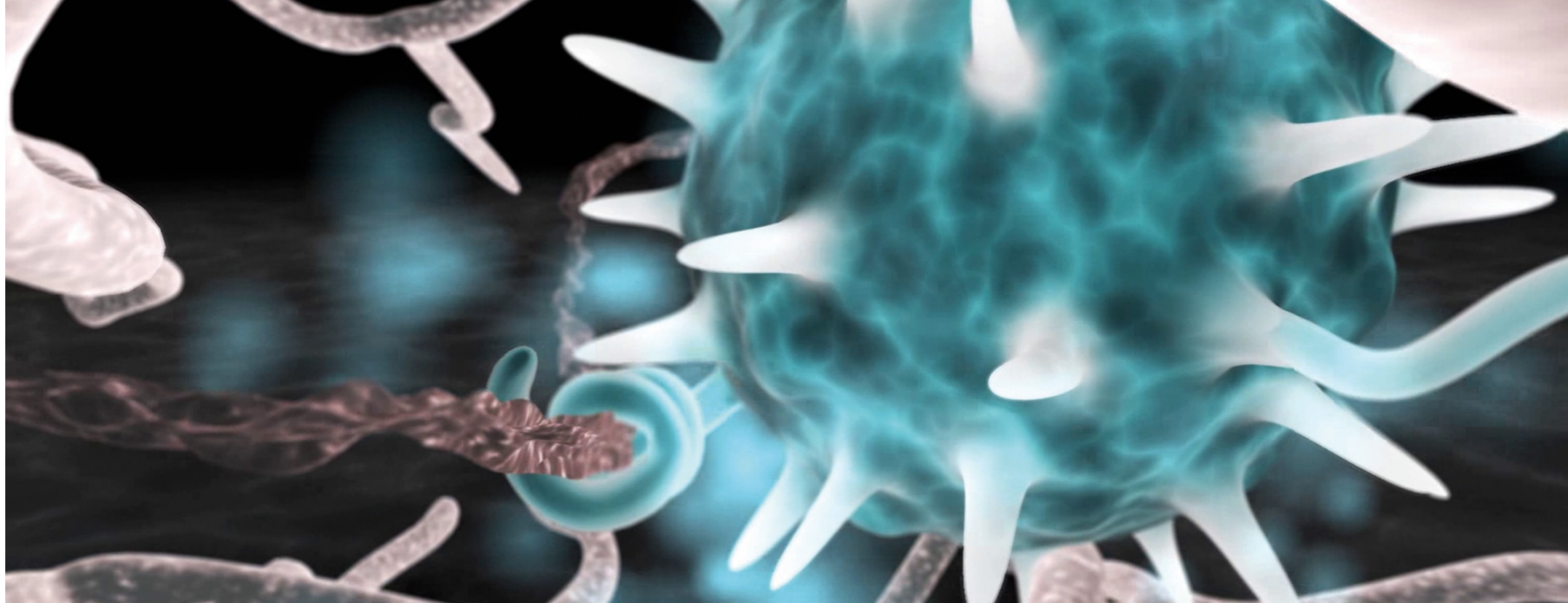


PATENT: CZ302297

Usage of microorganism *Pythium oligandrum* M1 for elimination of moulds on the walls is protected by patent.

BIOPREPARÁTY, spol. s r.o.
Tylišovská 772/1
Dejvice - Prague 6
160 00
Czech Republic

Office & mailing address:
BIOPREPARÁTY, spol. s r.o.
Úherce 1
440 01 Louny 1
Czech Republic
Mobile: +420 773 796 890
E-mail: biopreparaty@biopreparaty.eu



BIOREPEL®

*Pythium
oligandrum*

BIOPREPARÁTY, spol. s r.o.
biopreparaty@biopreparaty.eu



EUROPEAN UNION
European Regional Development Fund
Operational Programme Enterprise
and Innovations for Competitiveness

- Microorganism *Pythium oligandrum* – a new biocidal active substance in the European Union.
- A biotechnology that eliminates moulds without a chemical.
- The safest technology on the market today.
- New and unique biocide in the European Union.
- New and unique biocide to the world.

*Pythium
oligandrum*



Table of Contents

Typical Effects of Mould Exposure	3
The Four Most Common Genera of Household Mould	3
<i>Aspergillus</i> and <i>Alternaria</i>	4
<i>Cladosporium</i> and <i>Penicillium</i>	5
<i>Pythium oligandrum</i> – active substance in BIOREPEL®	6
Product Description	8
Product Overview	9
Expected Results 1	10
Expected Results 2	11

The Four Most Common Genera of Household Mould

*Pythium
oligandrum*

Mould is all around us on this planet. It is an important part of our ecosystem, but in our homes mould can cause problems to our living environment and our health. For this reason it is important to be aware of the areas of our home where mould can form. When mould is discovered, take action immediately. Remove the mould, and, if possible, fix the supply of moisture. In our ecosystem, mould has an important job. Mould functions to accelerate decay of organic matter so that the components may be recycled.

It is not a good thing when mould starts to grow in our homes. Unfortunately, in a home mould will perform the same function as it does in nature. This means it might break down and decompose various objects (not only food) in our homes if left untreated.

The study of mould is one of the more daunting frontiers of science. Scientists have estimated there are many varieties of mould, but only a fraction of known species have been identified and scientifically described. There are many different types of mould found in homes, and some are more common than others. The four most common types of mould found in homes are *Cladosporium*, *Penicillium*, *Aspergillus* and *Alternaria* species.

Typical Effects of Mould Exposure

The problems with moulds usually begin when mould spores get inside and grow where moisture is present. Homeowners who have mould growth must kill and remove it, then repair the cause of moisture to prevent mould from returning in the future.

Homes with moisture problems often have mould growth on their walls and ceilings and underneath carpet. Since mould spores require moisture to thrive, damp rooms such as basements, kitchens, laundry rooms and bathrooms are usually where moulds occur. Mould growth may have a dank or musty smell and is visible on drywall and other surfaces. While killing mould is important, it must be removed because dead mould spores as well as live ones can cause adverse health effects as mentioned below. Mould also damages the surfaces on which it grows on after an extended period of time, which can require homeowners to make costly repairs to wood or drywall.

Moulds and mould spores may have adverse effects on human health. A range of symptoms and diseases that may be caused by moulds include **respiratory problems** (wheezing, asthma attacks etc.), **nasal and sinus congestion or dry, hacking cough, eye irritation** (burning, watery, redness), **nose or throat irritation** (sneezing fits, blood noses), **skin irritations** (rashes or hives). Further problems include **affections of the nervous system** (headaches, memory loss, mood changes, depressions) and aches and pains.

Aspergillus and Alternaria

Aspergillus

Aspergillus is one of the most common moulds, and one of the most dangerous. This fast-growing mould often appears after a flood or a large plumbing leak, but it can also form anywhere where there is extremely high humidity and organic matter for the mould to use as a food source.

Aspergillus, like many other moulds, produce dangerous substances known as mycotoxins. While this mould presents the greatest risk to those who are immunosuppressed, it could cause health problems to anyone. If you find *Aspergillus* in your home, it should be disposed of and treated immediately.

Alternaria

Though *Alternaria* is found mostly outside, this airborne mould can easily enter the home. *Alternaria* often settle in carpets, clothing and on flat surfaces. This mould does not need as much water as other moulds usually require, so it can grow also in less humid areas. It still thrives in moist areas; often found in structures that have sustained water damage from plumbing leaks and floods.

This mould has long hairs and looks like a velvety tuft. It can vary in color, ranging from dark green to brown. *Alternaria* produces mycotoxins, and its large spores have been known to cause respiratory problems like hypersensitivity pneumonitis. For this reason, *Alternaria* has been called "an asthma-causing mould."

Cladosporium and Penicillium

Cladosporium

Though *Cladosporium* species are more commonly found outdoors, they can thrive in any damp, dark environment such as air conditioning systems, or bathroom ceilings with insufficient ventilation. They can also appear on walls and wallpaper in rooms lacking insulation, on foundation walls, basement crawlspaces and attics. If you find small, black, pepper-like mould in your home, it is most likely *Cladosporium*.

Though *Cladosporium* is not considered toxic, it can cause severe reactions to those with allergies, asthma or sensitive immune systems. These individuals should do their best to avoid contact with this variety of mould. Because *Cladosporium* is an airborne mould, it can be very difficult to eliminate completely.

Penicillium

Penicillium is commonly found on moist, dead organic matter in the outdoors. This common type of household mould is what we recognize as that green, white or blue fuzz that grows on our food. Eating food with *Penicillium* can cause severe gastric irritation, and its airborne spores can cause allergic reactions, such as nasal congestion, watery eyes and coughing.

Penicillium can also grow in other areas of the home, such as in air conditioning systems, moist areas such as cellars, basements, the bottom of closets and furniture, particularly if mould spores are in the carpet or flooring.



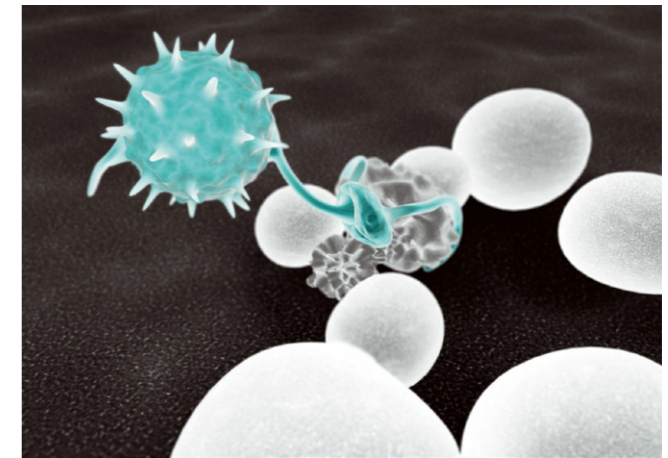
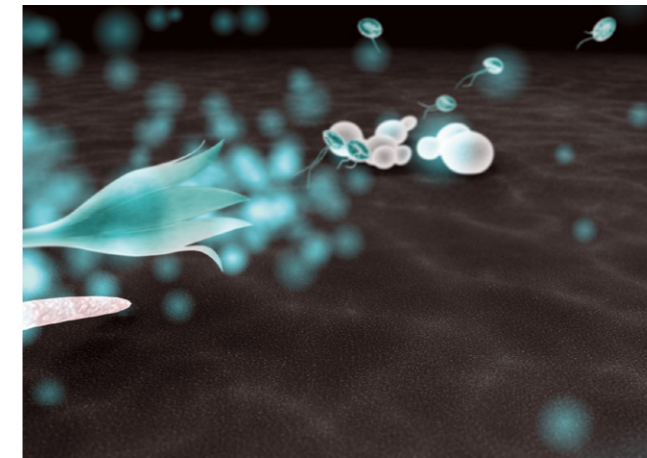
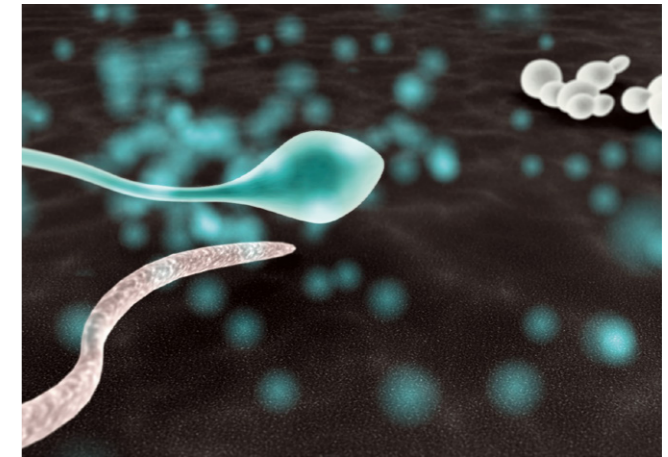
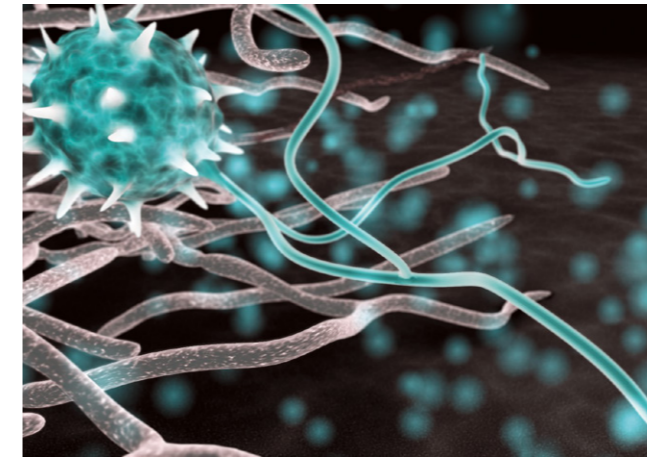
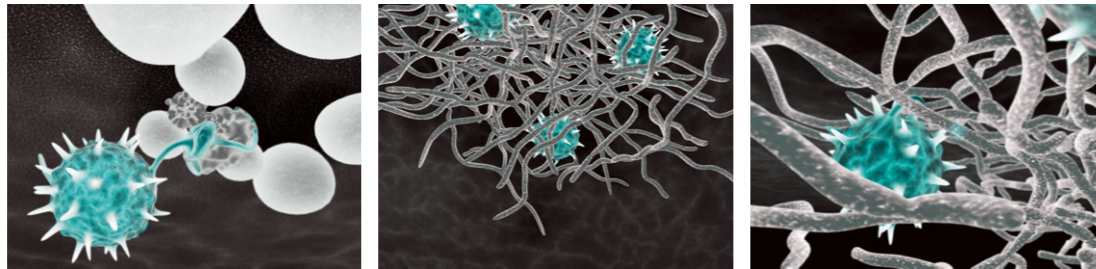
Pythium oligandrum – active substance in BIOREPEL®

Pythium oligandrum is a microscopic fungus that was discovered between the years of 1930–1932 by American scientist Charles Dreschler. In 1965, effective strains of *Pythium oligandrum* were isolated from the soil by Czech scientist Dáša Veselý, who dealt mainly with plant protection.

Pythium oligandrum parasitically consumes other microscopic fungi and uses them for its maintenance and survival. *Pythium oligandrum* penetrates with its parasitic hyphae into the microorganism and withdraws nitrogen, carbon and sterols for use in its own reproduction.

Due to its specific characteristics, this organism is classified in the kingdom Stramenopila – Alveolata – Rhizaria (SAR). *Pythium oligandrum* produces zoosporangia containing 8 to 40 moving zoospores that actively seek the parasitic fungi.

Besides formation of fungal filaments and characteristic spiny oospores, *Pythium oligandrum* produces different enzymes during its metabolism. Enzymes are primarily aimed at facilitating the penetration of hyphae into the fungal microorganisms. The moment *Pythium oligandrum* has nothing left to feed on it becomes dormant sustaining its ability for survival and re-expansion.





Product Description

Microorganism *Pythium oligandrum* M1 is approved as an active substance for the use in biocidal product – COMMISSION IMPLEMENTING REGULATION (EU) 2015/1610 of 24th September 2015

Composition: The biocidal product BIOREPEL® is composed of technical grade *Pythium oligandrum* and inorganic carrier silicon dioxide.

Active substance: *Pythium oligandrum* M1

Appearance: The product is a whitish water dispersible powder and due to its microbiological composition it has a slightly fungi-like odour.

Intended Product Use: The intended use of BIOREPEL® is for the effective treatment of moulds growing on walls or plaster. It can also be used as a preventive treatment against moulds growing on clean walls or floors.

- Packaging:**
1. BIOREPEL® is packaged in 0,5l PE spray bottle that contains the preparation as per above. Add 450 ml water before use.
 2. BIOREPEL® is packaged separately in two PE/PET plastic bags. Can be used as a refill to 0,5l PE spray bottle.

Self life: 2 years from date of production

Storage: Store in a dry place at a room temperature approx 25°C and a relative humidity of up to 40 %. Store in the original, sealed package.

Labelling: BIOREPEL® – is not hazardous material.

Licence Number: CZ-0017268-0000

Product Overview

*Pythium
oligandrum*

BIOREPEL® is a unique preparation representing new possibilities in fighting undesired influences of mildew on walls and plaster of the brick buildings. Its specific composition of micro-organisms isolated from natural substrates suppresses the undesirable mildew based on the principle of interspecies parasitism (where one fungus is parasitic on another). By its activity, it is also able to root out "mycelium" of mildew growing not only on the plaster, but also in or under it in the walls. After its elimination, the biological process is aborted. The preparation is activated with lukewarm clean drinking water and application of the prepared solution on the mouldy walls according to the instructions. The time after activation should not exceed two hours. Without observing these conditions, Bio Repel is not able to trigger its mechanism of performance.

BIOREPEL® is not a chemical preparation, but a biological one and not only removes the mildew from the walls but it also prevents resistance and has a lasting effect added to paints. The active microflora of the preparation does not contaminate the air, and is not pathogenic for the plants, animals or humans. As it is not harmful in any way, it is an important contribution to the treatment of both residential or production areas, for example in food industry. During the use of Bio Repel, no side or undesirable effects were found. Bio Repel was tested under the supervision of the best experts in accredited laboratories.

Expected Results 1

3 months after application of BIOREPEL®

Aspergillus niger

Cladosporium spp.

Penicillium spp.



A: control – water only
B: BIOREPEL® 1g / L
C: BIOREPEL® 2g / L
D: BIOREPEL® 3g / L

Expected Results 2

Pythium oligandrum

6 months after application of BIOREPEL®

Aspergillus niger

Cladosporium spp.

Penicillium spp.



A: control – water only
B: BIOREPEL® 1g / L
C: BIOREPEL® 2g / L
D: BIOREPEL® 3g / L