

BCX400

NARAVNA MOČ. ČISTI REZULTATI.



**ADVANCED BIOLOGICAL TECHNOLOGY BCx400
FOR EFFICIENT SEWERAGE SYSTEMS.**



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Wastewater and sewage systems represent a complex environment in which billions of microorganisms appear every day. These include bacteria, fungi, yeasts and viruses, which can significantly affect the operation of sewage networks, treatment plants and human and environmental health.

Due to the increasing use of antibiotics, disinfectants and other chemicals in households, healthcare facilities and industry, many microorganisms are becoming more resistant to conventional removal methods.

Microorganisms that develop resistance to antibiotics and form biofilms are of particular concern, as they can cause long-term problems in sewage systems and pose a potential risk to public health.

This catalog presents the most common reference microorganisms used in laboratory testing of the effectiveness of biological, disinfection and remediation processes.

Technical report on the testing of the BCx400 preparation in the sewage system of the city of Split - Croatia.

Sewerage system test – Split

Implementation date: 15. 5. 2026

Dosing location: 43.531697, 16.511156

Test duration: 9:30–12:00 (150 minutes / 2 hours 30 minutes)



01

PURPOSE OF TESTING

The purpose of the field testing was to verify the effectiveness of the BCx400 preparation in reducing organic load, fats, unpleasant odors, and improving biological activity in the heavily loaded sewage system of the city of Split. The test was designed as a dynamic flow-through dosing of the preparation into an active sewage stream with the aim of simulating real operating conditions in a municipal system.

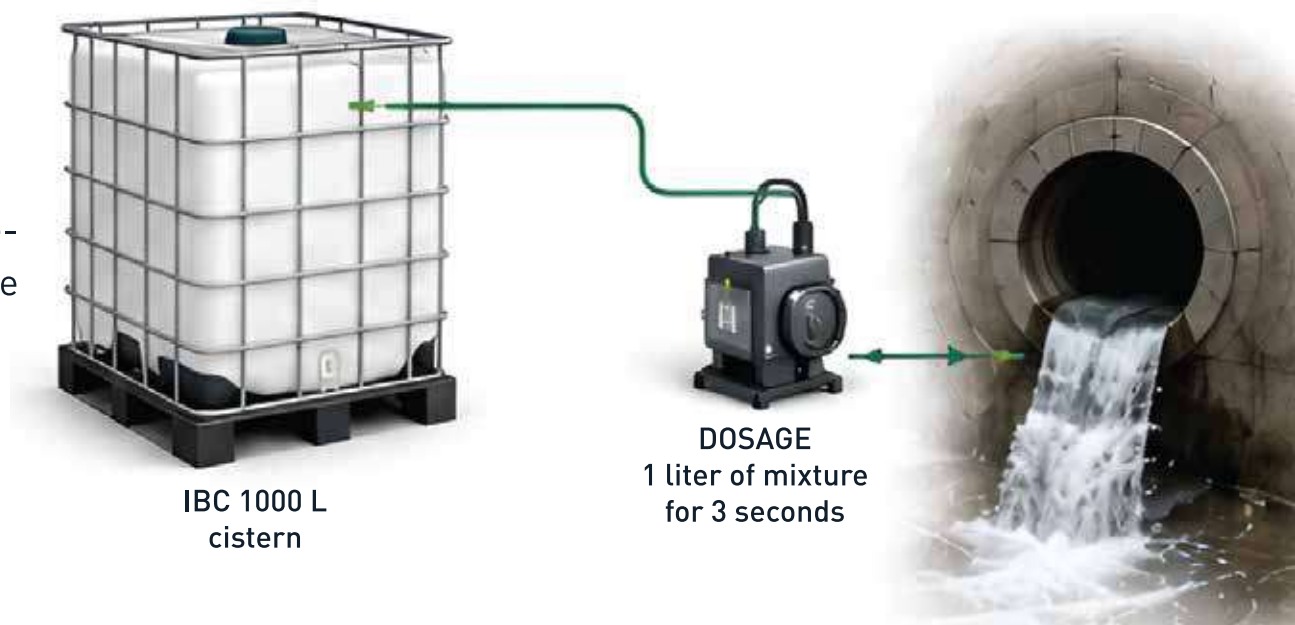


02

DESCRIPTION OF TEST PERFORMANCE

A 1000 L IBC tank was installed at the testing location, into which BCx400 was continuously added in quantities of 20 to 40 L per fill. The mixture of water and the preparation thus prepared was then dosed directly into the sewage system in a controlled manner.

The estimated base flow of the sewage stream was approximately 10–20 L/s.



IBC 1000 L
cistern

DOSAGE
1 liter of mixture
for 3 seconds

The dosing system was set to deliver approximately 1 L of the prepared mixture every 3 seconds. During the testing itself, a successive increase in the water inflow into the sewage system was observed, so an additional dosage correction was made by directly adding the concentrated BCx400 preparation in order to maintain the optimal concentration of active components in the flow system.



SEWER FLOW

10–20 L/s



BCx400 CONSUMPTION

približno 450 L



WATER FOR MIXTURE PREPARATION

približno 5000 L

03

SAMPLING AND ANALYSIS LOCATIONS

Wastewater sampling and laboratory analyses were carried out at several points in the sewage network:

-  **KovinaElektra**
-  **ELOS**
-  **CP Dujmovača**

The first reference (“zero”) sample was taken at 9:20 AM at the KovinaElektra location, immediately before the start of the preparation dosing.

The following samples were taken approximately 1.5 hours after the start of the treatment, which allowed monitoring of rapid changes in the flow system.





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4.1 REDUCTION ORGANIC LOADS (COD)

Analyses of the samples taken showed pronounced changes physicochemical parameters of wastewater **in a very short period of time.**

START
VALUE

3320

mg O₂/L

VALUE BEFORE
TREATMENT

1600

mg O₂/L

The most important indicator of effectiveness was the reduction in chemical oxygen demand (COD).



The result indicates very rapid **activation of biological processes** decomposition of organic matter in the sewage system.

51,8%

REDUCTION
COD



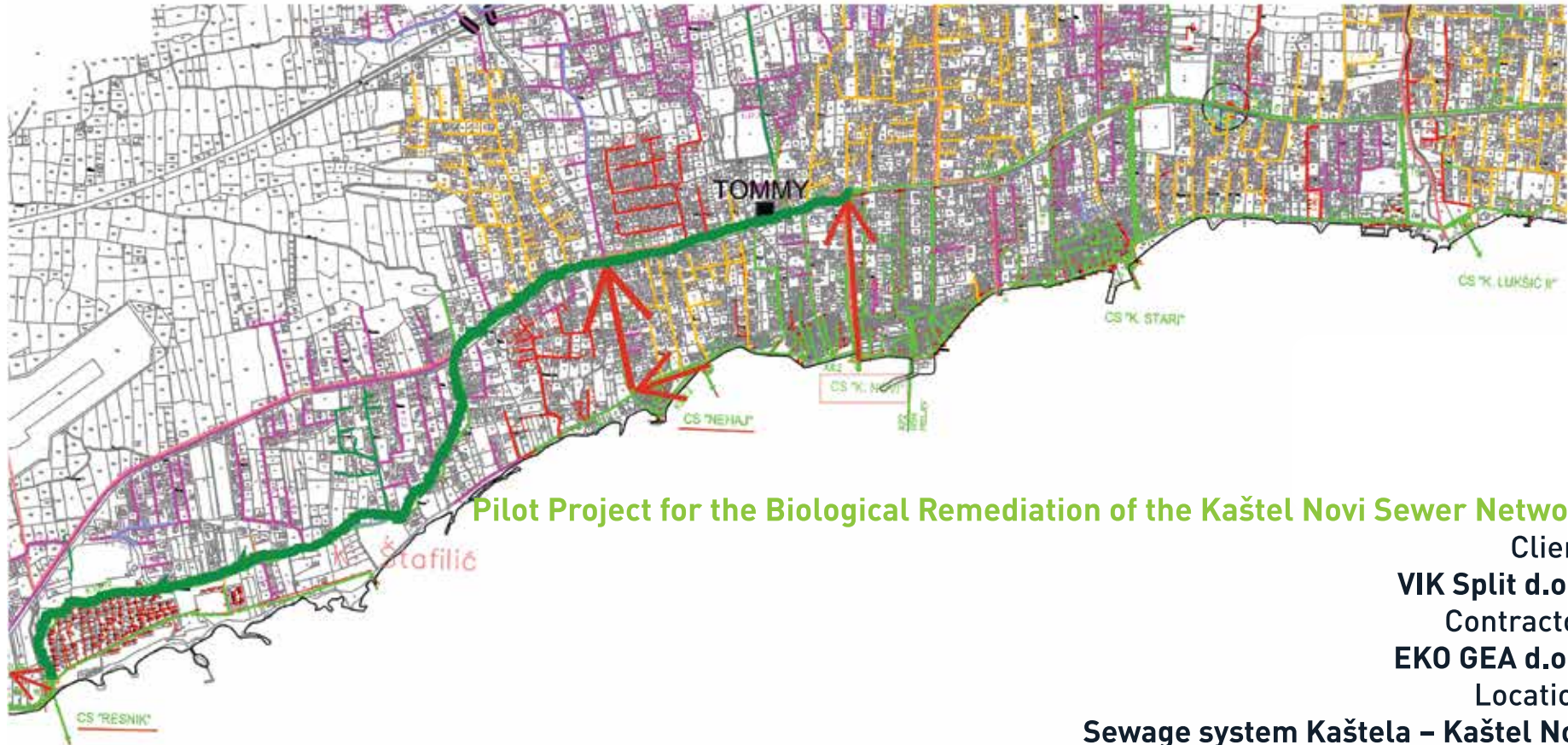
4.2

CHANGES OTHER PARAMETERS

The following positive changes were also observed during testing:

- ✓ an increase in pH value to 9.8, which indicates the activation of the biological process and stabilization of the system,
- ✓ decrease of 28.13% in the concentration of oils and fats in an hour and a half of treatment,
- ✓ improving the dissolved oxygen content in water,
- ✓ reduction of unpleasant odors immediately at the start of treatment (after 10 minutes),
- ✓ visible change in the structure and clarity of wastewater.

SCIENTIFIC-EXPERT REPORT VALIDATION OF THE EFFICACY OF THE BIOLOGICAL PREPARATION BCx 400 SEWERAGE SYSTEM OF KAŠTELA (CROATIA)



Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

Client:

VIK Split d.o.o.

Contractor:

EKO GEA d.o.o.

Location:

Sewage system Kaštela – Kaštel Novi

Testing period:

2026

SUMMAR

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

As part of the pilot project, the application of the biological preparation BCx 400 was carried out in the Kaštela sewage system with the aim of testing its impact on reducing unpleasant odors and improving the general biological condition of the sewage system.

The results of field observations, visual inspections and expert analysis of the product's performance show that the effects are not limited to odor reduction, but encompass a comprehensive impact on microbiological, biochemical and physical processes within the sewage system.

A reduction in conditions for the development of anaerobic processes, a reduction in biofilm formation, a reduction in organic deposits, an improvement in the fluidity of the system, and the creation of an environment that is not favorable for the development of many pathogenic microorganisms were found.

INTRODUCTION

Pilotni projekt biološke sanacije kanalizacijskega omrežja Kaštel Novi

Modern sewage systems represent a complex biological ecosystem in which numerous processes of decomposition of organic matter take place.

In the absence of oxygen, anaerobic conditions develop, causing:

- ✓ formation of hydrogen sulfide (H_2S),
- ✓ formation of mercaptans
- ✓ ammonia formation,
- ✓ accumulation of fatty deposits,
- ✓ increased corrosion of infrastructure,
- ✓ increased presence of pathogenic microorganisms.

BCx400 represents a new generation of biological preparations developed to optimize microbiological processes in sewage systems, pumping stations, pressure lines and treatment plants.

COMPOSITION AND MECHANISM OF ACTION OF THE PREPARATION BCx400

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

BCX 400 is a biological activator based on bioactive components of brown seaweed.

Contains:

- ✓ alginates,
- ✓ fucoidans,
- ✓ laminarins,
- ✓ polysaccharides,
- ✓ natural enzyme activators,
- ✓ organic minerals,
- ✓ trace elements.

Bioactive components stimulate the development of beneficial indigenous microbial populations and increase the efficiency of natural processes of organic matter decomposition. As a result, the formation of anaerobic metabolites is reduced and the stability of the entire sewage system ecosystem is improved.

LOCATION AND PERFORMANCE OF TESTING

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

The BCx400 preparation was dosed at the pumping station:

CS "K. NOVI"

Kaštel Novi

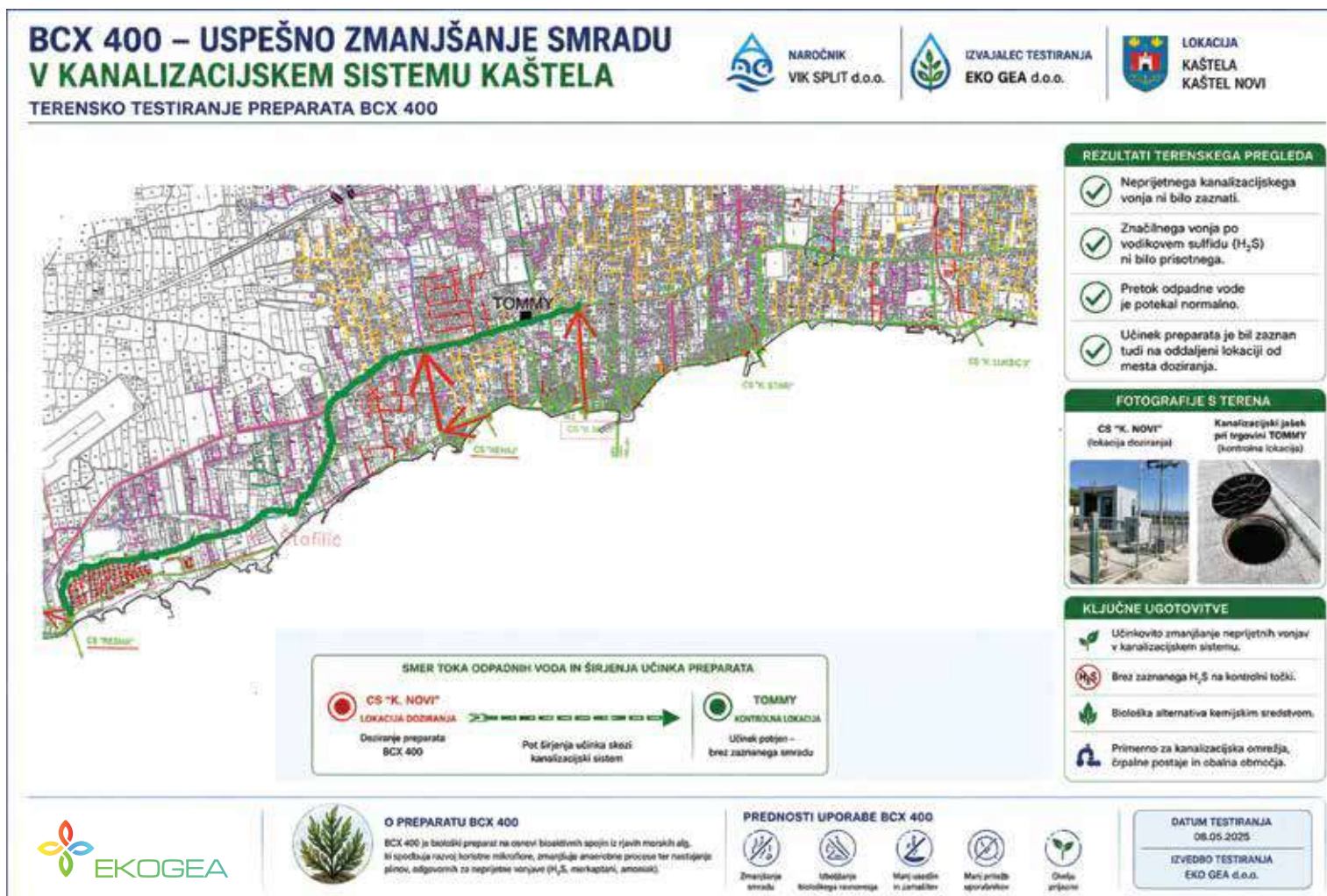
Effect monitoring control point:

Sewerage shaft at the TOMMY store

The purpose of choosing a remote control point was to verify the preparation's ability to operate throughout the entire sewage flow.

LOCATION AND PERFORMANCE OF TESTING

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network



ADVANCED BIOLOGICAL TECHNOLOGY BCx400 FOR EFFICIENT SEWERAGE SYSTEMS





ADVANCED BIOLOGICAL TECHNOLOGY BCx400 FOR EFFICIENT SEWERAGE SYSTEMS



OBSERVED EFFECTS

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

Reduction of unpleasant odors

After application of the product at the control location, no characteristic sewage odor was detected.

Also, no characteristic odor of hydrogen sulfide (H₂S) was detected.

This indicates a reduction in the anaerobic activity of bacteria responsible for the formation of sulfur compounds.

Biofilm reduction

Biofilm represents the main environment for the development of anaerobic bacteria and numerous pathogens.

The observed effects of BCx400 indicate a reduction in the conditions for its formation and the destabilization of existing biofilms.

As a result, the possibility of the development of:

- sulfate-reducing bacteria,
- pathogenic enterobacteria,
- other microorganisms that cause unpleasant odors is reduced.

Reduction of corrosion processes

Hydrogen sulfide is the main cause of biogenic corrosion of sewage systems.

By reducing its formation, the following are also reduced:

- corrosion of concrete structures,
- corrosion of metal parts,
- damage to pumping stations,
- damage to manholes.

This directly extends the lifespan of the infrastructure.

OBSERVED EFFECTS

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

Decomposition of fats and organic deposits
Fats represent one of the biggest problems in sewage systems.

BCx400 promotes the development of microorganisms that participate in the decomposition of:

- fats,
- proteins,
- starch,
- cellulose,
- organic deposits.

As a result, the risk of:

- blockages in pipelines,
- reduced flow,
- overloading of pumping stations,
- the formation of anaerobic pockets is reduced.



OBSERVED EFFECTS

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

Impact on pathogenic bacteria

Pathogenic bacteria often develop within biofilms and anaerobic zones in sewage systems.

By improving the biological balance and increasing competition among beneficial microorganisms, conditions for excessive growth are reduced:

- Escherichia coli,
- Salmonella spp.,
- Shigella spp.,
- Enterococcus spp.,
- Clostridium spp.

Impact on viral loads

Viruses in sewage systems typically attach to suspended particles, organic deposits, and biofilms.

Reducing the amount of biofilm and improving the biological activity of the system decrease potential sites for retaining viral particles.

This includes reducing risks associated with:

- enteroviruses,
- adenoviruses,
- noroviruses,
- rotaviruses,
- coronaviruses,
- other fecally transmitted viruses.



It is important to emphasize that BCx400 is not a traditional disinfectant, but rather creates conditions that will, in the long term, reduce the environment's suitability for the development of pathogens.

OKOLJSKI POMEN

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

The use of BCx400 represents an important step toward sustainable management of municipal systems.

Advantages include:

- reduced use of chemicals,
- reduction of odor emissions,
- improvement of air quality,
- reduction of impacts on surrounding residents,
- improved operation of the sewer network,



CONCLUSION

Pilot Project for the Biological Remediation of the Kaštel Novi Sewer Network

The pilot project in Kaštel Novi demonstrated that BCx400 not only acts as a means to reduce unpleasant odors.

The results indicate a comprehensive impact on the sewer ecosystem, including:

- odor reduction,
- reduction of H₂S formation,
- reduction of biofilm,
- breakdown of fat deposits,
- reduction of organic sediments,
- improvement of system flow,
- reduction of conditions for pathogenic bacteria development,
- reduction of potential viral reservoirs,
- reduction of corrosion processes,
- enhancement of the overall biological balance of the system.

Based on the testing results, BCx400 proves to be an effective, sustainable, and environmentally acceptable technology for managing next-generation sewer systems.

Report author:

EKO GEA d.o.o.

Center for Biological Technologies and Sustainable Solutions for Sewer Systems | 2026

05

MICROBIOLOGICAL EFFECTS

Based on observations and the properties of the BCx 400 preparation, a reduction in the presence of certain bacterial groups and potentially viral loads in water and the sea was also detected.

The following positive changes were also observed through testing:



Very important information!



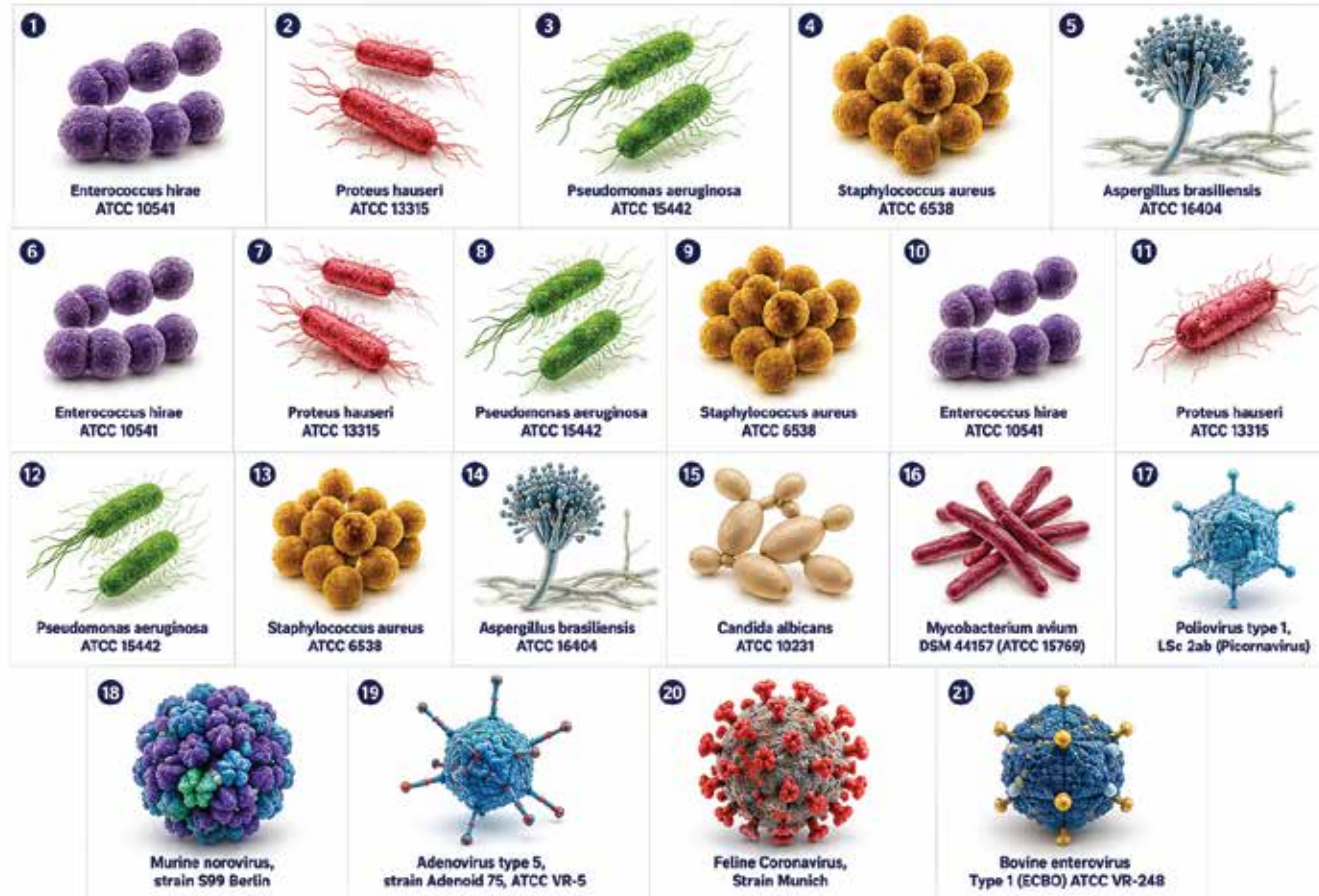
The occurrence of superbacteria in the sewer system is reduced, as there is no opportunity for development.

Microbiological activity table of the prepara-

Test	Organism	Contact time (mins)	Product Concentration %	Log reduction	Percentage reduction
EN 1656:2019	<i>Enterococcus hirae</i> ATCC 10541	60	10	5.00	99.999
	<i>Proteus hauseri</i> ATCC 13315	60	10	5.00	99.999
	<i>Pseudomonas aeruginosa</i> ATCC 15442	60	10	5.00	99.999
	<i>Staphylococcus aureus</i> ATCC 6538	60	10	4.42	99.996
EN 1657:2016	<i>Aspergillus brasiliensis</i> ATCC 16404	60	10	1.66	97.810
	<i>Candida albicans</i> ATCC 10231	60	10	4.00	99.990
EN 14349:2012	<i>Enterococcus hirae</i> ATCC 10541	60	10	4.00	99.990
	<i>Proteus hauseri</i> ATCC 13315	60	10	4.00	99.990
	<i>Pseudomonas aeruginosa</i> ATCC 15442	60	10	1.40	96.010
	<i>Staphylococcus aureus</i> ATCC 6538	60	10	2.40	99.600
EN 16437:2014+A1:2019	<i>Enterococcus hirae</i> ATCC 10541	60	10	2.47	99.660
	<i>Proteus hauseri</i> ATCC 13315	60	10	1.95	98.870
	<i>Pseudomonas aeruginosa</i> ATCC 15442	60	10	0.48	66.880
	<i>Staphylococcus aureus</i> ATCC 6538	60	10	1.05	91.080
EN 16438:2014	<i>Aspergillus brasiliensis</i> ATCC 16404	60	10	0.44	63.69
	<i>Candida albicans</i> ATCC 10231	60	10	3.00	99.90
EN 14204:2012	<i>Mycobacterium avium</i> DSM 44157 (ATCC 15769)	60	10	4.00	99.99
EN14476:2013+A2:2019	<i>Poliovirus type 1, LSc 2ab (Picornavirus)</i>	120	10	2.67	99.79
	<i>Murine norovirus, strain S99 Berlin</i>	120	10	3.33	99.95
	<i>Adenovirus type 5, strain Adenoid 75, ATCC VR-5</i>	120	10	2.58	99.74
	<i>Feline Coronavirus, Strain Munich</i>	120	5	4.00	99.99
EN14675:2015	<i>Bovine enterovirus Type 1 (ECBO) ATCC VR-248</i>	120	10	1.92	98.80



BACTERIA - FUNGI AND YEAST - VIRUSES



5.1 BACTERIA



Enterococcus hirae ATCC 10541

Type of organism

Gram-positive bacterium

Description

Enterococcus hirae belongs to the group of enterococci, which are often found in municipal wastewater and fecal discharges. Due to its ability to survive in various environmental conditions, it is often used as an indicator of fecal pollution.

Occurrence

- Municipal wastewater
- Sewage networks
- Treatment plants
- Fecal discharges

Environmental significance

The presence of the bacterium indicates fecal pollution and the potential presence of other pathogenic microorganisms.



Proteus hauseri ATCC 13315

Type of organism

Gram-negative bacterium

Description

Proteus hauseri is a highly motile bacterium known for its biofilm formation and ability to colonize wet surfaces. It is commonly found in wastewater and sediments.

Occurrence

- Sewage systems
- Industrial wastewater
- Sediments
- Biofilms

Environmental significance

Contributes to the formation of biofilms and unpleasant odors in sewage systems.



Pseudomonas aeruginosa ATCC 15442

Type of organism

Gram-negative bacterium

Description

Pseudomonas aeruginosa is considered one of the most important opportunistic bacteria in aquatic environments. It is characterized by its exceptional adaptability and ability to develop resistance to numerous antibiotics.

Occurrence

- Sewage
- Treatment plants
- Industrial systems
- Cooling towers

Environmental significance

An important cause of biofilms and one of the most frequently monitored microorganisms in assessing the effectiveness of remediation procedures.

5.1 BACTERIA



Staphylococcus aureus ATCC 6538

Type of organism

Gram-positive bacterium

Description

Staphylococcus aureus is one of the most commonly used reference microorganisms in disinfectant testing.

Occurrence

- Municipal wastewater
- Healthcare facilities
- Surface water

Environmental significance

Some strains are resistant to antibiotics and pose a significant health challenge.



Mycobacterium avium DSM 44157 (ATCC 15769)

Type of organism

Mycobacterium

Description

Mycobacterium avium is an extremely resistant microorganism with a thick cell wall, making it more difficult to remove than most common bacteria.

Occurrence

- Water
- Sediments
- Biofilms

Environmental significance

It is often used as an indicator of the effectiveness of more complex disinfection processes.



ADVANCED BIOLOGICAL TECHNOLOGY BCx400 FOR EFFICIENT SEWERAGE SYSTEMS



5.2 FUNGI AND YEAST



Aspergillus brasiliensis ATCC 16404

Type of organism

Mold

Description

Aspergillus brasiliensis produces large quantities of spores that are easily spread through air and water.

Occurrence

- Humid environments
- Sewage facilities
- Waste water

Importance for the environment

An important indicator of the effectiveness of antifungal procedures.



Candida albicans ATCC 10231

Type of organism

Yeast

Description

Candida albicans is one of the most common yeasts in the environment and in humans.

Occurrence

- Municipal wastewater
- Hospital systems
- Biological treatment plants

Environmental significance

Represents an important indicator of the effectiveness of remediation procedures.

TREATMENT TIME

- ✓ Activation of the biological process
- ✓ Optimization of the system
- ✓ Cleaner and more stable wastewater
- ✓ Efficient and fast operation



SUPERBACTERIA IN WASTEWATER

 Superbacteria are present in sewage and wastewater.

 They are resistant to multiple antibiotics.

 This makes infections harder to treat and a serious threat to human health and the environment.



Risk to
human health



Contaminated
water



Environmental
impact



Harder to
treat infections



BCx400 creates an environment where super-bacteria have no opportunity to thrive.

With the power of advanced biotechnology, BCx400 creates conditions in which resistant microorganisms develop more slowly, while beneficial bacteria take on a key role in maintaining system stability.

Natural defense against super-bacteria!

5.3 VIRUSES



Poliovirus Type 1 (LSc 2ab)

Type of organism

Virus

Description

A classic representative of enteric viruses that are transmitted through water.

Importance

Used to assess the effectiveness of removing viruses from wastewater.



Murine Norovirus S99 Berlin

Type of organism

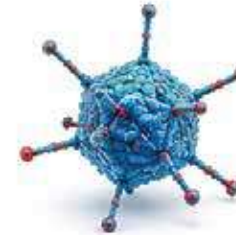
Virus

Description

A model virus used to study the persistence of noroviruses in the environment.

Importance

Often used in the validation of disinfection procedures.



Adenovirus Type 5 (ATCC VR-5)

Type of organism

Virus

Description

A very resistant virus that can survive for a long time in aquatic environments.

Importance

A key indicator of disinfection effectiveness.

5.3 VIRUSES



Feline Coronavirus – Strain Munich

Type of organism

Coronavirus

Description

A coronavirus representative used in research on virus persistence in water.

Importance

A model for assessing removal of enveloped viruses.



Bovine Enterovirus Type 1 (ECB0) ATCC VR-248

Type of organism

Virus

Description

An enteric virus of cattle with high persistence in the environment.

Importance

An important model virus in studies of wastewater treatment.

5.4 CONCLUSION

Presence of bacteria, fungi, yeasts, and viruses in wastewater presents an important challenge for both sewage systems and treatment plants.

Effective management of microbiological risks requires a combination of advanced biological procedures, continuous monitoring, and long-term solutions to reduce environmental impacts.

EKO GEA d.o.o. develops innovative biological solutions to improve the functioning of sewage systems, reduce biofilms, unpleasant odors, and optimize biological processes in wastewater.



06

EXPERT ASSESSMENT

The test results confirm the potential for use in:

- ✓ municipal sewage systems,
- ✓ pre-treatment of wastewater,
- ✓ reducing fats and bio-deposits/bio-sludge,
- ✓ optimizing the operation of wastewater treatment plants,
- ✓ reducing odors and organic pollution.

It is important to emphasize that the test was carried out:

- ✓ in a heavily burdened sewer system that has been in operation for many years,
- ✓ under real flow conditions,
- ✓ within a very short time period of only 150 minutes.

Despite this, already in the first hours, significant positive changes in water parameters were observed, confirming the rapid response of the BCx400 dosing.





BCx400

ADVANCED BIOLOGICAL PREPARATION

BCx400 is a concentrated biological preparation based on active components from pure sea algae. It is specially formulated for use in sewage systems.



ADVANCED BIOLOGICAL TECHNOLOGY BCx400 FOR EFFICIENT SEWERAGE SYSTEMS



07

THANK YOU TO PARTICIPANTS

Special thanks to the teams of the company “Vodovod i Kanalizacija Split d.o.o.” for quickly organizing and providing effective logistical support for water delivery and technical assistance during the entire testing process.

Their professionalism, responsiveness, and cooperation significantly contributed to the successful completion of the project.



ADVANCED BIOLOGICAL TECHNOLOGY BCx400 FOR EFFICIENT SEWERAGE SYSTEMS





International recognition for innovative sustainable technologies and biological solutions of the future.

Nutreco Feed & Food Tech Challenge is an international program and competition organized by the Dutch group Nutreco, aimed at recognizing and supporting breakthrough technologies in sustainable food, biotechnology, aquaculture, and the circular economy.

Being selected as a finalist or receiving an award means the solution is recognized as innovative and promising by leading industry experts.

AD AND BIOGAS INDUSTRY AWARDS 2019

We won “best Biogas Plant 2019” at the AD and Biogas Industry Awards

International recognition for excellence and innovation in the fields of biogas, waste management and sustainable environmental solutions.

The AD & Biogas Industry Awards are organised by the Anaerobic Digestion and Bioresources Association and the World Biogas Association. The awards are considered one of the most important international recognitions in the field of anaerobic digestion, biogas, waste management and the circular economy.

They are intended for projects and technologies that demonstrate exceptional results in the field of environmental efficiency and sustainable development.



IMAGINE { } H₂O

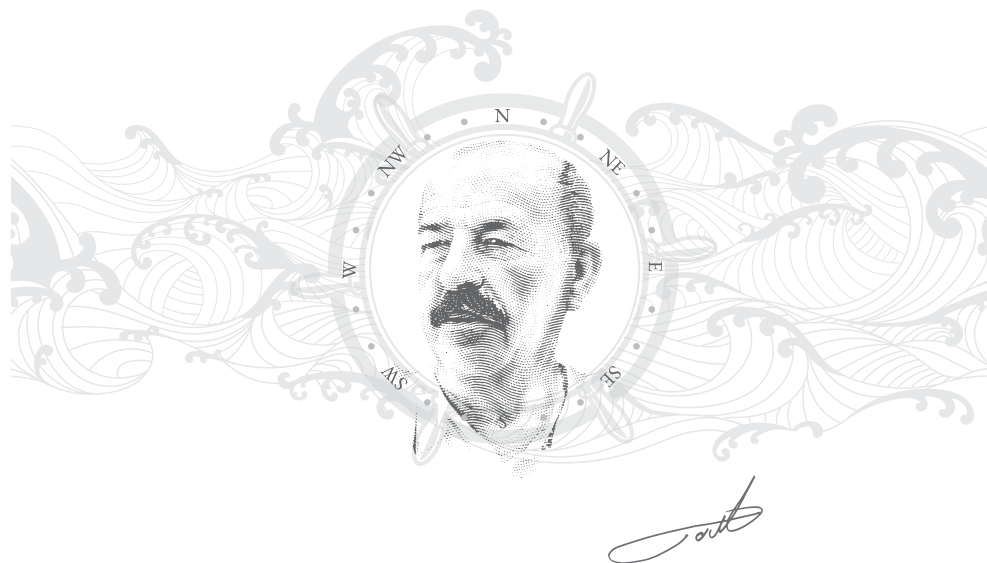
We've won a place in 2019 Imagine H2O Asia for our novel anaerobic wastewater treatment technology.

Global recognition for innovative technologies in the fields of water, wastewater and sustainable water resource management.

Imagine H2O is one of the world's leading water technology accelerators. The program supports the development of innovations in water treatment, wastewater, water reuse and environmental technologies. Selected solutions gain international recognition, expert mentorship and access to investors and industry partners.



Special thanks are given to Goran Đorđić for his exceptional dedication, professionalism, and persistent efforts in the research work. His valuable contribution, analytical approach, and willingness to share knowledge and experience significantly contributed to the quality and successful execution of the research.



BCX400

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