergillus ustus 8268
Aureobasidium pullulans 8269
Cladosporium herbarum 8270
Penicillium funiculosum 8271
Scopulariopsis brevicaulis 8272

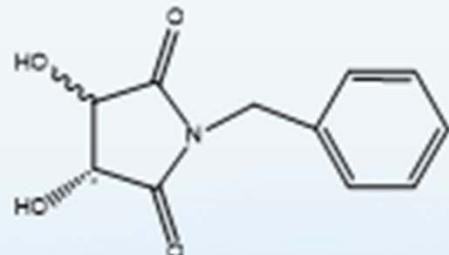
Compositions of fungal degradats Kits for biostability tests of polymers

Kit 1 <i>Alternaria alternata</i> 12115 (ISS) <i>Aspergillus fumigatus</i> 12036 (Mir) <i>A. niger</i> 8133 (GOST) <i>Penicillium chrysogenum</i> 12039 (Mir) <i>P. decumbens (steckii)</i> 8220 (NE)	Kit 2 <i>Aspergillus niger</i> 8266 (Commission) <i>A. versicolor</i> 12086 (Mir) <i>Cladosporium macrocarpum</i> 12043 (Mir) <i>Paecilomyces lilacinus</i> 8221 (NE) <i>Penicillium aurantiogriseum</i> 12050 (Mir)
Kit 3 <i>Aspergillus fumigatus</i> 12101 (Mir) <i>Penicillium chrysogenum</i> 12110 (Mir) <i>P. melinii</i> 12035 (Mir) <i>P. decumbens (steckii)</i> 8220 (NE) <i>Phoma eupyrena</i> 12047 (Mir)	Kit 4 <i>Aspergillus fumigatus</i> 12116 (ISS) <i>Cladosporium sphaerospermum</i> 12098 (ISS) <i>Paecilomyces lilacinus</i> 8221 (NE) <i>Penicillium aurantiogriseum</i> 12132 (ISS) <i>Ulocladium botrytis</i> 12037 (Mir)
Kit 5 <i>Penicillium chrysogenum</i> 12110 (Mir) <i>P. decumbens (steckii)</i> 8220 (NE)	Kit 6 <i>Paecilomyces lilacinus</i> 8221 (NE) <i>Penicillium aurantiogriseum</i> 12050 (Mir)

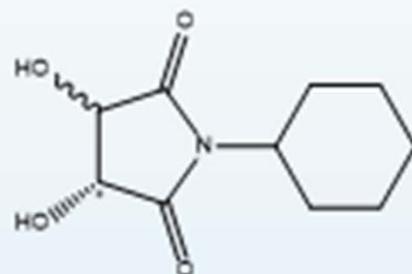
Stability of synthetic polymeric materials to sets of degrading fungi

Fungi and bacteria kits	Degree of fouling of polymer materials, points				
	Poly-ester	Fluoro-layer	Poly-imide	Poly-ethylene	Polyethylene terephthalate
Kit № 3	4	4	5	4	4
Kit № 5	4	4	5	5	4
Kit "GOST "	3	3	4	3	4
Kit "Commission"	3	3	4	4	4
Kit "New"	4	3	4	3	4

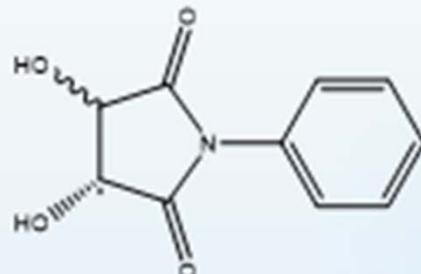
NEW SYNTHETIC DERIVATIVES OF TARTARIC ACID



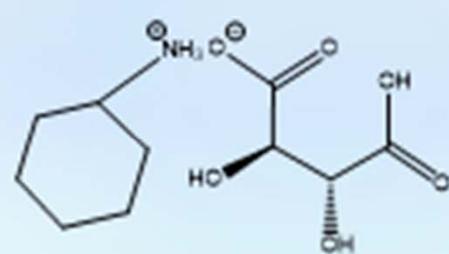
Tartaric acid benzyl
imide (BI)



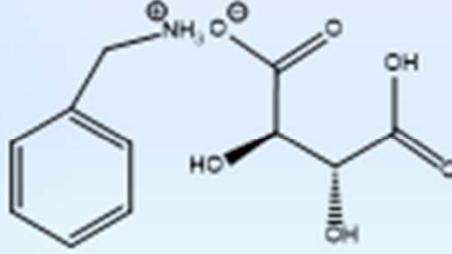
Tartaric acid
cyclohexymide (CI)



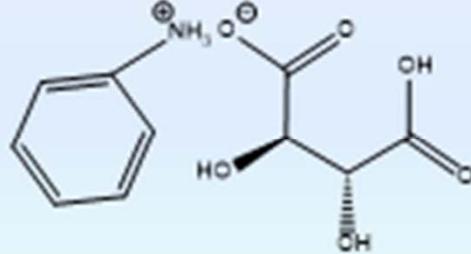
Tartaric acid
phenylamide (PhI)



Cyclohexylamino complex
tartaric acid (CAS)



Benzylamino complex
tartaric salt (BAS)



Phenylamino complex
tartaric acid (PhAS)